Communicable Diseases

National survey of notifications of tuberculosis in England and Wales in 1983

MEDICAL RESEARCH COUNCIL TUBERCULOSIS AND CHEST DISEASES UNIT

Abstract

In a survey of all notifications of tuberculosis in England and Wales for the first six months of 1983 56% of the 3002 newly notified patients who had not been treated before were of white and 37% were of Indian subcontinent (Indian, Pakistani, or Bangladeshi) ethnic origin, findings similar to those of a survey in 1978-9. In the four and a quarter years between the surveys the number of patients notified had declined by 26%, the decline being 28% among those of white and 23% among those of Indian subcontinent ethnic origin. The white patients were on average older than the patients of Indian subcontinent ethnic origin, and a higher proportion of them had respiratory disease (82% compared with 66%). The pulmonary lesions were on average larger and more often bacteriologically positive in the white patients. There were considerable differences between the ethnic groups in the estimated yearly rates of notifications per 100 000 population in England in 1983. The highest rates occurred in the Indian (178) and the Pakistani and Bangladeshi (169) populations and were roughly 25 times the rate in the white population (6·9). In the Indian subcontinent ethnic groups the highest rates occurred among those who had arrived in the United Kingdom within the previous five years.

Introduction

Although the yearly number of notifications of tuberculosis in England and Wales has continued to decline over the past 20-30 years, immigrants from various ethnic groups have formed an increasing proportion of the patients presenting as new cases.[1-5] Information on ethnic origin and country of birth is not available from the statutory system of notification, but a national survey of new notifications of tuberculosis in England and Wales from 1 October 1978 to 31 March 1979[3] conducted by the tuberculosis and chest diseases unit of the Medical Research Council provided information about rates of notification and characteristics of disease in the different ethnic groups (classified according to a well tested system[6]).

A second national survey, reported here, was undertaken in 1983 to assess the present position and to measure any changes that had occurred since the earlier survey.

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Methods

The methods were similar to those of the first survey.[3] All medical officers for environmental health in England and Wales sent to this unit a photocopy of every notification form for tuberculosis received by their local authorities for 1983. For the first six months all patients were included in the survey, and for the second six all those who were aged less than 25 on the date of notification were studied. This report concerns the main findings for the first six months.

We asked all clinicians notifying new cases of tuberculosis to send to this unit a patient form giving clinical details for each patient included in the survey and a pretreatment posteroanterior chest radiograph for all patients with pulmonary disease, a pleural effusion, or mediastinal lymphadenopathy for independent assessment. The forms were matched with the photocopies of the notification forms to ensure that no patient was overlooked. Information on the patient form included the ethnic origin (classified by the physician, as listed in table II) and, for patients born abroad, the country of birth and year of first entry to the United Kingdom. In addition, the Office of Population Censuses and Surveys sent us details of age, sex, and type of disease for all cases notified during 1983 from the weekly returns made to it by the medical officers for environmental health. This enabled us to check that we had received photocopies of all notifications during the survey period.

The results of tests of sensitivity to antituberculosis drugs of strains of *Mycobacterium tuberculosis* isolated from the notified cases were provided by the six regional centres for tuberculosis bacteriology and the mycobacterium reference unit of the Public Health Laboratory Service, which all use the same techniques and definitions. The Public Health Laboratory Service Communicable Disease Surveillance Centre coordinated this contribution to the survey.

To ensure confidentiality only those who were directly connected with the coordination of the survey had access to the documents.

Results

We received copies of 3839 notification forms from the medical officers for environmental health, and the check against the returns from the Office of Population Censuses and Surveys showed that these comprised all the notifications reported for England and Wales for the six month period. The main analyses were restricted to newly notified patients who had not been tested before, and table I shows the various categories of patients excluded, including 300 patients who had been treated for tuberculosis before. The

TABLE I—*Notifications in six month surveys in 1983 and 1978-9*

	1983 survey	1978-9 survey
Notifications to medical officers for environmental health	3839	4838
Duplicate notifications in the survey period	107	77
Exclusions:		
Patients receiving chemoprophylaxis only	207	363
Patients already notified before survey	11	34
Diagnosis changed by physician	104	105
Disease due to mycobacteria other than *M tuberculosis*	101	69
BCG abscess	3	0
Inactive disease, notified after death	4	18
Patients previously treated for tuberculosis	300	440
Newly notified, previously untreated patients	3002	3732
No of notifications reported to Office of Population Censuses and Surveys*	3609	4496

* Includes previously treated patients.

number of newly notified patients who had not been treated before dropped from 3732 in the 1978-9 survey to 3002 in the present survey, a decline of 20%. Only the first three months of the year, however, were common to both surveys, and there are seasonal variations in the notifications of tuberculosis. After adjustment based on the quarterly published figures for notifications the figures showed an overall decline of 26% over the four and a quarter years between the surveys (table II); a decline was evident in all the ethnic groups.

As in the 1978-9 survey most of the patients were of white (56%) or of ethnic origin Indian subcontinent (defined as Indian, Pakistani, or Bangladeshi) (37%), and only 3% were of West Indian ethnic origin.

TABLE II—*Ethnic origin of newly notified patients who had not been treated before*

Ethnic origin	No (%) in 1983 survey	No (%) in 1978-9 survey	% Change between surveys*
White	1668 (56)	2125 (57)	−28
Indian	720 (37)	897 (35)	−26
Pakistani and Bangladeshi	377	426	−18
West Indian	79 (3)	76 (2)	−4
Other†	158 (5)	208 (6)	−30
All patients	3002 (100)	3732 (100)	−26

* Corrected for seasonal variation.
† Classified as African, Arab, Chinese, mixed, or other and including four patients in 1983 and nine in 1978-9 whose ethnic origin was unknown.

CLASSIFICATION OF DISEASE

Respiratory tuberculosis was defined as pulmonary disease, mediastinal lymphadenopathy, a pleural effusion, or any combination of the three. The disease was classified as respiratory only in 2032 (68%) cases, non-respiratory only in 745 (25%), and both in 225 (7%). For the 1668 white patients the figures were 78%, 18%, and 4% and for the 1097 Indian subcontinent patients 54%, 34%, and 12%, respectively (data not tabulated here). The percentages were similar to those of the 1978-9 survey.

SEX AND AGE DISTRIBUTION

Of the 1668 white patients, 65% were male—namely, 70% of those with respiratory disease but only 44% of those with non-respiratory disease. In contrast, 44% of the 720 Indian patients and 48% of the 377 Pakistani and Bangladeshi patients were male, the proportions being similar for respiratory and non-respiratory disease.

Almost half (47%) of the white patients were aged 55 or more (51% of the male and 41% of the female patients), and only 29% were less than 35. The age distribution was notably different in the Indian subcontinent ethnic groups as only 16% of the Indian and 10% of the Pakistani and Bangladeshi patients were aged 55 or more and 59% and 63%, respectively, were aged less than 35. The age distributions of the male and female patients were broadly similar within each of these three ethnic groups for both respiratory and non-respiratory disease.

RADIOGRAPHIC ASSESSMENTS

A posteroanterior chest radiograph taken between six weeks before and four weeks after chemotherapy was started was available for assessment for 2011 (89%) of the 2257 patients with respiratory disease in the 1983 survey. A 50% random sample of the radiographs from the 1978-9 survey, stratified by ethnic origin, was taken, and the films from both surveys were masked, mixed, and then read by the independent assessor, who was unaware of which survey any patient had been in.

In 1983 most (88%) of the 1201 white patients assessed had a pulmonary lesion, only 3% having enlarged nodes alone, whereas for the 670 Indian subcontinent patients the proportions were 63% and 24%, respectively. Lesions affecting a total area of more than one lung field were reported in 17% of the 1057 white patients and only 7% of the 421 Indian subcontinent patients with a pulmonary lesion, and cavitation was reported in 33% and 21%, respectively. The radiographic characteristics were similar to those of the patients in the 1978-9 survey for both the total population and the main ethnic groups (data not tabulated here).

BACTERIOLOGICAL RESULTS

In 1983 a positive culture from a respiratory specimen (nearly all from sputum) was obtained from 1198 (59%) of the 2032 patients with respiratory disease only, 809 (40%) having a positive smear as well. As in 1978-9 the proportions of positive bacteriological results, obtained from both cultures and smears, were higher in the 1299 white patients (66% and 46%, respectively) than in the 594 Indian subcontinent patients (45% and 28%, respectively).

Of the 855 strains tested for sensitivity to streptomycin, isoniazid, rifampicin, and ethambutol, 816 (95%) were fully sensitive to the drugs, 29 (3%) were resistant to one drug (eight to isoniazid, 20 to streptomycin, and one to ethambutol), and 10 (1%) were resistant to both isoniazid and streptomycin. A further 126 strains were tested for sensitivity to isoniazid, rifampicin, and ethambutol but not to streptomycin; none was resistant. Only 10 (1·6%) of the 623 strains obtained from white patients were resistant, nine to a single drug (six to streptomycin, two to isoniazid, one to ethambutol) and one to both isoniazid and streptomycin. Of the 179 strains from Indian subcontinent patients, 23 (12·8%) were resistant, 16 to a single drug (12 to streptomycin, four to isoniazid) and seven to both.

In 1978-9, 1038 (97%) of the 1070 strains tested were sensitive to streptomycin, isoniazid, rifampicin, and ethambutol. Only 13 (1·6%) of the 801 strains from white patients were resistant, compared with 15 (7·5%) of the 200 strains from Indian subcontinent patients.

ESTIMATION OF ANNUAL NOTIFICATION RATES

Population estimates

Population figures by ethnic group for 1978-9 were obtained from the National Dwelling and Housing Survey[6] and for 1983 from the 1983 Labour Force Survey (Office of Population Censuses and Surveys, unpublished findings), both of which were based on 0·5% stratified random sample surveys. Those subjects whose ethnic origin was unclassified were distributed proportionately according to the distribution of the population for whom the ethnic origin was known. Information on ethnic origin for Wales was not available in the National Dwelling and Housing Survey. The estimated size of both the Indian and the Pakistani and Bangladeshi populations in England increased by roughly 50% between the surveys. Most of this increase could be accounted for by immigration and births, but there remained a discrepancy of about 10%, suggesting that there were inaccuracies in one or both of the estimates. (There is evidence (Office of Population Censuses and Surveys, personal communication) that the Labour Force Survey underestimated the size of the West Indian population in 1983.) To estimate the yearly number of cases in each ethnic group for England the number of notified cases for each of the six month survey periods was multiplied by an appropriate scaling factor to allow for seasonal variations.

Notification rates

The estimated yearly rates per 100 000 for the different ethnic groups in England in 1983 differed considerably, the highest rates occurring in the Indian (178) and the Pakistani and Bangladeshi (169) populations and being roughly 25 times the rate for the white population (6·9) (table III). The difference in the rates between these ethnic groups was much greater for non-respiratory than for respiratory disease (table III). The West Indians had the lowest rate (30) of all the non-white ethnic groups.

The mean yearly decline in total rates between the surveys was 7% for the white, 15% for the Indian, and 16% for the Pakistani and Bangladeshi ethnic groups. (The apparent absence of a decline in the rate for the West Indian group was probably due to the underestimation of the population size in 1983.) Respiratory disease positive on smear testing, the main source of infection, was 10 times as prevalent in the Indian subcontinent (29/100 000) group as in the white group (2·7) (data not tabulated here).

In 1983 the rates of notification in the white ethnic group were higher in the older age groups and were consistently higher in the male population, the greatest difference occurring in the group aged 55 and over. In the Indian and the Pakistani and Bangladeshi ethnic groups the rates were higher in the older age groups, but these were based on small populations. In both these groups the rates were higher in the female population than the male population. Rates declined between the surveys in both sexes, all the age groups in the white, and almost all the age groups in the Indian and the Pakistani and Bangladeshi ethnic groups (report in preparation).

The highest rates in the Indian ethnic group occurred in the population that had arrived in the United Kingdom in the five years before the survey (table IV), and the rate declined as duration of stay increased. For the Pakistani and Bangladeshi ethnic group the rate was also highest among those most recently arrived but, apart from this, there was no trend with increasing duration of stay. The proportion of the total population who had arrived in the United Kingdom after 1977 differed substantially between the two ethnic groups, being 11% of the Indian compared with 26% of the Pakistani and Bangladeshi group, but the proportions of the patients notified

TABLE III—*Estimated yearly rates of notification/100 000 in 1983 and 1978-9 for newly notified patients who had not been treated for tuberculosis before. Results are by ethnic group for England and by all ethnic groups combined for Wales*

Ethnic origin	1983				1978-9			
		Yearly rate/100 000*				Yearly rate/100 000*		
	Estimated population (in thousands)	Total	All respiratory diseases	All non-respiratory diseases	Estimated population (in thousands)	Total	All respiratory diseases†	All non-respiratory diseases
White	42 994	6·9	5·7	1·5	43 320	9·4	7·9	1·9
Indian	773	178	118	85	525	354	237	156
Pakistani and Bangladeshi	422	169	113	73	248	353	241	147
West Indian	494	30	23	10	514	30	22	9
Other	634	47	30	21	425	97	72	36
Total for England	46 164‡	12·2	9·1	4·0	45 779‡	16·4	12·7	4·9
Total for Wales	2778	8·7	6·9	2·4	2768§	13·5	10·8	3·7

* Patients who had both respiratory and non-respiratory disease are included in both relevant columns.
† As classified by notifying clinician.
‡ Including 847 000 in 1983 and 747 000 in 1978-9 whose ethnic origin was unclassified.
§ Based on Office of Population Censuses and Surveys. Midyear estimate. *OPCS Monitor* 1979 June 5. PPI 79/3.

TABLE IV—*Relation between year of first entry to United Kingdom and size of population, number of notified cases of tuberculosis, and estimated yearly rates of notifications/100 000 in 1983 for Indian and Pakistani and Bangladeshi ethnic groups for England*

Year of first entry to United Kingdom	Indian			Pakistani and Bangladeshi		
	No (%) of population (in thousands)	No (%) of cases (in six months)	Yearly rate/ 100 000	No (%) of population (in thousands)	No (%) of cases (in six months)	Yearly rate/ 100 000
1978 to 1982-3	57·7 (11)	235 (36)	795	69·2 (26)	120 (37)	339
1973-7	129·3 (25)	154 (23)	233	59·9 (22)	65 (20)	212
1968-72	146·0 (28)	136 (21)	182	54·3 (20)	44 (14)	158
1963-7	116·2 (22)	84 (13)	141	48·2 (18)	51 (16)	207
Before 1963	73·1 (14)	40 (6)	107	35·3 (13)	36 (11)	199
Total born outside United Kingdom	522·3 (100)	657 (100)†	246	267·0 (100)	325 (100)‡	238

* Individuals whose ethnic origin, place of birth, or year of first entry to the United Kingdom was not recorded were distributed proportionately among groups for whom information was available.
† Includes eight patients for whom year of first entry was unknown.
‡ Includes nine patients for whom year of first entry was unknown.

in 1983 who had arrived in this period were similar, being 36% and 37%, respectively. Of the newly notified patients, however, 19% of the Indian and 27% of the Pakistani and Bangladeshi group had arrived more than 15 years previously.

Discussion

There are still nearly 7000 new notifications of tuberculosis in England and Wales each year, but the statutory system of notification provides limited information about their characteristics. In the four and a quarter years between the two recent surveys by the Medical Research Council, however, the number of newly notified patients who had not been tested before declined from 3732 to 3002—that is, by 26% when corrected for seasonal differences. In the earlier survey 57% of the patients were of white and 24% of Indian and 11% of Pakistani or Bangladeshi ethnic origin. In the 1983 survey the proportions were similar, and an important finding was that the notifications fell between the surveys in all three groups, by 28% for the white, 26% for the Indian, and 18% for the Pakistani and Bangladeshi ethnic groups.

Population data from the National Dwelling and Housing Survey enabled us to calculate the rates of notification per 100 000 for the different ethnic groups for 1978-9 and from the Labour Force Survey the rates for 1983. Between these two surveys the size and structure of the populations of both the Indian and the Pakistani and Bangladeshi ethnic groups changed. These increases were largely due to immigration between the surveys and births in the United Kingdom, but there was an excess of about 10% in the 1983 estimates that could not be accounted for, suggesting that the estimates for one or both of the surveys were inaccurate. Nevertheless, they are adequate for the calculation of rates of notification in these ethnic groups.

In both surveys the highest rates of notification occurred in the Indian and the Pakistani and Bangladeshi groups (354 and 353/100 000, respectively, in 1978-9 and 178 and 169, respectively, in 1983). These rates were about 40 times as high as that in the white group in 1978-9 (9·4) and 25 times as high as that in the white group in 1983 (6·9). The mean yearly decline in the rate between the surveys was 15% for the Indian, 16% for the Pakistani and Bangladeshi, and 7% for the white group. Because of the possible inaccuracies in the estimates of the populations, however, the declines for the Indian subcontinent ethnic groups are probably overestimated (report in preparation).

Although the rates of notification have dropped considerably in the Indian subcontinent ethnic groups, and the numbers of cases have declined, these groups still make a major contribution to the notifications of tuberculosis in this country, particularly in some areas (report in preparation). An important finding of the 1983 survey was that the highest rates in both the Indian and the Pakistani and Bangladeshi ethnic groups occurred in the population most recently arrived in the United Kingdom, confirming the findings of the British Thoracic and Tuberculosis Association in 1971.[7] In the Indian group the rate of notification declined as duration of stay increased, but even the group who had arrived more than 20 years ago had a rate 15 times as high as that of the white population. There was no evidence of a corresponding decline in the Pakistani and Bangladeshi groups among the population that had arrived more than five years previously, the rate being around 30 times as high as that in the white group even among those who had arrived more than 20 years ago. These differences were probably influenced by differing patterns of immigration (report in preparation). Clearly, the special risks for these ethnic groups, particularly for new arrivals in the United Kingdom, must be borne in mind by the entire medical profession, beginning with general practitioners, who have a major responsibility for the primary health care of the community.

Most of the patients (72%) with pulmonary disease positive on smear testing of sputum, the most infectious cases, were of white ethnic origin, 27% being white men over 55. The earlier and radiographically smaller lesions in the Indian subcontinent patients were partly due to the younger age of the patients, reflecting the age distribution of the total population of this ethnic group in the United Kingdom. Even so, the rate of disease positive on smear testing in the Indian subcontinent ethnic group in 1983 was roughly 10 times the rate in the white group. Furthermore, the Indian subcontinent population tends to live in close knit communities and so has greater exposure to infection. It is important that the health services responsible for the care of children of Indian subcontinent ethnic origin are fully aware of the

high risk of infection to which such children are exposed. A policy of BCG vaccination at birth for the children of these ethnic groups born in this country, as recommended by the Department of Health and Social Security[8] and the joint tuberculosis committee of the British Thoracic Society,[9] would probably protect most immigrants' children. It is equally important to reduce the likelihood of exposure to infection by earlier diagnosis and prompt treatment of the index cases, as it is those with pulmonary tuberculosis positive on smear testing who are the main source of infection. Clearly, exposure to the risks of infection in the Indian subcontinent, which occurs when immigrants visit their country of origin[10] or when their relatives visit this country, will contribute to the high level of infection in this ethnic group.

The white and Indian subcontinent patients also differed in the proportion of previously untreated patients with initial resistance to one or more antituberculosis drugs in 1983. The very low rates (1·6%) in both surveys for the white population reflect the high standards of chemotherapeutic practice over many years in the indigenous population of the United Kingdom. In contrast, 12·8% of the strains from the Indian subcontinent patients were resistant in 1983, a higher proportion than in 1978-9 (7·5%). Initial resistance was therefore more common in the Indian subcontinent patients in both surveys and had increased in the second, although in most cases resistance was to a single drug, usually streptomycin. Resistance to streptomycin alone, however, is probably of little clinical importance as use of this drug in primary chemotherapy has declined in the United Kingdom.[11]

This report highlights the main findings of the survey but does not explore many important aspects in detail—for example, the non-respiratory lesions—and further reports are in preparation.

This survey succeeded because of the enthusiastic cooperation of all (over 200) medical officers for environmental health in England and Wales, all (nearly 400) chest physicians and general physicians with a special interest in chest diseases, and over 400 clinicians in other specialties who provided information on the patients; the nursing staff, secretaries, and records officers of many hospitals and chest clinics; and the infectious diseases clerks and other local authority staff. We thank the Department of Health and Social Security, the Welsh Office, the British Thoracic Society, and several other specialist groups for their help. Dr Ian Sutherland and Dr Victor Springett gave valuable advice, particularly during the analysis.

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Lesson of the Week

Non-oliguric renal failure during treatment with mefenamic acid in elderly patients: a continuing problem

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Mefenamic acid, a non-steroidal anti-inflammatory drug of the anthranilic acid group, is widely used for the relief of mild to moderate pain. Like other non-steroidal anti-inflammatory agents, mefenamic acid has been reported as having a range of nephrotoxic effects,[1] particularly in the elderly.[2] None the less, the drug continues to be widely used at high dosage in elderly patients. We describe five patients referred to a geriatric medicine unit during one month with non-oliguric renal failure developing during treatment with mefenamic acid.

Mefenamic acid should be prescribed with great caution, if at all, to old people, particularly those receiving diuretics

Case histories

All patients were receiving mefenamic acid 500 mg three times a day. Tables I and II show their clinical and biochemical details. All the patients had developed diarrhoea and vomiting after beginning mefenamic acid, leading to depletion of fluid and electrolytes. Two patients (cases 1 and 2) had very poor oral intake of fluid, while four (cases 2-5) were also receiving diuretics, which were continued despite their deteriorating clinical state. In case 4 the serum potassium concentration at presentation was 8·1 mmol(mEq)/l. Discontinuation of mefenamic acid in all cases, and also the diuretic in cases 2-5, together with appropriate fluid replacement was associated with complete biochemical and clinical recovery in four patients. In case 4 the patient improved initially but died six weeks later from ischaemic heart disease. Postmortem examination showed changes in the kidneys compatible with chronic pyelonephritis and sustained hypertension, but no interstitial nephritis or papillary necrosis was noted.

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