

applications for licences. It seems unlikely that these dates can be achieved before the early part of 1971.

The second stage of the Act for implementation will involve a review of Licences of Right, a possible control of medical and veterinary devices—ligatures, dressings, implants, and so forth—and the possible initiation by the Medicines Commission of publications other than the *British Pharmacopoeia*.

Mr. Kenneth Robinson, the Minister of Health who introduced the Act, seemed determined to preserve the spirit of co-operation which characterized the previous Safety of Drugs

Committee. There is indeed no reason why communications between doctors and the medical staff of the new Safety Committee and its subcommittees should not be as flexible and informal as they have been under the voluntary system, or why applications from firms should be handled less expeditiously. Any legislation must provide for offences, legal proceedings, and penalties, but with co-operation and mutual confidence such proceedings should be most exceptional, and as the new arrangements develop doctors should find them beneficial and helpful and in no way hampering to their clinical freedom.

Chronic Disease and Disability in the Community: A Prevalence Study

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Summary: A two-stage prevalence survey of disability (defined as the inability to perform unaided defined activities essential to daily life) used questionnaires on a random sample of the population living in north Lambeth. The central estimates of the prevalence of disability in those aged 35-74 are 7.2% for men and 9.7% for women. Among the disabled population locomotor impairments were more common in women; internal impairments were more common in men. For men and women together chronic respiratory disease, mainly bronchitis, was shown to be the single most common condition associated with disability.

Though for women there may be an association between low social class and disability and between marital break-up and disability, these associations, though statistically significant, are weak. The data are therefore considered to be more widely relevant for the planning of health and welfare services.

Introduction

There are many difficulties in estimating the prevalence of chronic disease in a population. As Katz *et al.* (1969) point out, it is a group of many diagnoses, and multiple pathology results in different combinations of diseases, different patterns of complications, and combinations of diseases in different stages of severity. Lack of knowledge of the natural history of many chronic diseases makes definition and measurement difficult. Most chronic diseases, however, result in some disability and dependence, so it is possible to estimate the burden of chronic disease in a community by measuring the prevalence of disability. At the same time attempts may be made to screen the population for the presence of certain definable diseases associated with disability.

Little information on the prevalence of disability is available. For this reason and because of the increasing importance of chronic non-communicable disease in middle and old age as a cause of morbidity, it was decided to estimate the prevalence of disability in the catchment area of St. Thomas's Hospital to facilitate planning of health and welfare services.

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Definition and Measurement of Disability

We define disability in functional terms as limitation of performance of one or more activities essential to daily living, such that the person is dependent on others, and severity of disability is proportional to dependence. Essential activities are (1) mobility: walking, negotiating stairs, transfer in and out of bed or chair, and travel; (2) self-care: feeding, dressing, and toilet care; (3) domestic duties: shopping, preparation and cooking of food, household cleaning, clothes-washing, and/or (4) occupation: the ability to hold unmodified employment in open industry appropriate to the individual's age, sex, and skill.

For the anatomical, pathological, and psychological disorders which may cause or be associated with disability we use the term impairments. These may be classified into four categories: those affecting locomotion or any motor activity; those of sensory origin; those referable to internal medicine—for example, cardiac and respiratory disorders—and those of primarily psychological origin together with unclassifiable organic disorder.

There are three main methods by which such disability can be identified and measured: by clinical assessment of performance, by standard tests of performance conducted by a trained observer, and by detailed questioning of the person by a trained interviewer about his level of daily performance. Comparison of the three methods suggests that the interview is the most reliable, and it has obvious administrative and practical advantages for a large-scale survey conducted in the respondents' homes. We therefore developed and validated an interview schedule, details of which will be published separately.

Method

The study was based on a two-stage sampling design. In July 1966 a private census of a 20% random sample of dwellings in the six northern wards of Lambeth was undertaken and each enumerated person born before 1 January 1951—that is, aged 15½ and over—was asked to complete a short self-administered questionnaire. This contained 15 questions, of which 10 related to disability and impairment, each requiring a "yes" or "no" answer. Four questions asked whether the respondent could perform four essential activities of daily living without help, and a fifth whether there were limitations in any daily activities. Five questions inquired for selected physical impairments which might seriously affect locomotor activity and be associated with disability. The remaining five questions concerned personal and occupational data.

Full information was obtained from 5,499 (99.2%) of the 5,546 dwellings eligible for enumeration. This yielded a population of 18,347. A comparison of the age, sex, and social class distribution of this population with the population of the same area enumerated by the 10% national sample census of April 1966 showed no significant differences. The self-administered questionnaire was completed by 13,903 people aged 15½ and over, which again represents a response rate of over 99%.

For the second stage an age-sex stratified sample of males and females aged 35-74 was drawn from those identified as disabled and impaired or impaired only. This gave a study population of 260 males and 311 females, and they were matched for age and sex with non-disabled non-impaired controls, giving a total sample of 1,142.

Each respondent was visited at home and the validated interview schedule was administered. Seventeen interviewers took part, each having received training for some three weeks before starting field-work. Each completed interview schedule was reviewed by one of us on the day after the interview and checked for completeness and internal consistency. At regular intervals completed interview schedules were reviewed with the interviewers and their performance checked.

Data were obtained on 1,026 respondents in the second stage, representing a response rate of 94% when those who had died or been admitted to permanent institutional care between the two stages were removed from the sample. The mid-point of the second stage came in October 1967, 15 months after the screening operation.

Results

The percentages of males and females reporting disability as identified by each of the five questions of the screening questionnaire separately, together with the overall percentage of men and women in each age group reporting disability by any question, are given in Table I. The prevalence of disability increases consistently with age for both sexes. The questions are arranged in rank order of severity of disability, and with increase in severity there is a decrease in prevalence. As those who reported disability in any of the first four questions should also have done so in the fifth, the consistency of reporting may be assessed by comparing the percentages of people reporting disability in the fifth question with those reporting disability in any question. The figures are very similar, so that consistency of reporting was high.

The percentages of males and females aged 35-74 who reported disability in the screening questionnaire by 10-year age groups are given in Table II. In addition, final estimates calculated from the findings of both the first and second stages of the study taken together are shown (see Appendix on method of calculation).

The prevalence of disability is 7.2% for males and 9.7% for females. This female excess is contributed by the younger age groups and largely reflects limited ability to perform domestic duties. These activities are not relevant for most men and so were not included in the assessment of their disability in most cases. Males may be more fortunate in being able to undertake physically less demanding activities in full-time open employment.

The estimated percentages of disabled people according to the category of the primary impairment associated with their disability are given in Table III; the major diagnostic groups within the locomotor and internal impairment categories are given in Table IV. For females there is an excess of locomotor impairments, particularly arthritic disease. For both sexes cerebrovascular disease with paralysis is the next major contributor of locomotor impairment, and the remainder of the category is composed of other nervous diseases, such as multiple sclerosis and epilepsy, and various disorders of bones and joints, such as amputation and congenital malfor-

TABLE I.—Percentages of Males and Females in Random Sample of Population of Lambeth Reporting Disability by Screening Questionnaire

Questions to Identify Dependence	Sex	Age in Years				All Ages
		15-34	35-54	55-74	≥75	
Can you get in and out of bed by yourself?	M.	0.1	0.2	0.5	2.3	0.3
	F.	0.2	0.4	1.3	2.4	0.7
Can you dress and undress by yourself?	M.	0.1	0.1	0.9	3.2	0.4
	F.	0.1	0.5	0.9	3.3	0.7
Can you go up and down stairs by yourself?	M.	0.1	0.3	2.7	10.1	1.1
	F.	0.2	1.2	3.4	19.4	2.7
Can you go out in the street by yourself?	M.	0.2	0.5	2.2	13.8	1.2
	F.	0.1	0.8	3.8	25.1	3.0
Are you permanently limited in your daily activities by any physical handicap?	M.	2.0	4.0	11.7	32.1	6.0
	F.	1.7	4.6	9.5	41.7	8.1
Persons reporting disability by one or more questions	M.	2.1	4.3	13.0	34.4	6.5
	F.	1.9	4.6	11.1	41.7	8.1

TABLE II.—Initial Reported and Final Estimates of Percentages of Disabled Males and Females Living in Lambeth

Study	Sex	Age in Years				All Ages
		35-44	45-54	55-64	65-74	
Initial reported % disabled from screening study	M.	3.1	5.6	10.0	18.5	7.9
	F.	3.9	6.4	8.6	14.5	7.7
Final estimate % disabled	M.	0.6*	4.0	11.4	20.4	7.2
	F.	4.1*	7.1	11.1	20.8	9.7

*Difference between sexes statistically significant, $P < 0.05$.

TABLE III.—Estimated Percentages of Primary Impairment Categories Associated with Disability in Males and Females Aged 35-74 Years

	Sex	Impairment Category				All Categories
		Locomotor	Sensory	Internal	Other	
Males	..	2.5	0.1	3.5	1.1	7.2
Females	..	5.1	0.6	2.8	1.2	9.7

TABLE IV.—Estimated Percentages of Primary Diagnoses Associated with Disability in Males and Females Aged 35-74 Years

	Sex	Locomotor Impairment		Internal Impairment	
		Cerebrovascular Disease	Arthritic Disease	Respiratory Disease	Cardiovascular Disease
Males	..	0.6	0.8	2.3	0.8
Females	..	0.4	1.7	1.1	0.9

mation. Sensory impairments, which form the smallest category, are almost all due to blindness or defective vision: internal impairments are mainly due to respiratory and cardiovascular disease. The fourth category of other impairments contains predominantly psychological disorder. Chronic respiratory disease, principally bronchitis, is the single most important diagnostic group associated with disability when males and females are considered together.

Discussion

We show that some 7.2% of males and 9.7% of females aged 35-74 years living in the community are disabled according to our definition. The 95% confidence limits are 5.1% and 9.3% for males and 7.4% and 11.9% for females. These limits are unfortunately wide, and result partly from the two-stage design of the study with the attendant delay between the stages and partly from inevitable loss of precision by using a very simple screening questionnaire, which, however, contributed to the high response rate.

The second stage of the study was restricted to persons aged 35-74 years. Below this age the number of disabled in the census population was too small for estimates of prevalence to be made. By contrast, over the age of 74 the proportion of those functionally disabled rises very sharply as increasing frailty of old age restricts function and results in dependence. Thus for the practical purposes of planning in the health and welfare services, all those over the age of 74

form a special group of whom between one-third and one-half are dependent in some way.

It is difficult to compare our estimates with other data for there are so few and definitions differ. Our data, however, are in close agreement with the findings of the Danish study (Bonnieve, 1966) which identified 6.5% of persons aged 15-61 as physically handicapped. Jefferys *et al.* (1969) found that some 3.4% of the population aged 16 and over "could be described as motor impaired" and as many as 6% may have some level of such impairment. In America a survey of chronic illness found that 2.7% of the population of all ages suffered from chronic conditions which limited mobility (U.S. National Center for Health Statistics, 1964). We describe some 2.5% of men and 5.1% of women aged 35-74 as being disabled with an associated locomotor impairment.

The data describing the categories of the impairments and the diagnostic groups of the impairments among the disabled population are, we believe, unique. As such they can be assessed only in the light of other knowledge. Internal impairments, almost entirely due to respiratory and cardiovascular disease, are more prevalent in males than in females. By contrast locomotor impairments are more prevalent in females, and both these differences are in the direction expected from a knowledge of the prevalence of the individual conditions. Respiratory disease is the diagnostic group making the largest contribution to disability in males and females together, and again this finding would seem in accord with disease prevalence and the natural history of the pathological process. The estimates of disability associated with sensory impairment are in broad agreement with the numbers of blind and partially sighted persons on the register of the Welfare Department of the Lambeth Borough Council, which also shows a similar excess of females.

We have been careful in describing the impairment as being associated with disability. In most cases there is little doubt that this is a direct causal association and the functional loss is the result of anatomical or pathological change. In some cases, however, psychological factors, particularly motivation, may determine whether a person with a physical impairment becomes disabled. Also possibly the disability may result from unidentified psychological illness and be mistakenly ascribed to organic disease present at the same time. For these reasons we hesitate to describe a simple cause-and-effect relationship for all cases.

The two concepts of disability and impairment are of practical value as they can be defined and therefore an attempt can be made to measure them. In the first stage of this study 1,621 men and women out of the total population of 13,903 reported one or more of the specified impairments. Of that group only 582 (35.9%) reported disability. The size of the impaired but not disabled group underlines the distinction drawn in the definitions.

The question remains whether our data are referable to other populations. The age structure of the population enumerated by our census in north Lambeth is not significantly different from that of the population of Greater London as described in the report of the 1961 Census (General Register Office, 1963). The social class distribution differs and there is a deficiency of some 11% in social classes I and II and a similar excess in classes IV and V (Bennett and Kasap, 1970). The association of disability and social class has been examined on the results of the first stage of the study. For men there are no significant findings, but for women there is a significant increase in the numbers of disabled in the lower social classes. The data suggest that this

may be a causal relationship between low social class and disability. Again, for women only, there is an excess of separated and divorced among the disabled. It must be emphasized, however, that these are preliminary findings which are receiving further study, though it can be said that any influence of these characteristics is small.

Conclusions

Studies of chronic disease prevalence present conceptual and practical difficulties. To overcome some of these difficulties it would appear of value and practicable to assess function of individuals and to describe as disabled a person who cannot perform unaided the activities essential to daily life. Some 7.2% of males and 9.7% of females aged 35-74 living in the community can be so described.

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Appendix

The aim is to estimate the numbers of people in the private census population who would have been classified as disabled if it had been possible to administer the validated schedule instead of the screening questionnaire. The sample for the second stage was obtained from the screened census population, stratified for age, sex, and disability status, with different sample fractions for each stratum. At the second stage some individuals did not retain their original disability classification, but the correlation between the two assessments is high.

This situation is represented by the hypergeometric distribution. The maximum likelihood estimate of N (population size) is given by $\hat{N} = nr/k$, where \hat{N} is the maximum likelihood estimate of N , n is the number of individuals with the characteristic in the population, r is the sample size, and k is the number of individuals with the characteristic in the sample. Here the unknown quantity is n and is given by $n = Nk/r$.

Only in exceptional cases is it possible to make assertions about the population with complete certainty, and consequently it is necessary to fall back on statements expressible in terms of probability such as confidence limits. The figures we present are central estimates of the proportions of individuals with the various characteristics studied.

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