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HIV testing in black Africans living in England

B. RICE[1,2]*, V. DELPECH[1], K. E. SADLER[3], Z. YIN[1] AND J. ELFORD[2]

[1] *Health Protection Agency Centre for Infections, London, UK*
[2] *City University, London, UK*
[3] *National Centre for Social Research, London, UK*

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SUMMARY

We examined the uptake of HIV testing in black Africans living in England before the introduction of national testing guidelines. Analyses were conducted using data from an anonymous self-completed questionnaire linked to oral fluid samples to establish HIV status in black Africans attending community venues in England in 2004. Of 946 participants, 44% had ever been tested for HIV and 29% had been tested in the previous 24 months. Of those with undiagnosed HIV, 45% had previously had a negative HIV test. Almost a third of people tested in the UK had been at general practice. Uptake of HIV testing was not associated with perceived risk of HIV. These findings highlight the need for the implementation of national HIV testing guidelines in the UK, including the promotion of testing in general practice. Regular testing in black Africans living in the UK should be promoted regardless of their HIV test history.

Key words: Black African, community based, HIV, testing.

INTRODUCTION

Over the past decade, the HIV epidemic in the UK has been shaped, in part, by HIV diagnoses in black African heterosexual men and women [1–3]. Rates of late presentation and HIV-related symptoms are high in this group, exceeding those for other groups [2, 4, 5]. The 2008 National Guidelines for HIV Testing advised that all men and women from a high HIV prevalence country (>1%), as well as those reporting sexual contact abroad or in the UK with someone from those countries, should be routinely offered a HIV test [6]. Endorsing these recommendations, in 2011 the National Institute for Health and Clinical Excellence (NICE) recommended that HIV testing be made available to black Africans living in the UK in a range of healthcare and community settings, and that repeat testing be encouraged in those testing negative who remain at risk of infection [7]. The role of general practitioners in expanding the availability of HIV testing has recently been highlighted [8].

Relatively little is still known about HIV testing in persons born in sub-Saharan Africa who live in the UK. In this paper, we examine HIV testing in persons of black African ethnicity living in England who were surveyed in 2004. These data provide baseline information on HIV testing in black Africans in England before the introduction of the 2008 and 2011 testing guidelines, allowing changes over time to be monitored. We explore factors associated with having ever

* Author for correspondence: Dr B. Rice, Department of HIV and STI, Health Protection Agency Centre for Infections, 61 Colindale Avenue, Colindale, London NW9 5EQ, UK.
(Email: brian.rice@hpa.org.uk)

been tested for HIV and with being tested in the past 24 months, and report on the place of testing. We also explore factors associated with the perceived risk of 'catching HIV'.

METHODS

The Mayisha II survey has been described in detail elsewhere [9–11]. This community-based cross-sectional survey of HIV prevalence, sexual attitudes and lifestyles was conducted in black Africans aged $\geqslant$16 years attending community-identified commercial and social venues in three purposely selected areas of England. The sites were chosen as being those with the largest, most diverse, and well-established African communities (London, Luton, West Midlands). Fieldwork was conducted by a team of trained African field-workers between August and December 2004 [9, 11].

Self-completed questionnaires and anonymous oral fluid samples [using an Orasure^{TM} (USA) collection device for laboratory-based HIV testing] were, when provided, linked by a unique bar code and sealed in a tamperproof envelope. The survey comprised a short (24-item) self-completion questionnaire that collected demographic, health service use, behavioural and attitudinal information from respondents.

The following variables were included in the analysis: current HIV status (as reported by the participant and confirmed by a laboratory test result); HIV test history (whether a participant had previously been tested for HIV and, if so, when they were last tested and where [antenatal clinic, general practice, genito-urinary medicine (GUM) clinic, other]); sex; age; country of birth (aggregated to world region of birth); length of time living in the UK (for participants born abroad); highest level of formal education achieved (referred to as 'education'); condom use at last sexual intercourse (referred to as 'condom use'); number of sexual partners in the past 12 months (referred to as 'sexual partners'); if ever diagnosed with a sexually transmitted infection (STI) other than HIV (referred to as 'previous STI diagnosis'). Perceived risk of 'catching HIV' was examined by asking respondents whether they agreed or disagreed with the statement 'I do not think I am at risk of catching HIV'.

The oral fluid samples were forwarded to and stored at the Health Protection Agency where they were tested for anti-HIV-1/2 antibodies (methods described elsewhere) [12, 13]. The study was approved by the Trent Multi-centre Research Ethics Committee, following a successful feasibility and acceptability pilot study in 2004 [9, 10].

Of the 1359 eligible black African respondents to the Mayisha survey, 1006 participants for whom both a valid HIV laboratory test result and sex were available were included in the analyses (493 females, 513 males). Of these participants, variable completion exceeded 90% for country of birth, age, education, sexual partners, previous STI diagnosis, perceived risk of HIV, length of time living in the UK, previous HIV test history, and when and where last tested for HIV. Condom use was reported for 82% of participants (820/1006).

Persons with a laboratory-confirmed HIV-positive test result were allocated to one of two groups based on HIV test history and self-reported HIV test result: 'diagnosed HIV' (previously tested for HIV and reporting their HIV test result as positive) or 'undiagnosed HIV' (previously tested for HIV and reporting their HIV test result as negative, or no history of having had a HIV test). Persons with a laboratory-confirmed HIV-negative test result were classified as 'HIV negative' regardless of their HIV testing history.

Perceived risk of 'catching HIV' was categorized as low (*strongly agreed* or *agreed* with the statement 'I am not at risk of catching HIV') or high (*disagreed* or *strongly disagreed* with the statement). Country of birth was categorized as UK or one of six African regions (Central, Eastern, Northern, Southern, South-Eastern, Western). For participants born abroad, the number of months in the UK and the date they completed the questionnaire were used to estimate their year of arrival in the UK. To better understand HIV testing patterns in participants at risk of acquiring HIV while living in the UK, or while living with undiagnosed HIV in the UK, most analyses excluded participants with diagnosed HIV.

On the questionnaire, respondents were not asked in which country they had taken their HIV test. Of people born abroad who reported having had a previous HIV test, the date of their last test was compared with the estimated date of their arrival in the UK. In this way, we were able to identify people who had been tested for HIV after arriving in the UK. We assumed that participants who had a HIV test after arriving in the UK probably had their test in this country. Where it was not possible to establish whether testing had occurred before or after arrival in the UK (e.g. persons reporting both arriving in the

UK and being tested for HIV in the same 12-month period), data were imputed separately for HIV-negative participants and for those living with undiagnosed HIV based on the observed data.

Variables found to be significantly associated with HIV testing in univariate analysis were included in a multivariate logistic regression model. Pearson's χ^2 values and all confidence intervals presented are at the 95% level. Stata v. 9.0 (Stata Corp., USA) was used for analyses.

RESULTS

Of the 1006 Mayisha participants for whom both a valid HIV laboratory test result and sex were available, 865 (86%) were HIV negative (females 85%, 419/493; males 87%, 446/513), 93 (9·2%) were living with *undiagnosed HIV infection* (females 9·1%, 45; males 9·4%, 48), and 48 (4·8%) were living with *diagnosed HIV infection* (females 5·9%, 29; males 3·7%, 19). The overall median age was 29 years (males 31, range 16–71 years; females 29, range 16–69 years).

Most participants (925/970) were born abroad, with half born in Eastern Africa (495/970). Half (441/882) of the participants born abroad had arrived in the UK in the previous 4 years.

HIV testing

Forty-seven percent (468/994) of participants reported ever having had a HIV test. After excluding the 48 participants living with diagnosed HIV infection, this percentage was 44% (420/946). The rate of testing was similar in HIV-negative participants and in those living with undiagnosed HIV (Table 1). The remaining analysis is based on the 946 participants who had ever been tested for HIV who were HIV negative ($n=853$) or were living with undiagnosed HIV ($n=93$).

In univariate analysis, rates of testing did not vary by year of arrival in the UK (in participants born abroad), condom use, or perceived risk of catching HIV. In the multivariate model significant differences in rates of testing were observed according to age, region of birth, education, number of partners, and previous STI diagnosis (all $P<0·05$) (Table 1). The following participants were more likely to have ever tested for HIV: those aged 25–44 years, those born in Central Africa, people with a university education or professional training, those reporting 1–2 sexual partners in the past 12 months, and those diagnosed with a STI (other than HIV) (Table 1).

Recent HIV testing

Less than a third (29%, 272/946) of study participants reported having been tested for HIV in the previous 24 months (defined as testing recently); HIV-negative participants (29%, 244/853); and participants living with undiagnosed HIV (30%, 28/93). When comparing rates of recent (<24 months) and non-recent (⩾24 months) HIV testing in multivariate analyses, we observed significant ($P<0·05$) differences only by age and having a previous STI diagnosis (Table 2). Participants aged 16–24 years were most likely to have tested recently, with those aged 35–44 years the least likely (Table 2). Most participants diagnosed with a STI in the past year had tested recently for HIV, whereas in those diagnosed with a STI >5 years ago, only one in three had tested recently for HIV (Table 2).

Place of last HIV test

Of the participants who had ever tested for HIV, we estimated that 88% (324/370) probably had their last test in the UK (Table 3). This percentage was 87% (288/332) for HIV-negative participants and 96% (36/38) for those living with undiagnosed HIV ($P=0·16$). Of those living with undiagnosed HIV who had received their last HIV test in the UK, the majority reported having the test in the previous 24 months (83%, 20/24).

The majority of participants who had probably had their last test in the UK were tested either in a GUM clinic (43%, 99/231), or in general practice (28%, 65) (Table 3). The proportion tested in general practice increased significantly by year of arrival in the UK, from 13% (8/63) before 1995 to 39% (7/18) in 2003–2004 ($P<0·05$). Participants with undiagnosed HIV infection were significantly more likely to have had their last HIV test in general practice than their HIV-negative counterparts [46% (11/24) *vs.* 26% (54/207), $P<0·05$].

Of the 121 women who probably had their last HIV test in the UK, just over a third were tested in a GUM clinic (36%, 44), just under a third in an antenatal clinic (30%, 36), a quarter in general practice (24%, 29), and the remainder elsewhere (9·9%, 12). Of the corresponding 110 men, half were tested in a GUM clinic (50%, 55), a third in general practice (33%, 36),

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Table 1. *HIV testing characteristics in black Africans*

	Total*	Ever tested		Univariate			Multivariate†		
	n	*n*	Rate (%)	OR (95% CI)		*P*	OR (95% CI)		*P*
HIV status									
HIV negative‡	853	378	44·3	1·00	—	—	—	—	—
Undiagnosed HIV	93	42	45·2	1·03	(0·67–1·59)	0·876	—	—	—
Sex									
Male‡	487	202	41·5	1·00	—	—	—	—	—
Female	459	218	47·5	1·28	(0·99–1·65)	0·063	—	—	—
Age group (yr)									
16–24‡	282	85	30·1	1·00	—	—	—	—	—
25–34	363	187	51·5	2·46	(1·78–3·42)	*<0·001*	2·36	(1·59–3·49)	*<0·001*
35–44	175	87	49·7	2·29	(1·55–3·39)	*<0·001*	2·32	(1·46–3·68)	*0·001*
⩾45	54	23	42·6	1·72	(0·95–3·12)	0·075	2·00	(0·98–4·07)	0·056
Region of birth									
Eastern Africa‡	462	197	42·6	1·00	—	—	—	—	—
UK	42	11	26·2	0·48	(0·23–0·97)	*0·042*	0·45	(0·20–1·02)	0·054
Central Africa	105	59	56·2	1·73	(1·13–2·65)	*0·012*	1·80	(1·08–2·99)	*0·024*
Northern Africa	8	3	37·5	0·81	(0·19–3·42)	0·771	0·70	(0·13–3·62)	0·668
South-East Africa	118	54	45·8	1·13	(0·76–1·70)	0·541	0·98	(0·61–1·57)	0·928
Southern Africa	43	25	58·1	1·87	(0·99–3·52)	0·053	1·35	(0·63–2·86)	0·439
Western Africa	133	53	39·8	0·89	(0·60–1·32)	0·566	0·84	(0·53–1·34)	0·468
Year of arrival in UK for those born abroad									
2003–2004‡	171	76	44·4	1·00	—	—	—	—	—
2001–2002	243	108	44·4	1·00	(0·67–1·48)	1·000	—	—	—
1995–2000	249	108	43·4	0·96	(0·65–1·42)	0·828	—	—	—
⩽1994	165	78	47·3	1·12	(0·73–1·72)	0·603	—	—	—
Level of education									
None/primary‡	65	18	27·7	1·00	—	—	—	—	—
Secondary	236	83	35·2	1·42	(0·77–2·60)	0·260	1·46	(0·66–3·21)	0·349
University	510	242	47·5	2·36	(1·33–4·17)	*0·003*	2·62	(1·23–5·55)	*0·012*
Professional	118	67	56·8	3·43	(1·78–6·60)	*<0·001*	3·28	(1·42–7·57)	*0·005*
Condom use at last sexual intercourse									
Yes‡	398	200	50·3	1·00	—	—	—	—	—
No	377	182	48·3	0·92	(0·70–1·22)	0·582	—	—	—
Number of partners in past 12 months									
None‡	255	74	29·0	1·00	—	—	—	—	—
1–2	536	282	52·6	2·72	(1·97–3·74)	*<0·001*	2.23	(1.53–3.25)	*<0·001*
⩾3	117	54	46·2	2·10	(1·33–3·30)	*0·001*	1·36	(0·79–2·36)	0·266
When previously diagnosed with a STI									
Never‡	773	294	38·0	1·00	—	—	—	—	—
>5 years ago	47	34	72·3	4·26	(2·21–8·21)	*<0·001*	3·28	(1·55–6·96)	*0·002*
1–5 years ago	51	38	74·5	4·76	(2·50–9·09)	*<0·001*	4·40	(2·15–9·02)	*<0·001*
In the past year	57	49	86·0	9·98	(4·66–21·37)	*<0·001*	13·38	(5·91–30·29)	*<0·001*
Not at risk of HIV									
Strongly agree/agree‡	658	288	43·8	1·00	—	—	—	—	—
Disagree/strongly disagree	219	108	49·3	1·25	(0·92–1·70)	0·154	—	—	—

OR, Odds ratio; CI, confidence interval; STI, sexually transmitted infection.

* Does not include 48 participants living with diagnosed HIV.

† Includes variables where an association with testing (highlighted by italics) was identified in univariate analyses.

‡ Baseline groups; where no group naturally lends itself to be the baseline then the group with the highest numbers reported was chosen.

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Table 2. *Recent HIV testing*

	Total having tested, *n*	Recent testers (<24 months)		Multivariate*		
		n	Rate (%)	OR (95% CI)		*P*
Total	420	272	64·8	—	—	—
Age group (yr)						
16–24†	85	67	78·8	1·00	—	—
25–34	187	126	67·4	0·71	(0·38–1·34)	0·294
35–44	87	42	48·3	0·34	(0·17–0·69)	*0·003*
⩾45	23	12	52·2	0·58	(0·19–1·72)	0·324
When previously diagnosed with a STI						
Never†	294	186	63·3	1·00	—	—
>5 years ago	34	12	35·3	0·33	(0·14–0·75)	*0·009*
1–5 years ago	38	22	57·9	0·56	(0·27–1·17)	0·122
In the past year	49	47	95·9	10·73	(2·52–45·65)	*0·001*

OR, Odds ratio; CI, confidence interval; STI, sexually transmitted infection.
* Includes variables where an association with testing was identified in univariate analyses.
† Baseline groups.

Table 3. *Country and place of last HIV test*

	n	%*
Country of previous HIV test†		
UK	324	87·6
Abroad	46	12·4
Unable to allocate	50	—
Place of UK test‡		
Antenatal	36	15·6
General practice	65	28·1
GUM clinic (and HIV)	99	42·9
Other	31	13·4
Not stated	2	—

* Proportions are of adults for whom relevant information was available.
† Allocated based on time of previous test and time of UK arrival; country of previous HIV test was imputed for 91 HIV-negative participants and 13 participants living with undiagnosed HIV based on the observed data.
‡ For the 233 participants with a previous HIV test for whom it was possible to allocate directly to the UK based on time of previous test and time of UK arrival.

and the remainder elsewhere (17%, 19). Men were significantly more likely to have last been tested in a GUM clinic than women (50% *vs.* 36%, $P=0·04$).

The percentage of participants who probably had their last test in the UK and who were tested in a GUM clinic differed significantly ($P<0·05$) by region of birth [range: Western Africa (24%, 7/29) to Central Africa (64%, 23/36)], number of partners [range: none (24%, 9/37) to ⩾3 (67%, 20/30)], and year of UK arrival [range: 2003–2004 (22%, 4/18) to before 1995 (67%, 42/63)]. No significant difference was observed by previous STI diagnosis ($P=0·08$).

Perceived risk of HIV

Almost half of the participants (48%, 427/886) *strongly agreed* and 27% (239) *agreed* that they were not at risk of HIV (these two groups of people were categorized as having a low perceived risk of HIV: $427+239=666$; 75% of participants). One in six participants (16·7%, 148) *disagreed* that they were not at risk of HIV and 8·1% (72) *strongly disagreed* with this statement (both categorized as having a high perceived risk of HIV: $148+72=220$; 25% of participants).

In a multivariate model only age group and condom use were found to be significantly associated with perceived risk of HIV (both $P<0·05$). Compared to participants aged 16–24 years, those aged 25–44 years were significantly more likely to perceive themselves as being at risk of HIV [30% (104/343) *vs.* 20% (53/271), $P<0·05$]. Participants reporting condom use at last sexual intercourse were significantly more likely to perceive themselves as being at risk than those reporting no condom use [32% (121/379) *vs.* 22% (79/356), $P<0·05$]. There was no association between perceived risk of HIV and uptake of HIV testing, number of sexual partners, having a history of STI other than HIV, or HIV status.

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DISCUSSION

We have shown in our study population that before the introduction of national guidelines for HIV testing in 2008, less than half of black Africans living in England had ever been tested for HIV and less than a third had been tested in the previous 24 months. In black Africans living with undiagnosed HIV infection a similar proportion had ever been tested for HIV or had been tested in the previous 24 months. Significant differences in rates of testing were observed by age, region of birth, level of education, number of partners, and whether or not a participant had previously been diagnosed with a STI (other than HIV). Perceived risk of acquiring HIV was not associated with the uptake of HIV testing.

Overall rates of HIV testing in our study population fall within the range of those reported in other studies in black Africans living in the UK. A cross-sectional survey of sub-Saharan Africans resident in London, conducted between 1997 and 1999, reported that 32% of participants had ever had a HIV test [14]. Of black African respondents in the second British national survey of sexual attitudes and lifestyles conducted between 1999 and 2001, about 40% reported that they had ever been tested for HIV [15]. A more recent study of black Africans living in England in 2007 reported that 52% of participants had ever been tested for HIV [16], while a 2008 study reported a higher rate of ever testing of 62% [17]. Taken together, these studies suggest that the overall uptake of HIV testing in black Africans living in London increased between 1997 and 2008. However, rates of testing in black Africans living in the UK are still lower than those reported in homosexual men in whom rates range from 72% to 90% [18, 19].

We found that three quarters of black Africans who had ever been tested for HIV had probably done so in the UK. Of these, 40% had received their last test in a sexual health clinic; this percentage was higher for those born in Central Africa (64%), those reporting $\geqslant 3$ partners in the past 12 months (67%), or arriving in the UK prior to 1994 (67%). Unsurprisingly, we found a high rate of HIV testing in participants diagnosed with a STI (other than HIV) in the year before the survey. This high rate may reflect comprehensive policies and practices for HIV testing in sexual health clinics.

Almost a third of participants who had probably been tested in the UK did so in general practice, with higher rates in those living with undiagnosed HIV and those who had arrived most recently in the UK. In comparison, in homosexual men less than one in ten reported testing for HIV within general practice [18]. Primary care has been recognized as an important setting to reduce ongoing high rates of undiagnosed HIV and late diagnoses in black Africans [2], and has been shown to be well utilized by African communities in the UK [20].

It has been reported that individuals are more likely to seek a HIV test if they perceive themselves to be at risk of infection [21]. Studies in the UK have suggested that black African men and women generally may not suspect their HIV infection [22], and have low levels of perceived individual risk [20]. A survey of sub-Saharan Africans resident in London between 1997 and 1999 found the perceived risk of acquiring HIV to be associated with HIV testing for men but not for women [14]. In our study, most participants reported having a low perceived risk of HIV. Unlike the earlier survey, we found no association between perceived risk of HIV and test uptake.

The limitations of the Mayisha study have been discussed elsewhere [9, 11]. The most important limitation is that sampling and selection bias might have affected estimates of HIV infection and testing uptake. Although high, the overall estimate of HIV prevalence in our study (14%) [9, 11] is similar to that reported in two other studies conducted in black Africans in England in 2007 and 2009 [16, 17]. Participants born abroad who had ever been tested for HIV were classified as having been tested in the UK if their year of arrival in the UK was before the year of their last test. It is possible that some people classified as having probably tested in the UK were actually tested while travelling abroad. However, we believe this number is likely to be low given that voluntary and confidential HIV testing is available free of charge in open access clinics throughout the UK.

In 2008, UK national guidelines for HIV testing recommended that all individuals registering in a general practice where diagnosed HIV prevalence in the local population exceeds 2/1000 should be offered a HIV test by the practice [6]. In addition, all individuals from a country of high HIV prevalence ($>1\%$) should also be offered a HIV test in settings that include primary care [6]. Nonetheless, as recently as 2010 it has been suggested that non-specialist clinicians base testing decisions on a poor understanding of risk, that there is poor recognition of HIV-associated illnesses [23], and that in even multi-ethnic

areas HIV testing is not being discussed with black Africans [24].

To conclude, in this paper we provide baseline data on HIV testing in black Africans living in England before the introduction of HIV testing guidelines in 2008 and 2011 [6, 7]. The uptake of HIV testing by black Africans in England was low before the introduction of testing guidelines in 2008. Some recent studies suggest there has been an improvement in the uptake of testing in this population over time [16, 17]. Nonetheless, nearly half of our study participants living with undiagnosed infection had had a previous HIV negative test, most of these had probably tested negative in the UK in the previous 24 months. This raises the possibility that a substantial number of the undiagnosed infections could have occurred in the UK in the 24 months before the survey, demonstrating the importance of regular testing of those at risk.

By providing new information on patterns of testing in black Africans living in England we highlight the importance of universally and routinely offering a HIV test in a range of secondary- and primary-care settings. While we agree with current recommendations of offering HIV testing to all new registrants in general practice in high-prevalence areas, our findings suggest that testing should not be seen as a one-off but rather regular testing in black Africans should be promoted regardless of their perceived risk, region of birth, or HIV test history. Further research on frequency of testing and promotion of regular testing in black Africans is needed.

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DECLARATION OF INTEREST

None.

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