Incidence of psychotic illness in London: comparison of ethnic groups

Michael King, Eleanor Coker, Gerard Leavey, Amanda Hoare, Eric Johnson-Sabine

Abstract

Objective—To compare annual incidences of psychosis in people from different ethnic groups as defined in the 1991 census.

Setting—Catchment area of district psychiatric hospital.

Design—All people aged 16 to 54 years who made contact with a wide range of community and hospital services between 1 July 1991 and 30 June 1992 were screened for psychotic symptoms. Patients with such symptoms were interviewed face to face to collect information on demography, ethnic group, psychiatric history and symptoms, drug use, and how care had been sought. A key informant, usually a close relative, was also interviewed.

Main outcome measures—Age standardised incidence of schizophrenia and non-affective psychosis according to the ninth edition of the *International Classification of Diseases* in each ethnic group.

Results—Ninety three patients took part, of whom 38 were assigned a certain or very likely diagnosis of schizophrenia (15 in white population, 14 in black, seven in Asian, and two in others). The age standardised annual incidence of schizophrenia was 2.2 (95% confidence interval 1.5 to 2.9) per 10000 of the population. The incidence ratio for schizophrenia in all ethnic minority groups compared with the white population was 3.6 (1.9 to 7.1); the corresponding figure for non-affective psychosis was 3.7 (2.2 to 6.2).

Conclusions—Raised incidences of schizophrenia were not specific to the African Caribbeans, which suggests that the current focus on schizophrenia in this population is misleading. Members of all ethnic minority groups were more likely to develop a psychosis but not necessarily schizophrenia. The personal and social pressures of belonging to any ethnic minority group in Britain are important determinants in the excess of psychotic disorders found.

Introduction

The variation in the incidence and prevalence of schizophrenia in different ethnic groups in the United Kingdom remains controversial. Although there is disagreement about admission rates to psychiatric hospital for Asians with psychosis,¹ African Caribbeans have higher admission rates and receive a diagnosis of schizophrenia more often than do members of other ethnic groups.²⁻⁴ Possible explanations include selective migration,⁵ a negative experience after migration and the influence of racism,⁶ racial prejudice in psychiatric practice,⁷ inequitable service utilisation,⁸ use of cannabis,³ and specific biological causes.⁹ There has been considerable criticism of the findings, particularly with regard to the possibility of diagnostic inaccuracy,⁶ errors in calculating denominators,¹⁰ and a lack of appropriate comparison groups.⁶

To our knowledge the only other prospective study in Britain that focused on ethnic group was by Harrison *et al.*¹¹ They found that the mean annual incidence of schizophrenia in African Caribbeans aged 15-54 years was 12 times higher than that in the

remaining population and 18 times higher than that in those who were British born and aged 16-29 years. They, however, did not consider other ethnic groups or use a concurrent comparison group, and they used indirect figures to derive the population denominator.

We assessed the annual incidences and rate ratios of psychotic mental disorder in people from all ethnic groups resident in the defined catchment area of a psychiatric hospital in north London in the census year 1991; 1991 was the first census to estimate ethnic group directly. The black community in Haringey is one of the largest in a single health district in England and Wales.¹²

Patients and methods

ENTRY TO THE STUDY

All people aged 16 to 54 years who were resident in the catchment area of St Ann's Hospital and made contact with health services between 1 July 1991 and 30 June 1992 were eligible to take part. Information on potential cases was obtained from community, domiciliary, outpatient, casualty, and inpatient services. The community services included all local general practitioners, a mental health clinic, community psychiatric nurse case managers, and the community psychiatric team. All 280 general practitioners in the 125 practices of the Enfield and Haringey Family Health Services Authority were circulated with a letter (which included the screening criteria) every month for the year of recruitment. Members of staff of the community mental health teams and the regional interim secure unit and medical staff in Brixton and Pentonville prisons, the main remand prisons for the population, were contacted monthly by post. Medical staff in all inpatient facilities were contacted monthly by post and visited personally every two weeks by a member of the research team. All the professionals concerned were advised that we were seeking all patients with new onset of psychotic illness, but our specific hypotheses were not discussed. Patients from the catchment area who were admitted outside the area were monitored by a search of the integrated district and regional information system for the North East Thames Health Region.

We screened the information on potential cases for possible features of psychotic disturbance. The screening criteria applied were those used by Harrison *et al.*¹¹ In summary, evidence was required for at least one of the following: hallucinations, delusions, obvious thought disorder, psychomotor disorder, bizarre or grossly abnormal behaviour, and a definite change in personality or behaviour. Exclusion criteria were acute or chronic organic brain syndromes and conditions attributable to alcohol abuse. Patients meeting these criteria were approached to take part in a detailed, structured, face to face assessment which was carried out by two of us (EC and AH). EC is of black African origin born in England and AH is white and also born in England.

The study was approved by all relevant ethical practices committees. Each patient gave informed consent; consent was also obtained from the next of kin

University Department of Psychiatry, Royal Free Hospital School of Medicine, London NW3 2QG
Michael King, reader
Eleanor Coker, research fellow
Gerard Leavey, research fellow

Department of Psychiatry, St Ann's Hospital, London N15 3TH
Amanda Hoare, senior registrar
Eric Johnson-Sabine, consultant psychiatrist

Correspondence to: Dr King.

BMJ 1994;309:1115-9

of patients detained under a section of the Mental Health Act 1983.

ASSESSMENTS

Face to face interview was used to collect demographic details, a conventional psychiatric history using a semistructured questionnaire, an assessment of psychiatric symptoms using the present state examination,¹³ and an assessment of how the patient had sought help. A key informant, usually a close relative, was interviewed to corroborate the history and provide details of onset of disturbance and how care had been sought.

Drug use—Each subject was asked standardised questions about the use of non-prescribed drugs and was asked to give a urine sample, which was screened for drugs.

Ethnic group was assigned in the same way as the 1991 census. When patients were unable to assign themselves an ethnic category the interviewer assigned a category following the guidelines laid down by the Office of Population Censuses and Surveys. The ethnic ratings used in the 1991 census were arrived at after extensive consultation with ethnic minority organisations and piloting for acceptability during the 1980s.¹⁴ It provides the most accurate measure yet of the ethnic composition of the British population.

Psychiatric diagnosis was assigned to each patient according to the ninth edition of the *International Classification of Diseases (ICD-9)*¹⁵ and the revised third edition of the *Diagnostic and Statistical Manual of Mental Disorders (DSM-III-R)* of the American Psychiatric Association.¹⁶ When there was uncertainty, an alternative diagnosis was also recorded. Each diagnosis was the consensus of discussion between at least three clinical members of our research team (MK, EC, EJ-S, and AH). Only the original interviewer (EC or AH) was aware of the subject's ethnic origin. On the basis of the ICD consensus diagnosis, the degree of certainty for the diagnosis of schizophrenia was established as described previously.^{11 17}

To estimate incidence a broad classification of non-affective psychosis was derived; this included schizophrenia (ICD-9 code 295) and paranoid states (ICD-9 code 297) and other non-organic psychosis (ICD-9 code 298). ICD-9 codes 297 and 298 were, however, also examined in their own right. The Catego class, a computer estimate derived from the present state examination, was used to measure symptoms in the previous month.¹⁸

Onset of disorder—The mode of onset of disturbance was established from information given by the patient and key informant at interview and from case notes. As much independent information as possible was used to assess time since the first detectable change in personality and behaviour or the development of unequivocal psychotic symptoms, or both. Onset was further categorised as acute or insidious according to the classification established by the World Health Organisation.¹⁹

TABLE I—Demographic details of 93 patients with possible onset psychotic disorder in catchment area of St Ann's Hospital, north London

	No of patients
Sex:	
Men	50
Women	43
Level of education:	
Primary school	3
Secondary school	52
College of further education	32
Polytechnic or university	6
Place of birth:	
United Kingdom	54
Abroad	39
Marital state:	
Married or cohabiting	20
Single	64
Divorced, separated, or widowed	9
Employment:	
Employed	15
Unemployed	70
Housewife	5
Student	3
Social class of head of household:	
Managerial and technical	4
Skilled	34
Part skilled	24
Unskilled	21
Not classifiable/not known	10
Accommodation at ascertainment:	
Homeless:	
Rough	3
Bed and breakfast hotel	1
Hostel	4
Living with family	56
Living alone	29
Self assigned ethnic group*:	
White	39
Black Caribbean	19
Black African	14
Black other	5
Indian	5
Pakistani	3
Other Asian	3
Other	5

*In 16 cases in which patients were unable to give an answer, interviewer's rating was used (see text).

TABLE II—Summary data from 1991 census for catchment area of St Ann's Hospital, north London. Values are numbers (percentages) of inhabitants

Ethnic group	Age group (years)		
	16-54 (n=167 984)*	16-29 (n=73 121)*	30-54 (n=94 863)*
White	121 438 (72.3)	51 485 (70.4)	69 953 (73.7)
Black	27 348 (16.3)	13 546 (18.5)	13 802 (14.5)
Black Caribbean	14 973 (8.9)	6 610 (9.0)	8 363 (8.8)
Black African	9 381 (5.6)	4 936 (6.8)	4 445 (4.7)
Black other	2 994 (1.8)	2 000 (2.7)	994 (1.0)
Asian	11 644 (6.9)	4 276 (5.8)	7 368 (7.8)
Indian	6 326 (3.8)	2 233 (3.1)	4 093 (4.3)
Pakistani	1 065 (0.6)	506 (0.7)	559 (0.6)
Other	4 253 (2.5)	1 537 (2.1)	2 716 (2.9)
Other	3 847 (2.3)	2 011 (2.8)	1 836 (1.9)

*Including Bangladeshi and Chinese ethnic groups.

ANALYSIS

Univariate analyses applied were the χ^2 statistic for proportions, the Mantel-Haenszel test for linear association, and Student's *t* test and analysis of variance for differences in means. Incidences were calculated from the 1991 census figures for the catchment area, which were made available to us by the health authority. Rates were standardised in two broad age bands (16 to 29 and 30 to 54 years) using figures for England supplied by the Office of Population Censuses and Surveys. Confidence intervals for incidences were calculated with the computer program confidence intervals analysis,²⁰ and rates were compared by linear logistic modelling with the GLIM computer program.²¹

Results

RESPONSE RATES

One hundred and three subjects satisfied the screening criteria for having a possible first onset psychotic disorder. Three patients refused to take part and seven could not be contacted. A search of the integrated district and regional information system found a further three psychotic patients who had been missed. Thus, 93 patients (88%) were successfully recruited, five of whom were unable to undergo a present state examination owing to disturbed behaviour and concentration. An ethnic classification was attempted on the 10 patients who satisfied criteria but refused to participate or could not be contacted. Four were white, three black Caribbean, two black African, and one black other.

DEMOGRAPHY

The mean ages were 31.9 years and 27.2 years for women and men respectively (mean difference 4.7 years (95% confidence interval 1.1 to 8.4), $t=2.53$, $df=91$, $P=0.013$) (table I). The median time of residence in the area was 39 months, 14 patients having lived there for six months or less. Ten (11%) patients had refugee status compared with 5% of people (of all ages) in the population of the catchment area.²² Fifty four patients were born in the United Kingdom; in 40 cases one or both parents had been born abroad, in 11 both parents had been born in the United Kingdom, and in three the parents' place of birth was uncertain.

ETHNIC GROUP

Sixteen patients were unwilling or unable to decide on their ethnic group, which was therefore assigned by the interviewer (table I). Census figures for the St Ann's catchment area are shown in table II. Of the 39 white patients, 18 were of British origin, five were Irish, seven were Greek or Turkish Cypriot, and nine were of other European origin.

There were no significant differences between the ethnic groups as categorised in the 1991 census (white, black Caribbean (African Caribbean), black African, black other, Asian (Indian, Pakistani, and other Asian) and other) in terms of sex, marital state, social class of head of household, level of education, employment, period of residence in the area, or homelessness. White patients were older than the others (mean difference 3.4 years, $P=0.08$).

INCIDENCES OF PSYCHOTIC ILLNESS

Sixty two patients were given a diagnosis in one of the categories of non-affective psychosis, including schizophrenia (ICD-9 codes 295, 297, and 298). Thirty eight patients were assigned a restrictive (certain or very likely) diagnosis of schizophrenia (table III). There was strong agreement between ICD-9 and DSM-III-R; only one of these 38 patients received a discrepant diagnosis. When the Mantel-Haenszel test for trend was applied there was no significant relation

TABLE III—Ethnic group and ICD-9 diagnosis of schizophrenia in the 93 patients in catchment area of St Ann's Hospital, north London. Values are numbers (percentages) of patients

	Certainty of schizophrenia ¹⁷				
	Certain	Very likely	Probable	Possible	No schizophrenia
White (n=39)	12 (31)	3 (8)	3 (8)	5 (13)	16 (41)
Black (n=38)*	13 (34)	1 (3)	7 (18)	3 (8)	14 (37)
Asian (n=11)†	7 (64)			1 (9)	3 (27)
Other (n=5)	2 (40)			1 (20)	2 (40)

*Black Caribbean, black African, and black other. †Indian, Pakistani, and other Asian.

TABLE IV—Rates of schizophrenia and non-affective psychosis in population of catchment area of St Ann's Hospital, north London

Ethnic group	Rate	Age standardised rate per 10 000 population (95% confidence interval)	
		Schizophrenia	Non-affective psychosis
White		15/121 438	2.0 (1.2 to 2.8)
Black		14/27 348	8.7 (5.3 to 12.0)
Black Caribbean	9/14 973	5.3 (1.8 to 8.7)	8.9 (4.4 to 13.5)
Black African	3/9 381	4.1 (0 to 8.8)	8.7 (2.4 to 14.9)
Black other	2/2 994	8.1 (0 to 20.8)	12.0 (0 to 25.7)
Asian		7/11 644	6.9 (2.1 to 11.6)
Indian	3/6 326	4.5 (0 to 9.6)	4.5 (0 to 9.6)
Pakistani	2/1 065	15.3 (0 to 36.5)	15.3 (0 to 36.5)
Other	2/4 253	4.8 (0 to 11.4)	7.0 (0 to 15.0)
Other		2/3 847	5.8 (0 to 12.3)
Total		38/167 984	3.6 (2.7 to 4.5)

*When lower limit of confidence interval was negative zero has been substituted.

between the degree of certainty of schizophrenia (five categories in table III) and ethnic group.

The annual incidences of schizophrenia and non-affective psychosis were standardised for age with a cut off point of 29 years for ease of comparison with other studies in which incidences have not been standardised (table IV).¹¹ The age standardised annual incidence of schizophrenia was 2.2 per 10 000 population (1.5 to 2.9). Linear logistic modelling (controlling for age) showed significant overall differences between the white population, black Caribbeans, black Africans and black others, all Asians and others in the rate of schizophrenia ($\chi^2=19.54$, $df=4$, $P<0.001$) and non-affective psychosis ($\chi^2=30.51$, $df=4$, $P<0.001$). To avoid multiple comparisons of small numbers, we report rate ratios only for the white population against all other ethnic groups. The incidence ratio for schizophrenia in all ethnic minority groups compared with the white population was 3.6 (1.9 to 7.1); the corresponding ratio for non-affective psychosis was 3.7 (2.2 to 6.2).

Nine patients (five white, two black African, one black other, and one other) three of whom were refugees, received a diagnosis of mania (ICD-9 codes 296.0, 296.2, and 296.4). The age standardised annual incidence of mania in the population of the catchment area was 0.5 (0.2 to 0.8) per 10 000 population.

Nine of the 10 refugees (five white, four black African, and one other) were given a diagnosis of affective psychosis (eight of ICD-9 code 296 and one of ICD-9 code 298). One was given a diagnosis of non-affective psychosis (ICD-9 code 297.8, paranoid state); in this case there was a degree of uncertainty about the diagnosis.

PSYCHIATRIC STATE

Doubtful interviews, in which the adequacy of ratings of key symptoms in the present state examina-

tion was questionable, occurred no more or less often in any particular ethnic group. The ethnic group of the interviewer was not a factor influencing the rate of doubtful interviews. On the basis of the CATEGO class there were no unusual or distinctive syndromes predominating in any particular ethnic group.

The distribution of the time that had elapsed between the first sign of a change in behaviour or personality and the first contact with psychiatric services was highly skewed, with a mean of 90 weeks and a median of 28 weeks, but it did not vary significantly between the white, black, Asian, or other ethnic groups. In particular, there was no difference between black Caribbean and other patients in time since the first onset of schizophrenia or all psychoses (median difference 2 weeks longer for black Caribbeans, $P=0.33$). There was no difference between the ethnic groups with regard to the type of onset of the disorder, broadly defined as acute or insidious.

Fourteen patients had a first degree relative who had had a psychotic illness. Neither size of sibship nor prevalence of psychotic illness in first degree relatives differed significantly between ethnic groups.

Black patients were overrepresented among those with less common psychotic syndromes: five black Caribbean, three black African, and two white patients had diagnoses with ICD-9 codes 295.4, 298.3, 298.4, 298.8, and 298.9). Only five of these, however, had developed the disorder acutely (in two weeks or less).

All nine black Caribbeans with schizophrenia were aged 29 years or under, whereas there was a broader age distribution in the other ethnic groups.

More white patients (33/39, 85%) had been admitted to hospital at ascertainment compared with black patients (23/38, 61%), Asians (7/11, 64%), or patients in the census classification other groups (2/5, 40%) ($\chi^2=7.93$, $df=3$, $P=0.047$). There were no differences between the ethnic groups in terms of compulsory admission under the Mental Health Act or the police being involved in admission.

USE OF NON-PRESCRIBED DRUGS

Cannabis was the main drug misused. Fourteen (36%) white, 12 (32%) black, and three (27%) Asian patients reported having used cannabis at one time. Six white and seven black patients used cannabis at least weekly. Urine samples were screened for drugs in 63 patients; six tests were positive for cannabinoids, four of which were from black patients. There was no association between ICD-9 diagnosis of schizophrenia and use of cannabis.

Discussion

To our knowledge, ours is the only prospective study in Britain of first onset psychosis to have focused on all ethnic groups in a diagnostic interview. The age standardised annual incidence of schizophrenia was 2.2 (1.5 to 2.9) per 10 000 population, close to the rate reported previously in a British study.¹⁷ The annual incidence of mania was just below the lower range usually quoted for mania in Britain.²³ Annual incidences of schizophrenia or all non-affective psychoses were consistently higher in the ethnic minority groups than in the white population. Confidence intervals for the estimated incidences were wide for some groups, particularly the Pakistanis, because of their small numbers; therefore these figures must be regarded with caution. Littlewood and Lipsedge pointed out that African Caribbeans present with schizophrenia at a younger age.⁶ This is confirmed by our results (schizophrenia in African Caribbeans occurred only in patients aged 16 to 29 years) and supports their view that lifetime incidence in African Caribbeans may be closer to the incidence in the base population.

The incidence of schizophrenia in African Caribbeans (all of whom were second generation) relative to other groups was lower than that reported by Harrison *et al* in Nottingham.¹¹ The 1991 census enabled us to obtain a much more accurate estimate of the denominator population and avoided the need for extrapolations from other sources, as in the Nottingham study.¹¹ As far as possible, we also limited the confounding influence of use of hospital psychiatric services by recruiting patients from primary care and community sources as well as from hospital psychiatric services.²³

Despite the higher rates, we found little in the mode of onset or clinical picture which distinguished the ethnic groups. Demographic factors were not important confounders. Service factors, such as admission, did not distinguish the ethnic groups, and we could not confirm other work that police involvement or use of the Mental Health Act were more likely in black patients.^{3,24} Reported cannabis use was not associated with any particular ethnic group and was thus unlikely to be an explanation for the higher incidence of psychosis in ethnic minorities.

FIRST AND SECOND GENERATION MIGRANTS

Like others,^{11,25} we found little evidence for the "atypical psychosis"—characterised by a female preponderance, a sudden onset, prominent emotional symptoms, and florid (often religious) delusions—that has been reported in African Caribbean people living in Britain, particularly first generation migrants.⁴ We did, however, find more unusual psychotic syndromes in black patients. Possibly because we assessed time of onset in a standardised manner, which is often not the case in routine clinical work, we found few truly acute syndromes and considerable concordance between the criteria of the ICD-9 and DSM-III-R; the criteria of DSM-III-R require at least six months of symptoms to diagnose schizophrenia.

Our population was striking in that 85% were born abroad or had at least one parent who had been born abroad. Most white patients with schizophrenia were also first or second generation migrants. Although some have speculated that raised incidence in African Caribbeans may have a biological basis,⁹ the consistent finding over many years and in several countries that first or second generation migrants of any ethnic group may be at greater risk of a psychotic illness is suggestive of environmental rather than constitutional factors in the provocation of these disorders. The sources of stress on members of ethnic minorities include the effects of migration, discrimination, racism, and cultural change. Perhaps the most important determinant of the mental health of ethnic minorities in Western countries is the conditions under which they live.²⁶ However, why such stresses should result in psychotic disorder rather than other more usual expressions of stress, such as anxiety disorders and alcohol dependence, is unclear. Nine of the 10 refugees developed an affective psychosis. We cannot say whether these disorders are provoked by the stress of this particular form of migration, but they stand in obvious contrast with the other psychoses occurring in people migrating for other reasons. These issues are best examined by case-control studies, in which index patients are compared directly with random controls selected from the same catchment area. We are undertaking such a study to try to unravel some of these important points.

Hospital admissions for psychotic disorders in people from the Indian subcontinent have been reported as being both higher and lower than those in the base population^{14,25}; differences exist within the Asian community, Pakistani born women having significantly lower rates.²⁷ The relatively small Asian population living in the catchment area of St Ann's

Clinical implications

- Schizophrenia is reported to be more prevalent among African Caribbeans living in Britain than among other ethnic minority groups and the white population
- This study of the annual incidence of psychosis among different ethnic groups (defined according to the 1991 census) found that the incidence of schizophrenia was higher among all ethnic minority groups, not just black Caribbeans
- Ethnic group bore no relation to the mode of onset or clinical picture of a first episode of psychosis or the likelihood of being admitted
- Cannabis use was not associated with any particular ethnic group or with the onset of psychosis
- The current focus on schizophrenia in African Caribbeans is misleading as all ethnic minority groups are vulnerable

Hospital may reduce the role of the extended family and community support that is postulated to be an important protective factor against severe mental illness in this community.²⁸ Sound evidence for this cultural stereotype, however, is lacking.²⁶ Our method of ascertainment may have avoided selection factors, such as differential use of services,²⁹ thereby estimating incidence more accurately. Only a similar study with larger numbers will confirm this finding.

LIMITATIONS OF STUDY

There are important limitations to our results. The census figures may not be completely accurate; between 0.57% and 2% of the population may have avoided the census.³⁰ The Office of Population Censuses and Surveys, however, has recently reported on a comparison between the 1991 census figures and the data of the 1989-91 labour force surveys, concluding that there is unlikely to be an ethnic bias in the rates of underenumeration.¹⁴ The census figures for the area indicated that black Caribbean men may be underrepresented by up to 10%. Assuming underenumeration by all black Caribbeans to this degree reduces their standardised incidence of schizophrenia only from 5.3 to 4.8 (1.7 to 7.9) per 10 000 population. A further limitation is that diagnosis in first onset psychosis is not always straightforward. Patients may display symptoms or behaviour which do not fit a diagnostic category because the symptoms have not been present for long enough. The presentation of mental illness may differ in different cultures and ethnic groups,⁴ and the use of categorical diagnoses established in Western populations may miss important cultural distinctions in the presentation of psychological distress.³¹ The CATEGO class derived from the present state examination, however, did not confirm the presence of unusual or distinctive syndromes in any particular ethnic group. We assessed symptoms cross sectionally at first presentation; the predictive validity of orthodox, psychiatric diagnosis can be established only by determining outcome. All patients recruited to the study will be interviewed again after 12 months.

CONCLUSIONS

In conclusion, we regard the current focus on African Caribbeans and schizophrenia as misleading. Members of all ethnic minority groups are more likely to develop a psychosis but not necessarily schizo-

phrenia. Although there is a biological component to psychosis, this finding suggests that the personal and social pressures of belonging to any ethnic minority group in Britain are important determinants of the excess of psychotic disorders found.

This study was supported by the Department of Health and the North East Thames Regional Health Authority. We thank all the patients and their relatives who took part and the clinical and administrative staff in the Haringey health district for their helpful cooperation throughout the study.

- 1 Cochrane R, Bal SS. Mental hospital admission rates of immigrants to England: a comparison of 1971 and 1981. *Soc Psychiatry Psychiatr Epidemiol* 1989;24:2-11.
- 2 Dean G, Walsh D, Downing H, Shelley E. First admissions of native-born and immigrants to psychiatric hospitals in south-east England 1976. *Br J Psychiatry* 1981;139:506-12.
- 3 McGovern D, Cope RV. First admission rates for first and second generation Afro-Caribbeans. *Social Psychiatry* 1987;22:139-49.
- 4 Littlewood R, Lipsedge M. Some social and phenomenological characteristics of psychotic immigrants. *Psychol Med* 1981;11:289-302.
- 5 Carpenter L, Brockington JF. A study of mental illness in Asians, West Indians and Africans living in Manchester. *Br J Psychiatry* 1980;137:201-5.
- 6 Littlewood R, Lipsedge M. Psychiatric illness among British Afro-Caribbeans. *BMJ* 1988;296:950-1.
- 7 Fernando S. *Race and culture in psychiatry*. London: Tavistock/Routledge, 1988.
- 8 Moodley P. The Fanon project: a day centre in Brixton. *Bulletin of the Royal College of Psychiatrists* 1987;11:417-8.
- 9 Eagles JM. The relationship between schizophrenia and immigration. Are there alternative hypotheses? *Br J Psychiatry* 1991;159:783-9.
- 10 Sashidharan SP. Psychiatric illness among British Afro-Caribbeans. *BMJ* 1988;296:1735.
- 11 Harrison G, Owens D, Holton A, Neilson D, Boot D. A prospective study of severe mental disorder in Afro-Caribbean patients. *Psychol Med* 1988;18:643-57.
- 12 Balarajan R, Raleigh VS. The ethnic populations of England and Wales: the 1991 census. *Health Trends* 1992;24:113-6.
- 13 Wing JK, Cooper JE, Sartorius N. *Measurement and classification of psychiatric symptoms*. Cambridge: Cambridge University Press, 1974.

- 14 Teague A. Ethnic group: first results from the 1991 census. *Population Trends* 1993;72:12-7.
- 15 World Health Organisation. *Mental disorders: glossary and guide to their classification in accordance with the ninth revision of the international classification of diseases*. Geneva: WHO, 1978.
- 16 American Psychiatric Association. *Diagnostic and statistical manual of mental disorders third edition, revised*. Washington, DC: APA, 1987.
- 17 Cooper JE, Goodhead D, Craig T, Harris M, Howat J, Korner J. The incidence of schizophrenia in Nottingham. *Br J Psychiatry* 1987;151:619-26.
- 18 Wing J, Cooper J, Sartorius N. *The description and classification of psychiatric symptomatology: an instruction manual for the PSE and CATEGO system*. London: Cambridge University Press, 1974.
- 19 Sartorius N, Jablensky A, Korten A, Ernberg G, Anker M, Cooper JE, et al. Early manifestations and first contact incidence in different cultures. *Psychol Med* 1986;16:909-28.
- 20 Gardner MJ, Gardner SB, Winter PD. *Confidence interval analysis version 1.1*. London: British Medical Journal, 1989.
- 21 Numerical Algorithms Group. *Generalised linear interactive modelling, revised edition*. Oxford: NAG, 1986.
- 22 Awai J. *Refugee groups in Haringey*. London: Haringey Health Authority Public Health Directorate, 1992.
- 23 Boyd JH, Wiseman MM. Epidemiology. In: Paykel ES, ed. *Handbook of affective disorders*. Edinburgh: Churchill Livingstone, 1982.
- 24 Thomas CS, Stone K, Osborn M, Thomas PF, Fisher M. Psychiatric morbidity and compulsory admission among UK-born Europeans, Afro-Caribbeans and Asians in central Manchester. *Br J Psychiatry* 1993;163:91-9.
- 25 Harvey I, Williams M, McGuffin P, Toone BK. The functional psychoses in Afro-Caribbeans. *Br J Psychiatry* 1990;157:515-22.
- 26 Sashidharan SP. Afro-Caribbeans and schizophrenia: the ethnic vulnerability hypothesis re-examined. *International Review of Psychiatry* 1993;5:129-44.
- 27 Cochrane R, Bal SS. Migration and schizophrenia: an examination of five hypotheses. *Social Psychiatry* 1987;22:181-91.
- 28 Birchwood M, Cochrane R, MacMillan F, Copestake S, Kucharska J, Cariss M. The influence of ethnicity and family structure on relapse in first episode schizophrenia. A comparison of Asian, Afro-Caribbean and white patients. *Br J Psychiatry* 1992;161:783-90.
- 29 Brewin C. Explaining the lower rates of psychiatric treatment among Asian immigrants in the United Kingdom: a preliminary study. *Social Psychiatry* 1980;15:17-9.
- 30 London Research Centre. *Census information notes 92-3*. London: LRC, 1992.
- 31 Fabrega H. Cultural relativism and psychiatric illness. *J Nerv Ment Dis* 1989;177:415-25.

(Accepted 19 August 1994)

Helicobacter pylori infection in childhood: risk factors and effect on growth

P Patel, M A Mendall, S Khulusi, T C Northfield, D P Strachan

Abstract

Objective—To investigate the current prevalence of *Helicobacter pylori* infection in childhood, the risk factors for infection, and the effect of infection on growth in preadolescent schoolchildren.

Design—Population based sample of 7 year old schoolchildren followed up at age 11; data on risk factors for infection collected at age 7; presence of infection at age 11 determined by measurement of salivary IgG against *H pylori* by a newly developed enzyme linked immunosorbent assay (ELISA). Height was measured at 7 and 11 years of age.

Subjects—554 schoolchildren from Edinburgh.

Results—62 (11%) children had *H pylori* infection. Independent risk factors for infection were single parent families (adjusted odds ratio=2.5; 95% confidence interval 1.1 to 5.7), the 10% most crowded homes (3.1; 1.3 to 7.2), and schools serving predominantly rented housing estates (2.5; 1.0 to 6.5). School catchment area was more important than parental social class or housing tenure. Growth in height between 7 and 11 was diminished in infected children by a mean of 1.1 cm (0.3 to 2.0 cm) over four years. This growth reduction was largely confined to girls (1.6 cm over four years), among whom it correlated with salivary IgG ($P=0.015$).

Conclusion—Data from salivary assay to investigate the epidemiology of *H pylori* suggest that factors relating to the type of community in which the child lives may now be as important for acquisition of this infection as features of the family home. The greater reduction of growth among infected girls

raises the possibility that *H pylori* infection may delay or diminish the pubertal growth spurt.

Introduction

Helicobacter pylori is a bacterium that colonises the human stomach and is the cause of type B gastritis.¹ It is strongly associated with peptic ulceration,² and more recently a link with gastric cancer has been found.³ Once acquired, the infection lasts several decades in most cases, with a very low rate of spontaneous eradication.⁴ Besides the well documented local effects of *H pylori*, little is known about the distant and perhaps more subtle effects of this chronic, lifelong infection.

In the developing world *H pylori* is acquired early in life; most of the population is infected by the age of 10 years.⁵ In the developed world there is a gradual rise in prevalence with age. The most important risk factors in adults relate to socioeconomic deprivation,⁶ and to overcrowding and poor hygiene in the childhood home.⁶ Currently there are few data on prevalence of infection among children in developed countries, but it is believed to be low. It is not known whether the risk factors identified in adults still apply to children in more recent times, as transmission has greatly decreased.⁷

Viable *H pylori* organisms have never been isolated from the environment, hence interpersonal transmission is most likely. *H pylori* seropositivity is more common in household contacts of infected children,⁸ but the family contacts of infected adults do not show

Division of Biochemical Medicine and Department of Public Health Science, St George's Hospital Medical School, London SW17 0RE

P Patel, research fellow in gastroenterology
M A Mendall, lecturer in gastroenterology
S Khulusi, research fellow in gastroenterology
T C Northfield, professor in gastroenterology
D P Strachan, senior lecturer in public health science

Correspondence to: Dr Patel.

BMJ 1994;309:1119-23