



Risk of sexually transmitted infections and violence among indoor-working female sex workers in London: the effect of migration from Eastern Europe

Lucy Platt,¹ Pippa Grenfell,¹ Chris Bonell,¹ Sarah Creighton,² Kaye Wellings,¹ John Parry,^{1,3} Tim Rhodes¹

► An additional appendix is published online only. To view this file please visit the journal online (<http://sti.bmj.com>).

¹Centre for Research on Drugs and Health Behaviour, Department of Social and Environmental Health Research, London School of Hygiene and Tropical Medicine, London, UK
²Department of Sexual Health, Homerton University Hospital, London, UK

³Virus Reference Department, Centre for Infections, Health Protection Agency, London, UK

Correspondence to

Dr Lucy Platt, Department of Social and Environmental Health Research, London School of Hygiene and Tropical Medicine, 15–17 Tavistock Place, London WC1H 9SH, UK; lucy.platt@lshtm.ac.uk

Accepted 9 April 2011
Published Online First
14 May 2011

ABSTRACT

Objectives To examine risk factors associated with HIV and sexually transmitted infections (STIs) and experience of physical and sexual violence among sex workers in London, with a particular focus on differences in risk between migrants from Eastern Europe (EE) or the Former Soviet Union (FSU) and UK-born sex workers.

Methods The authors conducted a cross-sectional survey of sex workers born in the UK, EE or FSU (n=268), collecting behavioural data, testing for antibodies to HIV and *Treponema pallidum*, and testing for infection with *Chlamydia trachomatis* or *Neisseria gonorrhoea*.

Findings Migrants were younger, saw more clients, and were less likely to use contraception; few reported being coerced into sex work. Overall, prevalence of HIV was 1.1% (95% CI –0.1% to 2.4%), prevalence of syphilis was 2.2% (95% CI 0.4 to 4.0%), and prevalence of infection with chlamydia or gonorrhoea was 6.4% (95% CI 3.2% to 9.6%). Risk factors associated with any infection included having no contact with an outreach worker, age, and having a non-paying sex partner. Increased risk of physical violence from clients was associated with a history of imprisonment or arrest and having a non-paying sex partner.

Conclusion Findings suggest an association between outreach services and reduced risk of STIs and between having non-paying partners and increased risk of STIs. Findings also suggest an association between enforcement policies, such as arrest or imprisonment, and drug use and increased risk of physical violence. Interventions are needed to expand outreach, improve uptake of contraceptives for migrants, and reduce levels of violence for all women.

INTRODUCTION

Studies in the UK and Europe have reported exploitation, violence, drug use and sexual risk behaviours associated with sex work.^{1–2} It is not clear how or indeed whether migration increases vulnerability to these and other adverse outcomes. International studies from high- and middle-income countries have shown higher rates of HIV and other sexually transmitted infections (STIs) among migrant than non-migrant sex workers,^{3–4} as well as increased drug use,⁵ termination of pregnancies,⁶ anal sex and unprotected sex,⁷ factors associated with increased risk of HIV and STI. Other evidence suggests that migrant sex workers are no more likely to engage in risk behaviours than indigenous sex workers.⁸

In the UK, sex worker support services report marked increases in the proportion of migrant women working in the UK sex industry, coinciding largely with the expansion of the European Union. This is particularly the case in London, where an estimated 76% of service users are migrants, of which approximately half are women from Eastern Europe (EE) or the Former Soviet Union (FSU).⁹ Evidence suggests that migrants' experience of sex work is heterogeneous, with some women at risk of poor sexual health and other harms due to exploitation, illegal immigration status or limited language skills, limiting negotiation of sexual services with clients and access to social and medical services.^{10–12} Others suggest that stigma attached to sex work, compounded by illegal immigration status, increases vulnerability to violence and crime.^{13–14} In response to reported increases in trafficking of women into sex work, the 2009 Policing and Crime Act made paying for sex with someone who is forced to work for the financial gain of a third party a criminal offence.¹⁵ The policy has raised concerns that sex work will be driven further underground as a result, with some research showing that criminalisation and enforcement-based approaches towards sex work can increase risk of both physical and sexual violence against women.^{16–17}

Given the large numbers of women from EE/FSU working in the sex industry in the UK relative to other migrant groups and the limited data on their risk profile and situation, we undertook a survey of EE/FSU migrant and UK-born indoor female sex workers in London. We set out to: describe the sociodemographic profile of female sex workers migrating from EE and FSU compared with those born in the UK; explore the circumstances and organisation of their sex work; assess whether sexual risk behaviours, access to health services and harms associated with sex work were more prevalent among migrant than non-migrant sex workers; and examine which factors were associated with increased risk of STI and HIV and recent experience of physical violence from clients. While we acknowledge that migrant sex workers' experience is heterogeneous and will depend on multiple factors including immigration status and levels of autonomy or coercion, we used a broad definition of both consensual and forced sex work, illegal and legal status, in order to examine how different aspects of sex work and migration may interact with risk in women's specific work environments and circumstances.¹⁸

METHODS

Between September 2008 and July 2009, we undertook a cross-sectional survey of EE/FSU-born and UK-born women selling sex in indoor locations in London. To be eligible, women must have exchanged sex for money, drugs or goods in the preceding 4 weeks from an indoor location, self-identify as having been born in an EE/FSU country or the UK, and be willing to provide oral fluid samples for HIV and *Treponema pallidum* antibody testing as well as self-administered vulvovaginal swabs to test for *Neisseria gonorrhoea* and *Chlamydia trachomatis*. Informed consent was gained from all participants, using translated written information and interpreters as appropriate.

Recruitment

A team of 15 field workers recruited participants from a variety of settings throughout London. These included clinical, drop-in and outreach sessions run by three specialist sex worker projects within the NHS (Praed Street Project, CLASH, Open Doors), saunas, massage parlours, escort agencies and flats where sex was sold, identified via the internet, newspaper, magazine and shop window advertisements. Women participating in the study were asked to invite other female sex workers from EE/FSU or the UK to take part.

Field workers were postgraduate students, employees of sex worker and drug service organisations, and women with experience of working in the sex industry.

Behavioural data

The questionnaire was designed using SNAP survey software (Snap Surveys 9, Portsmouth, New Hampshire, USA) and administered via computer-assisted survey interviewing (CASI) using hand-held computers, self-completed by participants. Data were collected on: sociodemographic characteristics; migration to the UK; entry into sex work and sex work organisation; sexual risk behaviours with clients and non-paying partners; experiences of violence, alcohol and drug use; health service use; contact with police and immigration; and social support networks. The questionnaire was available in English, Albanian, Latvian, Lithuanian, Polish, Romanian and Russian. Interviews were conducted in working flats and saunas, at sex worker support projects or in cafes and lasted ~40 min. All participants were offered £20 (either in cash or voucher for a high street shop) in appreciation of their time. A full description of all data collection and informed consent procedures, as well as the analytical approach, is included in an online appendix.

Biological data

The OraSure device (OraSure Technologies Inc, Bethlehem, Pennsylvania, USA) was used to collect oral fluid samples. The Murex ICE syphilis assay (Abbott/Murex, Dartford, UK; modified for use with oral fluids by UK's Health Protection Agency) was used to test for antibodies to *T pallidum*. For testing antibodies to HIV, an in-house version of the Abbott/Murex GACELISA HIV 1+2 enzyme immunoassay was used.¹⁹ This test was non-diagnostic; however, all participants were given information on local genitourinary medicine (GUM) clinics and encouraged to attend for a complete STI screen. Self-administered diagnostic tests collected through vaginal or vulval swabs (Becton Dickinson, Franklin Lakes, New Jersey, USA) were used to test for *C trachomatis* and *N gonorrhoea*. The sensitivity and specificity of these tests have been shown to be high, approaching 97.3% and 99.8%, respectively.^{20–22}

Ethics

The study was approved by the London School of Hygiene and Tropical Medicine's research ethics committee and the Camden and Islington research ethics committee and relevant site-specific ethics committees.

Analysis

We examined differences by migrant status in sociodemographic characteristics and circumstances of sex work using Pearson χ^2 tests (categorical variables) and two-sample Wilcoxon Mann–Whitney tests (continuous variables). We assessed associations between migration and adverse outcomes using multiple logistic regression adjusting for potential confounders: recruitment location, age, duration of time in sex work, and history of drug use.

We examined univariate and multivariate associations between various covariates and two outcomes—(i) single or co-infections with HIV, *T pallidum*, *C trachomatis* and *N gonorrhoea* and (ii) experience of physical violence from a client in the preceding 12 months—using multivariate logistic regression models. We used Wald tests to determine statistical significance. We followed a conceptual framework approach in conducting the multivariate analyses, whereby we classified variables into five groups ranging from more distal (sociodemographic indicators, organisation of sex work) to more proximal (sexual risk behaviours, use of services and adverse health outcomes) risk factors. Stata V.10 was used for all analyses.

RESULTS

Demographic characteristics

A total of 268 participants were recruited to the study, 61% of whom originated from EE/FSU. Thirty per cent of migrant women were from Romania, 19% from Lithuania, 17% from Poland, 7% from Latvia and Albania, 5.5% from the Czech Republic, and 4% from the Russian Federation. Two per cent or less originated from Bulgaria, Slovakia, Kosova, Estonia, Moldova, Serbia or Tajikistan. The median duration of time in the UK was 3 years (IQR 0.6–10) (data not shown). There was a high response rate of 89%; one woman declined because of fears for her personal safety.

Recruitment and sociodemographic characteristics by migration

Overall, a third of the sample was recruited from project drop-in services or outreach referrals, 40% via participants inviting members of their social networks, 20% via cold calling, and 10% through contacts of field workers. Proportionally more migrant sex workers were recruited via services than other methods (table 1). The median age was 26 years, and migrant women were significantly younger than UK-born women.

Circumstances and organisation of sex work

Migrant women more commonly cited financing their studies and saving money as their main financial motive for entering sex work, and UK-born women cited funding their social life. Ten per cent of UK-born women, but none of the migrant women, reported funding illicit drug use as their reason for entry. Few women reported being coerced into sex work (using the UN definition as made to work by someone or to give earnings to someone else²³), but this was more common among migrants. UK-born women had been selling sex for an average of two years longer than migrant women. More migrant than non-migrant women reported working via escort agencies and saunas, while the reverse was true for the combined category of work via bars, private calls, street-based and other locations. Both migrant and

Table 1 Characteristics and organisation of sex work by migration status among indoor-working sex workers in London recruited 2008–2009

	All		UK-born women		EE/FSU women		p Value*
	n/n	% or median (IQR)	n	% or median (IQR)	n	% or median (IQR)	
No of women interviewed (% of total sample)	268		105	39.2%	163	60.8%	
Recruitment method							
Project clinic/drop-in/outreach referral†	78/264	29.5%	6	5.7%	72	45.3%	
Social network referral	106/264	40.1%	55	52.4%	51	32.1%	
Cold call	52/264	19.7%	26	24.8%	26	16.4%	
Field worker's contact‡	28/264	10.6%	18	17.1%	10	6.3%	<0.001
Demographics							
Age (years)		26 (22–35)		33.5 (24–45)		25 (22–29)	<0.001
Education							
Attended higher education	56/245	22.9%	20	21.00%	36	24.0%	
Completed secondary education	175/245	71.4%	73	76.80%	102	68.0%	
Completed primary	14/245	5.7%	2	2.1%	12	8.0%	0.11
Accommodation in last 4 weeks							
Own home	149/254	58.6%	76	73.1%	73	47.4%	
Parents' home	26/254	10.2%	12	11.5%	14	9.1%	
Someone else's home	59/254	23.2%	9	8.6%	50	32.5%	
Other§	20/254	7.9%	7	6.7%	13	8.7%	<0.001
Have children	112/253	44.4%	66	66.0%	46	30.1%	<0.001
Organisation of sex work							
Main financial reason for entering sex work							
Household expenses/support family	123/248	49.6%	53	51.5%	70	48.3%	
Social life	31/248	12.5%	17	16.5%	14	10.0%	
Studies/saving	58/248	23.4%	13	12.6%	45	31.0%	
Drugs	10/248	4.0%	10	9.7%	0	0.0%	
Made to work by someone/give to other	13/248	5.2%	3	2.9%	10	6.9%	
Debts/survival/other¶	13/248	5.2%	7	6.8%	6	4.1%	<0.01
Duration in sex work (years)		3 (1–8)		5 (2–15)		3 (1–4)	<0.001
Where most often met clients in last 4 weeks							
Flat	160/254	63%	74	71.8%	86	56.9%	
Sauna	54/254	21.3%	10	9.7%	44	29.1%	
Escort	20/254	7.9%	4	3.9%	16	10.6%	
Bar/private/other**	20/254	7.9%	15	14.6%	5	3.3%	<0.001
Median % earnings kept for personal use on last working day		50 (50–75)		50 (50–75)		50 (50–80)	0.69
Lifetime experience of drug use for non-medical reasons††	103/249	41.4%	57	57.6%	46	30.7%	<0.001
Uses drugs‡‡ during or before sex work in last 4 weeks	45/250	18.0%	28	28.3%	17	11.3%	<0.001

*p Value derived from χ^2 tests or two-sample Wilcoxon Mann–Whitney tests. See online appendix for summary of sample size needed to detect a significant difference (80% power, 95% precision).

†10 People were recruited via outreach referrals.

‡This includes field workers' personal contacts or acquaintance and one recruit of unknown origin.

§Other includes: hotel (6), working flat (11), homeless hostel (1), council flat (1), unspecified (1).

¶Other defined as staying ahead/maintaining normal life (2).

**Other includes: street (3), regulars (1), variety (1).

††This includes injecting or non-injecting.

‡‡Drugs include: marijuana (10), ecstasy (1), opium (1), powder cocaine (20), crack (8), heroin (3), cocaine and heroin (1), prescription methadone (1).

non-migrant women kept a median of 50% of their earnings from the last day they worked for their personal use. More UK-born than migrant women reported past or recent drug use at work.

Potential harms by migration

Proportionally more migrant than UK-born women reported having 10 or more clients, and seven or more new clients, in the last seven days (table 2). Odds of having more clients and more new clients remained higher among migrant women after adjustment for age, drug use, duration in sex work, and recruitment location. Condom use was high with clients (although less consistent for oral sex), but low for last vaginal sex with non-paying partners; use did not differ by migrant status. Migrant women were less likely to use contraceptives than UK-born women. In the adjusted analysis, odds of not

using contraceptives were almost three times higher among migrant than UK-born women.

Proportionally more UK-born than migrant women had never had contact with a nurse or an outreach worker attached to a sex worker support service at their workplace; this difference remained significant in the adjusted model. A minority of women had not had an STI screen in the last six months. Although this did not differ significantly by migration, a quarter of migrant women reported using STI services abroad in the preceding 12 months (36/135). Proportionally more migrant than UK-born women had not had an HIV screen during the preceding 12 months nor were registered with a general practitioner (GP). Odds of not being registered with a GP remained significantly higher among migrant women in the adjusted analysis, but differences in HIV screening by migration became insignificant.

Table 2 Prevalence of potential harms among indoor-working sex workers and associations with migrant status

	Nationality						OR for EE/FSU migrants				p Value†
	All		UK-born		EE/FSU		Unadjusted		Adjusted*		
	n/n	%	n	%	n	%	OR	95% CI	OR	95% CI	
Sexual risk behaviours											
10 or more clients per week	98/188	52.1%	33	42.3%	65	59.1%	2.0	1.09 to 3.55	2.7	1.17 to 6.27	0.02
7 or more new clients per week	75/171	43.9%	25	33.8%	50	51.5%	2.1	1.12 to 3.90	3.2	1.26 to 8.19	0.02
Currently has non-paying sex partner	106/253	41.9%	47	45.6%	59	39.3%	1.3	0.78 to 2.15	1.2	0.58 to 2.35	0.66
Did not use condom the last time had vaginal sex with a client	2/252	0.8%	2	1.9%	0	0.0%					
Did not use condom the last time had oral sex with a client	51/248	20.6%	25	25.0%	26	17.6%	0.6	0.34 to 1.19	1.3	0.53 to 3.15	0.57
Did not use condom the last time had vaginal sex with a non-paying partner‡	156/225	69.3%	64	67.4%	92	70.8%	0.5	0.48 to 1.51	1.7	0.77 to 3.69	0.19
No contraceptives used in the last 4 weeks§	49/258	19.0%	13	12.5%	36	23.4%	2.1	1.07 to 4.26	2.8	1.06 to 7.56	0.04
Use of services											
Never been visited by an outreach worker/nurse at place of sex work	136/249	54.6%	65	65.0%	71	47.7%	0.5	0.29 to 0.83	0.4	0.19 to 0.81	0.01
No HIV test in the last 12 months	184/235	78.3%	64	69.6%	120	83.9%	2.28	1.22 to 4.28	1.9	0.81 to 4.53	0.14
No STI screen in the past 6 months	48/265	18.1%	20	19.1%	28	17.5%	0.9	0.48 to 1.70	1.1	0.44 to 2.50	0.91
Not registered with a GP	83/253	32.8%	4	4.0%	79	52.0%	26.2	9.19 to 74.9	21.1	6.33 to 70.1	<0.001
Adverse health outcomes											
Physical violence¶ from clients in the last 12 months	63/255	24.7%	26	25.2%	37	24.3%	0.9	0.53 to 1.70	0.9	0.35 to 1.73	0.55
Physical violence¶ from non-paying partners in the last 12 months	37/254	14.6%	17	16.5%	20	13.2%	0.8	0.38 to 1.56	0.7	0.28 to 1.96	1.45
Sexual violence** from clients in the last 12 months	38/255	14.9%	23	22.3%	15	9.8%	0.4	0.19 to 0.77	0.3	0.11 to 0.89	0.03
Sexual violence** from non-paying partners in the last 12 months	18/255	7.6%	11	10.7%	7	4.6%	0.4	0.15 to 1.07	0.2	0.12 to 1.47	0.15
Alcohol consumption†† audit score 3+	137/237	57.8%	73	73%	64	46.7%	0.3	0.19 to 0.56	0.4	0.19 to 0.88	0.02
Ever been arrested or imprisoned	53/262	20.2%	43	41.3%	10	6.3%	0.1	0.04 to 0.2	0.2	0.05 to 0.45	0.00
Biological data											
Any infection (HIV, <i>T pallidum</i> , <i>C trachomatis</i> , <i>N gonorrhoea</i>)	24/234	10.3%	6	6.5%	18	12.8%	2.1	0.81 to 5.56	1.7	0.46 to 6.57	0.41
HIV	3/268	1.1%	1	0.9%	2	1.2%	1.3	0.11 to 14.4	2.9	0.11 to 78.4	0.52
<i>T pallidum</i>	6/268	2.2%	2	1.9%	4	2.4%	1.3	0.23 to 7.2	1.1	0.1 to 17.7	0.96
<i>C trachomatis</i>	10/232	4.3%	3	3.3%	7	5.0%	1.6	0.39 to 6.2	0.7	0.11 to 4.3	0.69
<i>N gonorrhoea</i>	5/232	2.2%	0	0.0%	5	3.6%					
Current infection (<i>N gonorrhoea</i> and/or <i>C trachomatis</i>)	15/233	6.4%	3	3.3%	12	8.5%	2.8	0.76 to 10.1	1.6	0.32 to 7.79	0.58

*Model adjusted for age, duration of sex work, lifetime experience of drug use, recruitment location.

†p Value derived from Wald test.

‡Excludes respondents who have not had vaginal sex with a non-paying partner in the last 12 months.

§Participants were asked which methods of contraceptives they had used in the last 4 weeks from a wide range of hormonal and barrier methods; multiple responses were permitted and contraceptive was the third most commonly reported response.

¶Physical violence is defined as reporting one or more of the following incidences: being robbed, hit, beaten, threatened, attacked with a weapon, kidnapped.

**Sexual violence is defined as forced to have vaginal or anal sex or oral sex, gang raped, attempted anal or vaginal sex, touched against your will.

††Calculated on the basis of answers to first three questions of AUDIT questionnaire: How often do you have a drink containing alcohol? On a typical day when you are drinking, how many drinks containing alcohol do you have? How often do you have six or more alcoholic drinks on one occasion? A score of three or more suggests hazardous drinking.

GP, general practitioner; STI, sexually transmitted infection.

Overall, 58%, and proportionally more UK-born women than migrant women, scored three or above on the alcohol audit score,²⁴ indicating problematic drinking. After adjustment, odds of increased alcohol use remained lower among migrant women than UK-born women. A quarter of the sample reported experience of physical violence from clients in the last 12 months (15% from non-paying partners), and 8% reported sexual violence from non-partners; this did not differ by migration status. Proportionally fewer migrant women reported experience of sexual violence from clients in the same time frame.

Biological data

Overall, 10.3% (95% CI 6.3 to 14.2%) tested positive for *C trachomatis*, *N gonorrhoea* or antibodies to HIV or *T pallidum*, and, in total, 6.4% (95% CI 3.3 to 9.6%) had an acute infection (either

N gonorrhoea or *C trachomatis*). All cases of *N gonorrhoea* were among migrant women.

Risk associated with HIV and STI

Prevalence and odds of infection were significantly higher (although with wide CIs) among sex workers aged 23 and 26 years compared with younger women, and among those working independently compared with those working from a flat (table 3). Infection was also associated with currently having a non-paying sex partner and not being visited by an outreach worker. Decreased odds and prevalence of infection were associated with being recruited from outside health services.

The multivariate analysis confirmed the decreased odds of any infection among women aged 23–26 years compared with those aged 22 years or less, and increased odds among women who

Table 3 Risk factors associated with having antibodies to HIV, *T pallidum*, infection with *C trachomatis* or *N gonorrhoea* among indoor-working sex workers in London

	STI/HIV infection		Unadjusted model		Adjusted model†		p Value‡
	n*/n	%	OR	95% CI	OR	95% CI	
Demographic indicators							
Migrant status							
UK-born	6/93	6.5%	1.0		1.0		
Eastern Europe	18/141	12.8%	2.1	0.81 to 5.56	2.1	0.61 to 7.01	0.24
Recruitment method							
Outside of project¶	12/163	7.36%	1.0		1.0		
Project drop-in/outreach referral§	12/71	16.9%	3	1.11 to 6.12	1.7	0.59 to 4.98	0.32
Age (years)							
17–22	1/50	2.0%	1.0		1.0		
23–26	10/57	17.5%	10.4	1.28 to 84.6	12.3	1.44 to 105.1	
27–35	8/58	13.8%	7.8	0.94 to 65.1	6.7	0.76 to 58.9	
36+	4/60	6.7%	3.5	0.38 to 32.4	4.7	0.46 to 48.5	0.09
Organisation of sex work							
Main location of sex work							
Flat	11/141	7.7%	1.0		1.0		
Escort	5/42	11.9%	1.6	0.53 to 4.96	1.6	0.42 to 5.87	
Sauna	1/18	5.6%	0.7	0.08 to 5.81	0.4	0.04 to 3.61	
Bar/private/other**	4/17	23.5%	3.7	1.02 to 13.3	3.1	0.71 to 13.1	0.29
Duration in sex work							
2 years or less	8/83	9.6%	1.0		1.0		
3–5 years	7/66	10.6%	1.1	0.38 to 3.24	0.9	0.28 to 2.97	
6 years or more	5/65	7.7%	0.8	0.24 to 2.51	1.1	0.28 to 4.05	0.97
Sexual risk behaviours							
10 or more clients in last 7 days							
No	8/81	9.9%	1.0		1.0		
Yes	10/86	11.6%	1.2	0.45 to 3.21	1.3	0.42 to 3.78	
Don't know/no response	5/61	8.2%	0.8	0.25 to 2.62	1.1	0.32 to 4.14	0.92
Currently has non-paying sex partner?							
No	6/96	6.3%	1.0		1.0		
Yes	16/128	12.5%	2.1	0.881 to 5.7	3.0	1.03 to 8.73	0.05
Used condom at last oral sex with client							
Yes	16/171	9.4%	1.0		1.0		
No	6/47	12.8%	1.4	0.52 to 3.85	1.1	0.36 to 3.48	0.85
Used a condom at last vaginal sex with non-paying partner							
Yes	5/59	8.5%	1.0		1.0		
No	15/139	10.8%	1.3	0.45 to 3.78	1.1	0.32 to 3.63	
No vaginal sex with partner in last 12 months	2/21	9.5%	1.1	0.20 to 6.35	0.7	0.06 to 7.01	0.90
No contraceptive used in last 4 weeks							
No	18/184	9.8%	1.0		1.0		
Yes	23/44	11.4%	1.2	0.41 to 3.38	1.1	0.31 to 3.61	0.92
Use of services							
Ever been visited by an outreach worker/nurse at place of work							
Yes	6/101	5.9%	1.0		1.0		
No	17/118	14.4%	2.7	1.01 to 7.04	3.6	1.14 to 10.5	0.02
HIV test in the last 12 months							
Yes	4/48	8.3%	1.0		1.0		
No	17/159	10.7%	1.3	0.42 to 4.12	1.7	0.51 to 5.97	0.38
STI screen in the past 6 months							
Yes	16/189	8.5%	1.0		1.0		
No	8/45	17.8%	2.3	0.93 to 5.87	2.8	0.93 to 8.29	0.07
Registered with a GP							
Yes	13/151	8.6%	1.0		1.0		
No	10/72	13.9%	1.7	0.71 to 4.12	1.6	0.51 to 5.26	0.41
Adverse health outcomes							
Sexual violence†† from a client in last 12 months							
No	19/194	9.8%	1.0		1.0		
Yes	4/31	12.9%	1	0.43 to 4.32	2.1	0.56 to 7.80	0.28
Sexual violence from a non-paying partner in last 12 months							
No	21/211	10.0%	1.0		1.0		
Yes	2/14	14.3%	1.5	0.32 to 7.20	1.5	0.27 to 8.21	0.64

Continued

Table 3 Continued

	STI/HIV infection		Unadjusted model		Adjusted model†		p Value‡
	n*/n	%	OR	95% CI	OR	95% CI	
Alcohol audit score‡‡							
Scores <3	9/90	10.0%	1.0		1.0		
Scores 3+	13/121	10.7%	1.1	0.44 to 2.65	1.1	0.38 to 3.12	0.86
Used drugs during or before sex work in last 4 weeks							
No	17/181	9.4%	1.0		1.0		
Yes	5/39	12.8%	1.4	0.49 to 4.11	1.9	0.29 to 3.14	0.93
Ever been arrested or imprisoned							
No	18/183	9.8%	1.0		1.0		
Yes	6/48	12.5%	1.3	0.49 to 3.5	2.0	0.58 to 7.18	0.27

*This refers to single infections or in combination.

†Final model adjusted for age, contact with an outreach service, currently have a non-paying sex partner, recruitment location and migration status.

‡p Values derived from Wald tests.

§10 people were recruited via outreach referrals.

¶This includes cold calling, field workers' personal contacts or acquaintance or social network referrals and one recruit of unknown origin.

**1=regulars, 1='variety' (3=street omitted from risk factor analysis).

‡‡Sexual violence is defined as reporting one or more of the following incidences: forced to have vaginal or anal sex or oral sex, gang raped, attempted anal or vaginal sex, or touched against will.

‡‡‡Calculated on the basis of answers to first three questions of AUDIT questionnaire: How often do you have a drink containing alcohol? On a typical day when you are drinking, how many drinks containing alcohol do you have? How often do you have six or more alcoholic drinks on one occasion? A score of three or more suggests hazardous drinking or an active alcohol disorder. GP, general practitioner; STI, sexually transmitted infection.

currently had a non-paying sex partner and who had never been visited by an outreach worker at their place of work. Odds of infection were higher among migrant sex workers than UK-born women but remained insignificant, and no evidence of interaction was found between migration and other covariates. Duration of time in the UK was not associated with increased risk of infection (data not shown).

Risk associated with recent experience of physical violence from a client

The univariate analysis showed the prevalence and odds of physical violence were significantly higher among women who had a lifetime experience of arrest or imprisonment and among those who used drugs before work (table 4). After adjustment, odds of recent physical violence remained raised among those with a history of imprisonment or arrest. Odds of physical violence became significantly higher among those with a non-paying sex partner and significantly lower among those scoring three or more on the alcohol audit scale.

DISCUSSION

Key findings

Our study suggests differences in the characteristics and circumstances of London-based sex workers migrating from EE/FSU and those born in the UK. Migrants were younger and reported having more clients and a higher turnover of new clients, lower levels of contraceptive use, and less use of GP services or HIV screening. However, migrant sex workers' entry into sex work was more often to save or support studies and less often to fund illicit drug use or debts, possibly indicating lower vulnerability. Findings suggest that prevalence of HIV, *T pallidum*, *N gonorrhoea* or *C trachomatis* are higher but not significantly so among migrant women. Recent experience of physical or sexual violence from a client was commonly reported, but risk of sexual violence was lower among migrant women. Increased vulnerability to violence from clients was associated with use of drugs during or before work as well as a history of arrest or imprisonment.

Estimates of the prevalence of *C trachomatis* and *N gonorrhoea* are consistent with studies among London clinic-based samples of female indoor sex workers^{25 26} and low relative to other

surveys of non-sex working women recruited from GUM and antenatal clinics.²⁷ Condom use with non-paying sex partners was low, explaining the increased risk of STI associated with currently having a partner. Reports of recent physical violence in our study are comparable to those reported by a sample of UK indoor-working women in 2001. This study found levels of violence far higher among women working on the street compared with those working indoors,¹ but recent experience of physical violence among our sample is similar to recent levels among street-working sex workers in Vancouver¹⁷.

Our definition of coercion into sex work falls within the United Nation's definition of trafficking (being forced to turn over earnings or made to work).²³ The proportion of migrant women being coerced by a third party is in line with other recent research among migrants in the UK sex industry¹⁵ and contributes further evidence that reported statistics may inappropriately conflate migrant and trafficked sex work.^{28 29} Our findings suggest the possibility that women's experience of some enforcement strategies (imprisonment and arrest) are associated with increased risk of recent physical violence from clients. Migrant women were no more likely to experience recent violence from clients or non-paying partners. However, projects working with this group have observed that migrant women can be reluctant to report incidences of violence to the police (personal communication, Praed Street Project), suggesting that our figures may underestimate violence.

Limitations

There is no established sampling frame to assess the representativeness of our sample of indoor-working sex workers. Although rates of acceptance to participate in the study were high, refusal to allow access to venues via cold calling was also extremely high (64%). We could not compare illegal immigration status because of the small number of migrants originating from outside the EU (n=22). As such, our findings may not be generalisable to the wider UK-born and migrant sex worker population in London, particularly those working under exploitative working conditions, and consequently have led to an underestimation in levels of coercion.

We explored associations between covariates and acute STIs only as an outcome. The same risk factors remained

Table 4 Risk factors for experiencing physical violence from clients in the last 12 months among indoor-working sex workers in London significant in a multivariate analysis

	Physical violence§		Unadjusted		Adjusted¶		p Value*
	n/n	%	OR	95% CI	OR	95% CI	
Demographic indicators							
Migrant status							
UK-born	26/103	25.2%	1.0		1.0		
Eastern Europe	37/152	24.3%	1.0	0.53 to 1.70	0.8	0.37 to 1.86	0.65
Recruitment method							
Outside of project‡	41/181	22.6%	1.0		1.0		
Project drop-in/outreach referral‡	22/74	29.7%	1.4	0.78 to 2.65	1.6	0.76 to 3.49	0.21
Sexual risk behaviours							
10 or more clients in last 7 days							
No	18/90	20.0%	1.0		1.0		
Yes	30/97	30.9%	1.8	0.91 to 3.51	1.7	0.80 to 3.55	
Don't know/no response	15/68	22.10%	1.1	0.52 to 2.45	1.0	0.41 to 2.43	0.28
Currently has non-paying sex partner							
No	20/105	19.1%	1.0		1.0		
Yes	41/147	27.9%	1.6	0.90 to 3.01	2.0	1.03 to 3.96	0.04
Adverse health outcomes							
Alcohol audit score							
Scores <3	30/100	30.0%	1.0		1.0		
Scores 3+	27/137	19.7%	0.6	0.31 to 1.04	0.4	0.21 to 0.82	0.01
Used drugs during or before sex work in last 4 weeks							
No	45/203	22.2%	1.0		1.0		
Yes	17/45	37.8%	2.1	1.07 to 4.24	1.9	0.81 to 4.38	0.14
Ever been arrested or imprisoned							
No	43/200	21.5%	1.0		1.0		
Yes	19/53	35.8%	2.0	1.06 to 3.93	2.6	1.14 to 5.71	0.02

*p Value derived from Wald test.

‡10 people were recruited via outreach referrals.

‡This includes cold calling, field workers' personal contacts or acquaintance or social network referrals and one recruit of unknown origin.

§Physical violence is defined as reporting one or more of the following incidences: being robbed, hit, beaten, threatened, attacked with a weapon or kidnapped.

¶Final model adjusted for migrant status, recruitment location, having a current sex partner, lifetime experience of arrest or prison, and alcohol audit score.

significantly associated in the multivariate analysis as for the composite variable of any infection. Owing to the few cases of infection and large number of inhibitory STI results, only a limited number of covariates could be examined in this model, so a composite variable of any infection is reported despite different STIs varying in transmission dynamics and lengths of infectivity. The reduced sensitivity of the *T pallidum* assay and the resulting misclassification may have further reduced precision and led to our underestimating syphilis prevalence. The use of CASI has been shown to reduce social desirability bias,³⁰ as has the use of field workers with privileged access to vulnerable populations,³¹ but missing responses hindered the collection of estimates of sexual risk, particularly with respect to measures of recent sexual acts and corresponding condom use. As the data are cross-sectional and behavioural findings are based on self-reports, any inferences about causality are limited. Some outcomes, such as HIV, syphilis, history of imprisonment, or lifetime experience of drug use, may predate migration to the UK.

Implications for research and policy

These findings have clear implications for sexual and reproductive health services for sex workers, with more emphasis on sexual health advice for women in their personal as well as professional lives. The protective effect of a visit from an outreach worker or a nurse at a sex working location on risk of STI may reflect the ability of outreach teams to gain access to places where the women are engaging in less-risky behaviours or

already attending services. However, maintenance of this effect after adjustment for place of recruitment or having a recent STI screen suggests that outreach does have a role in reducing risk of STI, particularly considering a quarter of migrants used STI services abroad. Outreach should be expanded and used for other necessary health-promotion activities such as increasing uptake of HIV testing or alcohol misuse prevention initiatives. Targeted sexual health interventions are needed among migrants to increase women's use of contraceptives.

Recent reports of sexual or physical violence are extremely high, and there is an urgent need for interventions to address this. Peer-level interventions such as the 'Ugly Mugs' scheme (a magazine describing potentially dangerous clients) have been successful in reducing violence by clients among English-speaking women, but among migrant women this is likely to be limited by language barriers; funding for translation would increase access to such interventions. The study was conducted before the Policing and Crime Bill came into effect, but our finding that migrant women were no more likely to report experiencing violence suggests that policing practices would be better directed at improving safety at work for sex workers as a whole rather than specifically targeting migrants. The association between previous history of imprisonment or arrest and increased risk of physical violence suggests the need for a refocusing of strategies towards facilitating safer working environments for all sex workers rather than enforcement approaches that can further marginalise women.

Key messages

- ▶ Migrant women were younger, had poorer access to GP services and lower contraceptive use, but few were forced to work or had a history of drug use.
- ▶ The findings show the role of outreach work to sex work establishments in reducing risk of sexually transmitted infections.
- ▶ Recent experience of physical violence from clients was frequently reported. Risk of this was associated with some enforcement strategies (imprisonment and arrest) irrespective of migration status.
- ▶ The findings support the need to improve safety at work for sex workers as a whole and facilitate safer working environments, rather than specifically targeting migrants.

Acknowledgements We thank the study participants for being so generous with their time and the following individuals: Jayne Aherne, Jane Anderson, Jane Ayres, Anthony Ashcroft, Katya Balan, Chrissie Browne, Mary Brown, Angela Burnett, Rosie Campbell, Venetia Clarke, Sarah Creighton, Andrew La Bray, Angie Feder, Justin Gaffney, Rebecca Green, Tim Green, Paz Hernandez, Chris Higgins, Silva Hove, Kelvin Justin, Petra Lazicka, Kim Leverett, Kasia Kościeszka, Cristina Lora, Sarah Macauley, Bryan Macgregor, Nick Mai, Dalya Marks, Cicely Marston, Derek McIlvenna, Agnes Mosobela, Sue Napierala, Carlo Narboni, Nikki Penny, Georgina Perry, Sue Pugh, Fatima Roberts, Angela Robinson, Helen Rushbrook, Andrea Scott, Alan Smith, Catherine Stephens, Effi Stergiopoulou, Lauren Weinberger.

Funding The study was funded by the Medical Research Council.

Competing interests None.

Ethics approval This study was conducted with the approval of the London School of Hygiene and Tropical Medicine's research ethics committee, the Camden and Islington research ethics committee and relevant site-specific ethics committees.

Contributors LP was the principal investigator, designed the study, and wrote the paper. LP, TR, KW, CB and SC had the original idea for the study and participated in and contributed to the conception of the study protocol. LP and PG did the statistical analysis and analysed and interpreted the results. LP and PG were responsible for the enrolment and survey of study participants. SC set up the laboratory testing of the vulvovaginal swabs, wrote the clinical protocol, and oversaw clinical arrangements for the provision of treatment to participants. JP set up the laboratory component of the study for testing of oral fluid sample and performed the laboratory testing and quality control. All authors contributed to the writing and approved the report.

Provenance and peer review Not commissioned; externally peer reviewed.

REFERENCES

1. Church S, Henderson M, Barnard M, *et al*. Violence by clients towards female prostitutes in different work setting: questionnaire survey. *BMJ* 2001;**322**:524–5.
2. Ward H, Day S. What happens to women who sell sex? Report of a unique occupational cohort. *Sex Transm Infect* 2006;**82**:413–17.
3. Fox J, Taylor GP, Day S, *et al*. How safe is safer sex? High levels of HSV-1 and HSV-2 in female sex workers in London. *Epidemiol Infect* 2006;**134**:1114–19.
4. Spina M, Mancuso S, Sinicco A, *et al*. Human immunodeficiency virus seroprevalence and condom use among female sex workers in Italy. *Sex Transm Dis* 1998;**25**:451–4.
5. Bautista CT, Mosquera C, Serra M, *et al*. Immigration status and HIV-risk related behaviors among female sex workers in South America. *AIDS Behav* 2008;**12**:195–201.
6. Tsakiridu DO, Vidal AF, Valdes FV, *et al*. Factors associated with induced abortion in women prostitutes in Asturias (Spain). *PLoS One* 2008;**3**:e2358.
7. Bautista CT, Pando MA, Reynaga E, *et al*. Sexual practices, drug use behaviors, and prevalence of HIV, syphilis, hepatitis B and C, and HTLV-1/2 in immigrant and non-immigrant female sex workers in Argentina. *J Immigr Minor Health* 2009;**11**:99–104.
8. Ojeda VD, Strathdee SA, Lozada R, *et al*. Associations Between Migrant Status and Sexually Transmitted Infections Among Female Sex Workers in Tijuana. Mexico: Sex Transm Infect, 2009.
9. Morgan Thomas R. TAMPEP 7 Final Report—Activity Report. Edinburgh: TAMPEP, 2007.
10. Cooper K, Day S, Green A, *et al*. Maids, migrants and occupational health in the London sex industry. *Anthropol Med* 2007;**14**:41–53.
11. Soskolne V, Shtarkshall RA. Migration and HIV prevention programmes: linking structural factors, culture, and individual behaviour—an Israeli experience. *Soc Sci Med* 2002;**55**:1297–307.
12. Wolffers I, Fernandez I, Verghis S, *et al*. Sexual behaviour and vulnerability of migrant workers for HIV infection. *Cult Health Sex* 2002;**4**:459–73.
13. Mai N. *Migrant Workers in the UK Sex Industry: Final Policy-Relevant Report*. London, UK: London Metropolitan University, 2009.
14. Scambler G. Sex work stigma: opportunist migrants in London. *Sociology* 2007;**41**:1079–96.
15. Office H. Policing and crime act. In: Office H, ed. 26. <http://www.legislation.gov.uk/ukpga/2009/26/contents>. 2009.
16. Goodyear MD, Cusick L. Protection of sex workers. *BMJ* 2007;**334**:52–3.
17. Shannon K, Kerr T, Strathdee SA, *et al*. Prevalence and structural correlates of gender based violence among a prospective cohort of female sex workers. *BMJ* 2009;**339**:b2939.
18. Agustin D'Andrea L. The (crying) need for different kinds of research. *Research for Sex Work* 2002;**5**:30–2.
19. Connell JA, Parry JV, Mortimer PP, *et al*. Novel assay for the detection of immunoglobulin G antihuman immunodeficiency virus in untreated saliva and urine. *J Med Virol* 1993;**41**:159–64.
20. Ryan C, Kudesia G, McIntyre S, *et al*. BD ProbeTec ET assay for the diagnosis of gonorrhoea in a high-risk population: a protocol for replacing traditional microscopy and culture techniques. *Sex Transm Infect* 2007;**83**:175–9. discussion 179–80.
21. Gaydos CA, Theodore M, Dalesio N, *et al*. Comparison of three nucleic acid amplification tests for detection of *Chlamydia trachomatis* in urine specimens. *J Clin Microbiol* 2004;**42**:3041–5.
22. Van Dyck E, Ieven M, Pattyn S, *et al*. Detection of *Chlamydia trachomatis* and *Neisseria gonorrhoeae* by enzyme immunoassay, culture, and three nucleic acid amplification tests. *J Clin Microbiol* 2001;**39**:1751–6.
23. Office on Drugs and Crime. *Convention against Transnational Organized Crime and the protocols thereto*. New York: United Nations, 2004.
24. Frank D, DeBenedetti AF, Volk RJ, *et al*. Effectiveness of the AUDIT-C as a screening test for alcohol misuse in three race/ethnic groups. *J Gen Intern Med* 2008;**23**:781–7.
25. Ward H, Day S, Green A, *et al*. Declining prevalence of STI in the London sex industry, 1985 to 2002. *Sex Transm Infect* 2004;**80**:374–6.
26. Macauley S, Creighton S. Testing commercial sex workers for chlamydia and gonorrhoea on outreach. *Sex Transm Infect* 2009;**85**:231–2.
27. Adams EJ, Charlett A, Edmunds WJ, *et al*. *Chlamydia trachomatis* in the United Kingdom: a systematic review and analysis of prevalence studies. *Sex Transm Infect* 2004;**80**:354–62.
28. Cusick L, Kinnell H, Brooks-Gordon B, *et al*. Wild guesses and conflated meanings? Estimating the size of the sex worker population in Britain. *Crit Soc Pol* 2009;**29**:703–19.
29. Busza J, Castle S, Diarra A. Trafficking and health. *BMJ* 2004;**328**:1369–71.
30. Turner CF, Ku L, Rogers SM, *et al*. Adolescent sexual behavior, drug use, and violence: increased reporting with computer survey technology. *Science* 1998;**280**:867–73.
31. Power R. Some methodological and practical implications of employing drug users as indigenous field workers. In: Boulton M, ed. *Challenge and Innovation: Methodological Advances in Social Research on HIV/AIDS*. London: Taylor and Francis, 1994:97–111.