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Barriers preventing early testing and diagnosis of HIV: results of a five-year retrospective review of clinical data for those diagnosed HIV positive in two European regions.

Abstract

Background: Late diagnosis of HIV is detrimental to patients, resulting in increased morbidity, mortality, and increased potential for onward transmission. The prevalence of HIV in both the UK and France continues to rise, particularly in 'non-traditional' groups such as heterosexuals and older people, yet at least 20% of those infected with HIV do not know their status and are capable of transmitting the virus to others according to European Center for Disease Control/WHO data.

Methods: A five-year retrospective review of demographic and clinical data was conducted for every patient diagnosed with HIV (n=406) in two European regions, Kent and Medway in the UK, and Amiens and Creil in France to identify common barriers preventing people from seeking an early HIV test.

Results: Findings showed similarities between the two countries in relation to those most likely to present late. Heterosexuals formed the largest group of patients and were more likely to present late, as were migrants or other minority ethnic community members. Gay and bisexual men were likely to seek testing more frequently and had higher rates of early diagnosis than other groups. The two French regions performed better than the UK in respect of early diagnosis in all groups, though still not matching the performance of other French regions.

Conclusions: In spite of recent improvements in HIV treatment, it is necessary to educate more white and minority ethnic heterosexuals about the benefits of early HIV testing so that the number of late diagnoses and complications associated with these can be reduced. The study suggests that there is a need to develop specific health promotion and education interventions targeted at these groups, as well as healthcare professionals who continue to attribute signs and symptoms of HIV infection to non-HIV causes.

Keywords

HIV testing, late presentation, late diagnosis, health education, public health.

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Key messages:

- There is a need to raise awareness about the benefits of early HIV testing in both the UK and France, especially amongst older white heterosexuals, black and minority ethnic groups, and young adults.
- Continued public health and health promotion campaigns are vital to improve the uptake and timeliness of HIV testing.
- Longitudinal evaluations of public health awareness campaigns will add value in assessing impact and eliciting the resulting practice and behaviour of the public and healthcare professionals.

Introduction

This paper provides an overview of the aims, conduct, and findings of a five-year retrospective review of patient records to identify and compare clinical and demographic data on every patient diagnosed with HIV (n=406) in Kent and Medway in the UK, and Amiens and Creil in France. The review was conducted as phase 1 of an international mixed-methods study designed to identify barriers to the early diagnosis of HIV (defined as having a CD4 count ≤ 350 cells/mm³ within three months of diagnosis), identify interventions to increase testing, and reduce the number of late HIV diagnoses in both regions. The study was funded by the INTERREG IVA Channel Programme (Project 4282) with ethical approval obtained in each country including the NHS National Research Ethics Service (13/NE/0267 IRAS 136799), and the Comité de Protection des Personnes en Recherche Biomédicale of the Centre Hospitalier Universitaire Amiens Picardie in France. The two regions involved in the study have similar population demographics [1], consisting of both rural and urban populations close to the national capital, with similar rates of HIV infection higher than the national average, with each being situated within the geographical area covered by the INTERREG research programme scheme.

More than 142,197 people received a positive HIV diagnosis in the WHO European Region in 2014 including 29,992 from the European Union and European Economic Area (EU/EEA) [1]. These accounted for 21% of the total whilst 77% of the remainder occurred in the East of the Region in countries such as Belarus, Ukraine and Russia [1]. There were consequently 59,647 new diagnoses (8.2:100,000) in the European Region as a whole, with 32,605 cases (6.4:100,000) in the EU/EEA area. These are the highest ever-recorded number of new HIV cases since records began, and come on top of an 80% increase between 2004 and 2013 [1]. HIV prevalence amongst migrants and injecting drug users (IVDUs) continues to rise, but prevalence in heterosexuals is also increasing, especially in the east of the region [2-4].

Data from Public Health England [5] show that 6,095 people tested positive for HIV in the UK in 2015, the most recent year for which statistics are available. This is the highest number of new

diagnoses in any EU/EEA country with 139,778 people living with the virus in 2014. Of these, 305 received an AIDS diagnosis at the point of their first test [1].

Men who have sex with men (MSM) accounted for 3,320 (54%) of these diagnoses with 2,360 cases (39%) occurring in heterosexuals (1,010 men and 1,350 women). Intravenous drug users (IVDUs) accounted for 210 or 2% of cases, 130 were due to vertical mother-to-infant transmission, and 50 cases were caused by the transfusion of contaminated blood or blood products. Thirty-nine percent (2,350) of all adult diagnoses were late, a slight improvement on previous years, although the proportion of late diagnoses in both male (490/890) and female (536/1,094) heterosexuals is higher than MSMs at 55%, 49% and 30% (or 877/2,923 MSMs) respectively. Mortality figures show that 613 people with an HIV infection died in 2015 although not all of HIV or AIDS related conditions [5].

The European Centre for Disease Prevention and Control/WHO Regional Office for Europe state that France had 4,327 (6.6:100,000) new HIV diagnoses (second only to the UK) in 2014 meaning that they had 65,929 people living with HIV in 2014 [1]. This is the third highest number of new AIDS diagnoses in Western Europe (after Italy and Spain) with 405 new diagnoses in 2014 and a cumulative total of 65,929 cases between 1980 and 2014 [1]. French government statistics put the figure higher [6] and estimate that approximately 152,000 (range 135,000-170,000) people are living with the virus with mortality from AIDS remaining relatively constant at 1,700 per annum [7].

There has been a progressive increase in the number of rapid tests conducted in France since the introduction of the 2010-2014 national plan for the prevention of HIV/AIDS and sexually transmitted infections which resulted in 61,600 rapid tests being conducted in 2014 [8]. It is estimated that 20% of those currently infected with the virus do not know their status and are likely to transmit it to others, a similar percentage to those thought to be undiagnosed in the UK [9].

There is still no cure for AIDS, so prevention, screening, and early diagnosis are vital to control the onward transmission of the virus and provide optimum treatment to those affected [10,

11]. Consequently, the 5-year retrospective review of demographic and clinical data would help to:

- identify why individuals in both regions had presented for an HIV test;
- identify any correlations between those who presented late and those who presented early;
- provide guidance on the development of interventions intended to increase HIV testing in those at risk of infection and if possible, the number of earlier diagnoses in both regions.

Methods

Retrospective demographic and clinical data on every patient diagnosed with HIV (n=406) in the preceding five years were collected by clinicians and/or administrative staff in each study centre using a standardised data extraction sheet in Excel format. The sheet was developed during two international clinical consensus meetings attended by academics, clinical experts in the fields of sexual health, community/primary healthcare, and public health; including representatives from HIV patient/activist groups from both countries (Figure 1). Pearson's chi-squared test (χ^2) was undertaken to establish correlations between these variables for both countries data sets using IBM SPSS software package (version 23). Data extraction sheets missing data in relation to one or more items were excluded from the analyses of those items.

Figure 1: Variables included in the data extraction sheet for the review

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|--|---|
| <ul style="list-style-type: none">• age• sex (male/female)• relationship status at the likely time of infection/diagnosis (married, single, civil partnership, cohabiting, separated, divorced, widowed)• generic postcode of the town/municipality in which the patient lived (to identify distances travelled between their home and place of testing)• educational status (highest educational qualification)• occupational status (working, not working, full-time, part-time, retired) | <ul style="list-style-type: none">• current or most recent occupation• ethnic origin• country or region of birth• likely mode of transmission (MSM, heterosexual, IVDU or other)• date of first positive test• age when diagnosed HIV positive• CD4 count at diagnosis• clinical circumstances/history leading to the test• number of previous tests (if known)• HIV/AIDS related signs and symptoms noted at the time of the positive test• non-HIV/AIDS related comorbidities noted at the time of the positive test. |
|--|---|
-

Results

Overall Results

The data showed that late diagnosis of HIV continued to be a problem in both regions. Although the incidence of late diagnosis was slightly lower in France (39.67% compared to 41.24%) the difference was not statistically significant. The data showed that HIV is no respecter of age in either country, the oldest patient being 81 years old when diagnosed in the UK (range 19-81) and 71 years (range 17-71) in France. The mean age of diagnosis was lower in France than the UK at 37 years (independent $t = 3.66$ $p=0.0003$) compared to 40 years (independent $t = 2.89$ $p<0.005$), although older patients were more likely to be diagnosed late in both countries. One hundred and fifty-five (38.2%) of the combined UK/French sample were women. This is consistent with commonly cited gender differences in HIV infection reported in the literature [11]. Women were diagnosed later than men in both countries, though France fared much better in this respect than the UK, with women representing 53.3% of late diagnoses in Amiens and Creil and 67.9% of late diagnoses in Kent and Medway.

The samples in both countries were ethnically diverse (Table 1). Forty-four percent of the UK sample and 51.5% of the French sample were born outside their respective countries. Whilst HIV infection was higher in MSMs, it is clear that late diagnosis is more common in those not perceived to be at 'high' risk such as heterosexuals, and in particular older heterosexuals. The level of education, occupational status, location of first test, and presence of non-HIV/AIDS related co-morbidities were not statistically significant factors leading to late diagnosis in either country.

Data from Kent and Medway showed that late diagnosis of HIV infection is greater than the national average. Of the 240 British patient records analysed for the study, 145 (60.4%) had CD4 counts on diagnosis of 350 or less, and 95 (39.6%) had CD4 counts of 351 or more. Sixty-seven percent ($n=162$) of the UK sample were men, but no gender difference is apparent in levels of late diagnosis (Table 2).

Table 1. Place of birth of patients with an early/late diagnosis in the UK and France.*

			CD4 count ≤350mm ³	CD4 count >350mm ³	Number and percent
UK	UK born	Number	71	62	133 (55.65%)
		Percentage	53.4%	46.6%	100.00%
	Rest of world	Number	74	32	106 (44.35%)
		Percentage	69.8%	30.2%	100.0%
	Total	Number	145	94	239
		Percentage	60.7%	39.3%	100.0%
France	French born	Number	33	47	80 (48.5%)
		Percentage	41.3%	58.7%	100.0%
	Rest of world	Number	50	35	85 (51.5%)
		Percentage	58.8%	41.2%	100.0%
	Total	Number	83	82	165
		Percentage	50.3%	49.7%	100.0%

*Whilst both place of birth and ethnicity data were collected in the UK arm of the study, it is illegal to identify people on the grounds of ethnicity alone in France, so data on the place of birth was used as a proxy in this case.

Table 2. Gender of patients CD4 count ≤350mm³ versus CD4 count >350mm³

			CD4 count ≤350mm ³	CD4 count >350mm ³	Total
UK	Male	Number	92	70	162
		Percentage	56.8%	43.2%	100.0%
	Female	Number	53	25	78
		Percentage	67.9%	32.1%	100.0%
	Total	Number	145	95	240
		Percentage	60.4%	39.6%	100.0%
France	Male	Number	42	47	89
		Percentage	47.2%	52.8%	100.0%
	Female	Number	41	36	77
		Percentage	53.3%	46.7%	100.0%
	Total	Number	83	83	166
		Percentage	50.0%	50.0%	100.0%

The UK sample was ethnically diverse, with 56% being White British or Irish, 30% Black, 4% Asian, 1% Mixed and 8% classified as 'other' – mainly white EU/EEA or Commonwealth citizens. Late diagnosis was more common in the non-British ethnic minority groups (70.2%) compared with the

White British/Irish group (53.0%) although this difference is only marginally significant. The most frequent categories in relation to transmission risk in the UK sample were MSMs and heterosexual females with only 5 IVDUs in the sample. The profile of the transmission groups varies markedly by country of birth however, with the largest UK-born group being MSMs (54%), and heterosexuals representing the largest group diagnosed with HIV amongst non-UK born individuals (81%), predominantly from Africa and Eastern Europe (Table 3).

Table 3. Likely transmission route CD4 count $\leq 350\text{mm}^3$ versus CD4 count $>350\text{mm}^3$

			CD4 count $\leq 350\text{mm}^3$	CD4 count $>350\text{mm}^3$	Total
UK	MSMs	Number	44	44	88
		Percentage	50.0%	50.0%	100.0%
	Intravenous drug users	Number	4	1	5
		Percentage	80.0%	20.0%	100.0%
	Heterosexual	Number	87	48	135
		Percentage	64.4%	35.6%	100%
	Other/unspecified	Number	7	1	8
		Percentage	87.5%	12.5%	100%
	Total	Number	142	94	236
		Percentage	60.2%	39.8%	100.0%
France	MSMs	Number	15	20	35
		Percentage	42.9%	57.1%	100%
	Intravenous drug users	Number	0	1	1
		Percentage	0.00	100.0%	100%
	Heterosexual	Number	63	56	119
		Percentage	52.9%	47.1%	100%
	Other/unspecified	Number	4	6	10
		Percentage	40.0%	60.0%	100%
	Total	Number	82	83	165
		Percentage	49.7%	50.3%	100.0%

Results from the UK dataset

The percentage of late diagnoses varies by transmission group, with British-born MSMs having a slightly higher incidence of early diagnosis although this was not statistically significant. The most common place of testing was a sexual health clinic, followed by acute hospitals after admission due to an illness that may or may not have been HIV related. For those admitted with HIV or AIDS

defining illnesses, the incidence of late diagnosis was far higher (89.1%) compared with other settings which ranged from 41-50%. Antenatal screening accounted for 14 positive tests, only 42.9% (or 6 women) were diagnosed early. In 41 cases, the initial HIV test took place elsewhere, including GP surgeries, prison or private clinics. Of the 166 UK patients diagnosed late, 119 (71.7%) had one or more comorbidities compared to only 38 (36.9%) of those diagnosed early.

Results from the French dataset

The French data set contained information for 170 patients with information on CD4 counts at first diagnosis being available for only 166 individuals. Eighty-three (50.0%) of these had CD4 counts ≤ 350 cells/mm³ and 83 had >350 cells/mm³ so the number of early and late diagnoses was perfectly balanced in the French sample. As in Kent and Medway, the proportion of late diagnoses in Amiens and Creil were higher than the national average. Similarly, there was no significant geographical difference in the levels of late diagnosis across the region although the majority of elective HIV tests in France take place in commercial pathology laboratories or local HIV/AIDS charity centres at the suggestion of the GP. The proportion of men and women in the French data set was more equally balanced between men (n=89) and women (n=77). Men tended to be diagnosed earlier than women (47 or 52.81% versus 36 or 46.75% for women). Although not statistically significant, this highlights once again the gender imbalance in early and late diagnoses in both countries.

Fewer patients born outside France were diagnosed late than those born outside the UK (35 or 41.18% versus 47 or 58.75% for French born citizens), though 'French born' also includes people born in French overseas territories or départements et territoires d'outre-mer in the Caribbean, Indian Ocean and Pacific. Some of these have relatively higher rates of HIV infection than mainland France, but enjoy the same citizenship rights as those born in the country. Direct comparison between the two national data sets is therefore difficult.

As in the UK, the largest number of HIV diagnoses occurred in heterosexuals (n=119) and MSMs (n=35), with similarly small numbers of IVDUs (n=1) and others (n=10) affected. The transmission profile of groups in France also varied markedly by country of birth with 56% of French-

born and 88% of foreign-born patients identifying as heterosexual. The median delay between arrival in France and HIV screening in non-French born patients was one year ($p=0.38$) with no significant difference between those diagnosed early or late ($p=0.66$). MSMs were more highly represented in the French born patients (37%) than those born outside of France (5%), although these also had higher rates of early diagnosis (57%) than their heterosexual counterparts who were diagnosed early in only 47.1% of cases although this is not statistically significant, and the single IVDU was diagnosed early. Comorbidities such as respiratory, renal and dermatological problems were more common in those diagnosed late (58.75% or 47 patients compared to 41.25% or 33 patients); a marginally smaller proportion than in the UK, although 40 of those (50%) diagnosed early also had one or more comorbidities including haematological problems (malaria/sickle cell) or gynaecological problems at the time of diagnosis, a figure higher than in the UK.

Discussion

A review of the literature conducted prior to the study [12] identified a number of reasons for late diagnosis, although relatively few of these papers came from the UK or France. Older age, and living in a region of low prevalence of HIV increased the risk of late diagnosis since individuals (including healthcare professionals in those areas) considered the risks of infection to be lower in such instances [13, 14]. Low socio-economic status (as indicated by occupational status) and education levels also correlated in the literature with later diagnosis, particularly amongst heterosexual men and women, although it should be noted that migrant or minority communities in both countries are also likely to have lower economic status than those born in the UK or France [12]. Both data sets contained large numbers of patients from sub-Saharan Africa, as well as parts of Asia and Eastern Europe where HIV is more prevalent [1].

The literature suggests that language barriers, poor knowledge of healthcare systems, and social and cultural beliefs about illness causation may also prevent early testing, and there is some evidence that healthcare practitioners are generally reluctant to question patients about their sexual activity, particularly when social and cultural barriers exist between professionals and their patients

[15, 16, 17]. Doubts about the perceived efficacy of medical treatment may be especially strong in those whose primary understanding of HIV comes from prior experience in resource poor countries [16, 17,18], or fear the consequences of a positive test, including associations of HIV with pain, death, discrimination, social isolation and diminished employment opportunities because of these experiences [12, 14, 16]. There is also evidence in the literature that a positive diagnosis may be reported to immigration services, housing authorities or employers. These factors may also present barriers to early testing in migrant populations and explain the results identified in relation to the French and British data sets reported upon here [17].

However, even in non-migrant groups, cognitive dissonance may still determine some individual's reluctance to seek early testing irrespective of their ability to access information, support and counselling about HIV testing or their own appraisal of risk [12, 13, 15, 17]. The decision to take an HIV test is harder in social contexts characterised by fear and stigma; or where prevailing attitudes associate HIV with deviancy or immorality [12-19]. It is not entirely surprising therefore, that MSMs were likely to undergo more frequent testing and consequently receive their diagnoses earlier than those considering themselves to be at less risk or fearful of others' censure should they be diagnosed with the virus.

The five-year retrospective analysis of clinical and demographic data showed that there are marked similarities in the profile of those likely to present late for testing and consequently receive a late HIV diagnosis in both countries [19]. For the most part these were migrants and heterosexuals. MSMs were likely to test more frequently and receive their diagnosis earlier than their counterparts in both countries; though this finding is hardly surprising given the emphasis on HIV testing within the gay, bisexual and MSM community, and its frequent mention in the gay media. MSMs were also more knowledgeable about HIV risk and more adept at seeking out testing services than other groups in both countries, though the rates were generally better in France than the UK for all groups.

This may be due to population screening measures introduced because of a nationwide campaign to improve HIV testing rates in France that started in 2011 and led to some 5.0-5.2 million HIV serology tests being performed in the four years before the study period. This campaign also had an emphasis on making GPs key players in the fight against HIV in France, although GPs in Amiens and Creil undertake fewer than the national average number of HIV tests (or refer patients elsewhere for testing), one of the reasons the region was included in the study. Historically, more than a third of late diagnoses in the region had an AIDS defining CD4 count of less than 200/mm³ although this had improved by the time of our study [6]. In contrast, GUM or sexual health clinics are considered the frontline against HIV in the UK [20], and this is borne out in the proportion of patients diagnosed in these rather than general practice settings. The number of people diagnosed in acute hospital settings was also higher in the UK. These often had HIV/AIDS defining symptoms previously missed by general practitioners although harder to enumerate from UK paper-based systems than the French national database.

Conclusions and limitations

The study confirmed that late diagnosis of HIV infection continued to be a problem in both Kent and Medway in the UK and Creil and Amiens in France, although French HIV services were making better progress in relation to improving the uptake of early HIV testing than their UK counterparts. In both cases, healthcare services were making less progress increasing the number of tests and reducing the number of late diagnoses than the national average in spite, in France at least, of a high profile, population based screening campaign. It is also clear that HIV is no respecter of age in either country, with a statistically significant difference in the number of late diagnoses in older people in both countries.

Women were diagnosed later than men in both countries, at odds with the prevailing wisdom that women are more adept at accessing healthcare services than men and routine screening for HIV in pregnancy. Older women were particularly at risk of late diagnosis partly, it would seem, because symptoms indicative of an HIV infection were attributed to other causes

outside of their sexual career or relationships on account of their age and assumptions about their being married or in a long-term relationship. Migrants and those from BAME communities were also less likely to encounter 'mainstream' information about HIV testing targeted towards MSMs and IVDUs, and were also deleteriously affected, partly because of language and cultural difference, but also because of information and economic deficits, including migrant status, which made some fearful of seeking a test in the event that it proved positive.

Caution is needed in interpreting findings from an unmatched international comparison of retrospective data collected from different data systems including a hospital, paper-based system in the UK, and a national, digital health insurance record in France. Nevertheless, similarities in the findings reported here suggest that there is a substantial need to develop health promotion and education interventions targeted at heterosexuals, and older heterosexual women in particular, and migrant of BAME groups in both countries.

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Conflicts of interest

None declared.

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Figure 1: Variables included in the data extraction sheet for the review