ORIGINAL ARTICLE

Reducing the risk of gonorrhoea in black Caribbean men: can we identify risk factors?

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Objectives: Grouping patients by self assigned ethnicity may hide intraethnic differences in disease associations and sexual behaviour patterns. The aim of the study was to detect associations between gonorrhoea with differences in ancestry, degree of acculturation, and religious belief in young black Caribbean men, which could subsequently be used to target health promotion interventions.

Methods: A questionnaire based case-control study of black Caribbean men with gonorrhoea and a community control group without gonorrhoea.

Results: A lesser degree of acculturation, attending a single sex school, increasing numbers of partners, lack of condom use, not being married, and a belief that sex before marriage was not wrong were associated with an increased risk of gonorrhoea. Country of birth and religious belief were not associated with gonorrhoea.

Conclusions: A number of factors were identified which may be useful in designing healthcare interventions in young black Caribbean men and these differed little from those in other ethnic groups. The healthcare intervention should include advice on reducing the number of partners and increasing the use of condoms.

Studies have previously demonstrated that ethnic origin (as assigned by the individual) is associated with differences in the incidence of sexually transmitted infections (STIs) in a variety of geographical locations.^{1–5} The incidence of gonorrhoea is 17 times higher in African/black Caribbean groups than white men in Birmingham, UK (1100/100 000 compared with 65/100 000) and the incidence of genital chlamydia is 5–15 times higher in the same groups.⁶ A number of different behavioural and demographic associated factors may influence the incidence of gonorrhoea but the reason for high rates of infection in black Caribbean men is not known. Differences in socioeconomic status or sexual behaviour do not appear to provide a full explanation.^{3–7}

Ethnicity can be defined as the cultural environment within which an individual grows up. This contrasts with race which is based on the biological variation between individuals—for example, skin colour, facial features. The cultural environment defining ethnicity clearly may influence sexual behaviour and thus rates of STIs, and as such may be an important marker of infection risk.

One difficulty in identifying causal associations to explain these differences, is that self assignment to a particular ethnic group may lead to the grouping together of individuals with very different ethnic affiliations—for example

- differences in ancestry—for example, country of birth, style of education
- differences in degree of integration and adoption of local cultural norms (acculturation) —for example, language spoken at home, length of time in the United Kingdom
- differences in religious belief and strength of religious belief.

It is possible that the factors associated with higher rates of STIs are hidden within an overall ethnic group label. The aim of this study was to identify associations between acquiring gonorrhoea and ancestry, degree of acculturation, and religious beliefs in black Caribbean men in Birmingham, UK.

METHODS

A questionnaire based case control study of black Caribbean men aged 16–35 with gonorrhoea attending the Whittall

Street genitourinary medicine clinic (WSC) and an age matched community control group of the same size was performed. Black Caribbean patients with gonorrhoea attending the genitourinary medicine clinic were invited to participate between April 2000 and July 2001. Community controls were interviewed between June and October 2000. Local ethics committee approval was obtained.

Male patients attending WSC completed a registration form which included self assigned ethnic origin. All black Caribbean men diagnosed as having gonococcal urethritis, based on microscopy of a Gram stained discharge or culture of a urethral swab, were invited to participate in the study. After giving informed consent the patient was interviewed using a questionnaire based on the National Survey of Sexual Attitudes and Lifestyles survey.⁸ Information on the following was collected:

- patient demographics (age, sex, employment, education, marital status)
- opinions on sexual behaviours
- ancestry
- acculturation
- religious affiliation
- number of partners
- frequency of sexual contact
- ethnicity of sexual partner(s)

Table 1 Age distribution of cases and controls*

Age	Controls	Gonorrhoea
16–19	60 (32%)	47 (24%)
20–24	43 (23%)	62 (32%)
25–30	42 (22%)	37 (19%)
31–35	44 (23%)	49 (25%)
Missing	0	1 (0.5%)
Total	189	196

*p=0.5.

Table 2 Univariate analysis of factors associated with gonorrhoea in black Caribbean men (variables with $p < 0.05$ shown, full table available on *STI* website)

		Controls	Gonorrhoea	p Value
Demographics				
At present are you	Married and living with spouse	30 (16%)	8 (4%)	0.001
	Living with partner of opposite sex	28 (15%)	33 (17%)	
	Other	7 (4%)	4 (2%)	
	Single	124 (66%)	151 (77%)	
How long have you lived in your city/town/village	0–5 years	28 (15%)	61 (31%)	<0.001
	6 years or more	33 (17%)	66 (34%)	
	Always	128 (68%)	69 (35%)	
Were you born in	Caribbean	28 (15%)	49 (25%)	0.044
	England	160 (85%)	146 (74%)	
	Other	1 (0.5%)	1 (0.5%)	
Have you got any of these qualifications*	Yes	153 (81%)	140 (71%)	0.028
	No	36 (19%)	56 (29%)	
Was the last school you attended	Mixed school	185 (98%)	177 (91%)	0.003
	Single sex school	4 (2%)	18 (9%)	
What language do you speak at home	Only English	184 (97%)	145 (74%)	<0.001
	Mostly English	4 (2%)	36 (18%)	
	Some/no English	1 (0.5%)	15 (8%)	
Did you live with birth parents until you were 16	Yes	161 (85%)	90 (46%)	<0.001
	No	28 (15%)	106 (54%)	
Sexual behaviour				
Frequency of sex with a woman in the past 4 weeks	0	41 (22%)	8 (4%)	<0.001
	1–2	29 (15%)	64 (33%)	
	3–6	40 (21%)	64 (33%)	
	over 6	79 (42%)	59 (30%)	
How many women have you had sex with in the past 4 weeks	1	109 (74%)	80 (43%)	<0.001
	2	20 (13%)	66 (35%)	
	3 or more	19 (13%)	42 (22%)	
How many of these were partners you had not had sex with before	0	117 (79%)	67 (36%)	<0.001
	1	19 (13%)	88 (47%)	
	2 or more	12 (8%)	33 (18%)	
Did you use a condom on any occasions in the past 4 weeks	Yes, on all occasions	86 (58%)	26 (14%)	<0.001
	Yes, on some occasions	18 (12%)	77 (41%)	
	No, not in the past 4 weeks	44 (30%)	85 (45%)	
In your life so far how many women have you had sexual intercourse with	1–5	73 (38%)	21 (11%)	<0.001
	6–10	47 (25%)	34 (17%)	
	11–20	32 (17%)	52 (26%)	
	21 or more	37 (20%)	89 (45%)	
Have you ever paid money for sex with a woman	Yes	5 (3%)	19 (10%)	0.004
	No	184 (97%)	177 (90%)	
Ever avoided sex to prevent getting infection or disease transmitted through sex	Yes	100 (53%)	128 (65%)	0.013
	No	89 (47%)	68 (35%)	
Sexual mixing				
In the past 5 years how many women have you had sexual intercourse	0–3	90 (48%)	32 (16%)	<0.001
	4–10	67 (35%)	79 (40%)	
	11 or more	32 (17%)	85 (43%)	
How many black Caribbean	0	18 (10%)	52 (26%)	<0.001
	1	103 (58%)	48 (24%)	
	2	29 (16%)	37 (19%)	
How many black other	3 or more	26 (15%)	59 (30%)	0.001
	0	153 (87%)	144 (73%)	
	1	16 (9%)	23 (12%)	
How many white	2 or more	7 (4%)	29 (15%)	<0.001
	0	135 (77%)	101 (51%)	
	1	25 (14%)	44 (22%)	
How many Indian	2 or more	16 (9%)	51 (26%)	0.017
	0	171 (97%)	179 (91%)	
	1 or more	5 (3%)	17 (9%)	
Which ethnic group are partners in	Black Caribbean only	117 (62%)	70 (36%)	<0.001
	Black Caribbean and white	20 (11%)	34 (17%)	
	Other	52 (27%)	92 (47%)	
Opinions				
Man and woman have sexual relationship before marriage	Always/mostly/sometimes wrong	58 (31%)	37 (19%)	0.017
	Rarely/not wrong	128 (68%)	152 (78%)	
	Depends/don't know	3 (2%)	7 (4%)	
Person living with partner having sexual relations with someone else	Always/mostly/sometimes wrong	167 (55%)	37 (19%)	0.017
	Rarely/not wrong	20 (11%)	152 (78%)	
	Depends/don't know	2 (1%)	7 (4%)	
Person having one night stands	Always/mostly/sometimes wrong	85 (45%)	119 (61%)	<0.001
	Rarely/not wrong	104 (55%)	70 (36%)	
	Depends/don't know	7 (4%)	7 (4%)	
Sexual relations between two adult women	Always/mostly/sometimes wrong	174 (92%)	148 (75%)	<0.001
	Rarely/not wrong	12 (6%)	37 (19%)	
	Depends/don't know	3 (2%)	11 (6%)	

*O levels, A levels, City and Guilds Certificate, ONC, OND, HNC, HND, teacher training certificate, nurse training certificate, degree.

- use of condoms
- contact with prostitutes.

A control group of black Caribbean men aged 16–35 were selected by using census data to target areas of Birmingham with a proportion of young black Caribbean men higher than the city average. Potential participants were approached at home at random and asked to complete a screening questionnaire to assess eligibility before being invited to take part in the study. The screening questions included self identification of ethnic group, age, and any previous history of gonorrhoea. If ineligible for the study the individual was thanked and no further data collected. Only one individual from each household approached was included; all interviews were undertaken face to face with the interviewer, in private. Because of the lengthy nature of the questionnaire (approximately ½ hour) participants were offered £5 to cover out of pocket expenses.

All interviewers attended a training session to explain the aims and methodology of the study and ensure consistent interview technique. A meeting with community leaders was arranged to explain the rationale for performing the study.

Data analysis

A power calculation was performed based on the following assumptions: for a characteristic occurring in 30% of the population, in order to detect a 15% difference between groups, 175 participants would be required in each group (80% power, $\alpha 5\%$). An initial univariate exploratory analysis was used to compare demographic and behavioural variables in the study and control groups. A multivariate conditional logistic regression model was then utilised to identify independent associations with gonorrhoea, entering variables which were significant at the 1% level on univariate analysis. A post hoc sub-analysis of men with one or more new partners in the past 4 weeks was also performed again using the same entry criteria.

RESULTS

A total of 400 individuals were interviewed, 201 community controls without gonorrhoea and 199 clinic attenders with gonorrhoea. This represented 64% of the possible 312 black Caribbean men with gonorrhoea attending the clinic over the study period. In the community control arm 310 men were approached (acceptance rate 65%). Fourteen participants who were not sexually active were excluded and one homosexual man was also excluded. The dataset analysed therefore comprised 189 community controls and 196 patients with gonorrhoea (total 385). The age distribution of the two groups is shown in table 1.

The results of the univariate analysis testing associations between the variables and gonorrhoea are shown in table 2.

On multivariate analysis (fig 1) gonorrhoea was found to be associated with having recent new partners, an increased number of partners over the past 5 years and with not using condoms. Increased frequency of sex was associated with a reduced risk of gonorrhoea. Individuals with no black Caribbean partners were at higher risk of gonorrhoea while those reporting partners of Indian ethnic background were also at higher risk. An increasing length of time staying in the same city, town, or village was associated with a reduced risk of infection as was living with parents until the age of 16, but the risk increased when English was not the main language spoken at home. An association with gonorrhoea was seen in those who were not married and those attending a single sex school. Those who thought that sex before marriage was rarely or never wrong had an increase risk of gonorrhoea but those who thought one night stands were rarely or never wrong had a decreased risk of infection.

A sub-analysis was performed on men who gave a history of one or more new partners within the past 4 weeks. This

Figure 1 Multivariate analysis of factors associated with having gonorrhoea in black Caribbean men aged 16–35.

revealed similar associations as the whole study group—increased risk in those not using condoms regularly, those with more partners, and those not living in the parental household until the age of 16 (table 3).

DISCUSSION

Within the male black Caribbean population gonorrhoea was found to be associated with a variety of demographic and behavioural characteristics. No association with country of birth was found although attending a single sex school was associated with an increased risk of gonorrhoea. A lesser degree of acculturation, as assessed by not speaking English at home and living in the same place for less than 5 years, was also associated with an increased risk of infection. The association between less integration into the community and gonorrhoea may be a reflection of limiting partner choice to a small pool of similar individuals. In a small sexual network of this type gonorrhoea could quickly become endemic. Belonging to a religious group did not influence the risk of having gonorrhoea and there was no association between infection with gonorrhoea and strength of religious belief as assessed by frequency of church attendance (data not shown).

We confirmed the findings of others that recent new sexual partners, lack of condom use, and having had more partners overall are associated with gonorrhoea in this population.⁹ Interestingly the association of gonorrhoea with marital status was similar for men who were single or living with a partner, with both groups at higher risk than those who were married. The reduced risk of infection found in those having more frequent sexual contact may reflect more stable relationships with less frequent partner change.

Table 3 Multivariate analysis of factors associated with having gonorrhoea in black Caribbean men, subanalysis of men with 1 or more new partners in past 4 weeks (n=152)

Variable	Controls	Gonorrhoea	OR (95% CI)
Condom use in the past 4 weeks			
All occasions	21	17	1
Some occasions	3	51	34.7 (6.7 to 178.9)
Never	7	53	16.6 (4.0 to 68.6)
Number of partners in the past 5 years			
0–3	10	18	1
4–10	14	53	7.5 (1.7 to 32.6)
11 or more	7	50	4.5 (1.1 to 18.7)
Lived with birth parents until age 16			
yes	28	58	1
no	3	63	6.5 (1.5 to 28.7)
Length of time living in current city/town/village			
0–5 years	10	34	1
Over 5 years	3	39	6.6 (0.9 to 49.0)
Always	18	48	0.4 (0.1 to 1.3)

Our results highlight the potential importance of social stability on infection risk in black Caribbean men—those who lived with their parents up to the age of 16, had lived in the same city, town, or village for at least 5 years or were married to their partner were at reduced risk of infection. Living with both parents has also been reported elsewhere as reducing the risk of gonorrhoea.¹⁰ A belief that sex before marriage was not wrong may be a marker for higher risk sexual behaviour and was associated with an increased risk of gonorrhoea. Counter intuitively, a belief that one night stands were not wrong was associated with a reduced risk of gonorrhoea. One possible explanation is that those who indulge in frequent one night stands are aware that their behaviour is high risk and take appropriate precautions—for example, by using condoms, to prevent catching gonorrhoea.

Previous studies have suggested that assortative mixing is one reason why high levels of infection are maintained within a population since having sex with someone in a high risk group is more likely to lead to infection.^{2,3,11,12} African-Americans appear to have higher rates of sexual mixing between low risk individual (defined as those reporting few partners) and high risk individuals (defined as those with numerous partners), when compared to whites who report less mixing between high and low risk groups.¹² Although individuals are generally more likely to choose partners similar to themselves, our results suggest that black Caribbean men at highest risk of gonorrhoea are less likely to have black Caribbean partners than those who do not have gonorrhoea. On univariate analysis, having gonorrhoea was commoner in men with more white partners but this association was lost in the multivariate model. A history of Indian partners was significantly associated with having gonorrhoea but this needs to be treated with caution since the numbers were small and the confidence intervals wide. Asian groups have previously been reported to have low rates of gonorrhoea.¹³ Interethnic mixing has been associated with a higher risk of other sexually acquired infections¹⁴ but this is thought to reflect sexual mixing with a higher risk group. Since black Caribbean men are more likely to have gonorrhoea than other ethnic groups it is not clear why having more non-black Caribbean partners would be associated with an increased risk of infection. It may reflect a wider and more varied pool of potential partners with increased risk of exposure to gonorrhoea. Also the dynamics of sexual partner change are complex and rates of infection are affected not just by the total number of partners but also by how likely these partners are to be infected with gonorrhoea—that is, the interactions within sexual partner networks, especially the number of sexual contacts occurring between those

in the “core” and “peripheral” groups as defined by the frequency of partner change.¹²

Other factors may influence the high rates of gonorrhoea in black Caribbean men. Ethnic differences in the successfulness of contact tracing does not explain why black Caribbeans have a higher prevalence of gonorrhoea^{15,16} but black men may have different patterns of clinic use and be more likely to attend for a “check up” than with a specific sexual health problem.¹⁷

The limitations of the study include the use of patient history to exclude gonorrhoea in the control group. If under-reporting of gonorrhoea in the control group did occur it would tend to reduce the power of the study and underestimate the strength of any association, rather than lead to spurious associations. Use of an STI clinic to identify study patients with gonorrhoea may introduce bias since not all patients with gonorrhoea may attend an STI clinic but previous studies in the United Kingdom suggest that most cases do indeed attend such a clinic.¹⁸ The small numbers included in the analysis for certain subgroups (for example, attending single sex schools, not speaking English at home) also requires cautious interpretation. One particular strength of the study is the use of a community control group which allows the results to be more generalisable.

It is important to differentiate between the racial and ethnic associations of sexually transmitted infections (STI). There is limited evidence of any racial or biological differences which could increase the susceptibility or response to infection, although an association has been reported between the risk of gonorrhoea and ABO blood group.¹⁹ The ethnic or cultural background is likely to be a more important determinant of sexual behaviour and STI risk. This provides the rationale to identify risk factors which can be used to target health intervention programmes and to change high risk behaviours in these groups. Our results identify a number of variables associated with gonorrhoea which could be used to assist targeting—sexual mixing with different ethnic groups, marital status, type of school attended, length of time in current town/city, and language spoken at home. These risk factors are very similar to those in other ethnic groups and, although valuable in designing health promotion campaigns, offer little to help target black Caribbean men. Alternative approaches to raise awareness and make STIs a priority to young men at high risk are required. Improved access to STI services to permit the rapid diagnosis and treatment of infections for this group with appropriate training and resources is also required. Future research is needed to address the cultural differences between different Caribbean islands and explore the effectiveness of specific health education programmes in this population.

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CONTRIBUTORS

JR, concept, grant application, supervision, data analysis, manuscript; AT, data collection, manuscript review; MG, data collection, manuscript review; GG, data collection, supervision.

A more detailed version of table 2 is available on the STI website at www.stijournal.com/supplemental

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