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THE APPLICATION OF THE EPIDEMIOLOGICAL METHOD IN PSYCHIATRY

by

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The assumptions underlying the epidemiological approach to psychiatry were clearly summarized in the report of a World Health Organization Expert Committee in 1960. It had, says the report, become increasingly apparent that "...the problems of studying personal susceptibility and the modifying effects of the environment or habit on the risks of attack were essentially similar in the communicable diseases and in other kinds of human illness. Consequently the methods which had been used so successfully in uncovering the origin and mode of spread of diseases associated with microbial infection came to be increasingly applied to the study of mental disorders and the use of the term 'epidemiology' to imply the study of their distribution and behaviour in differing conditions of life in human communities became widely accepted".

The application of epidemiological concepts to the field of psychiatry can thus be viewed as part of a more general change in medical attitudes towards the problems of chronic, non-infectious disease. The principal advantage to be derived from this outlook resides in a unification of research strategies, a drawing together of such previously varied topics as the analysis of institutional statistics, the use of psychometric tests in the screening of child populations, the demographic and sociological studies of suicide from the time of Durkheim onwards, the area population surveys of the German and Scandinavian geneticists, the ecological research of the Chicago school and the many descriptive accounts of collective psychopathology.

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Applications of the epidemiological method·

Morris has suggested seven separate applications of the epidemiological method, namely·

(1) for community diagnosis;

(2) for studying the working of health services;

(3) for completing the clinical picture;

(4) for identifying syndromes;

(5) for estimating the individual risks of acquiring disease,

(6) for historical study, and

(7) for establishing the causes of illness.

Of these seven uses it is the last, the study of causation, which is of most scientific importance. First, however, an example of each of the other six uses must be provided.

(1) Community diagnosis

In Great Britain, as in most industrial nations,severely subnormal children of school age are readily identifiable because they have been deemed unsuitable for the ordinary educational streams and as such have been notified to Local Authority Health Departments. By a process of extrapolation, the numbers of pre-school age children with primary amentia can be calculated for any standard population. It is thus possible to assess the need for services for children of all age-groups and to compare it with the existing state of affairs. Kushlick's survey in Wessex showed that only about one half of the children in this category had come to the notice of the health authorities.

(2) The study of the working of health services

The findings of Kushlick's survey of mental subnormality have led to the introduction of a scheme for an evaluative experiment in which locally-based hostel-accommodation will be provided for the estimated total number of severe subnormal children who are judged to be in need of residential care. This experiemental service has been compared with the traditional type of institutional care in terms of the children's progress, the problems experienced by their families, the administrative difficulties encountered and the relative costs. The practical advantages of such evaluative schemes are obvious, and illustrate the way in which epidemiological studies can be applied to planning and social administration in the health field.

(3) The completion of the clinical picture

The National Health Service of Great Britain provides an ideal sampling frame for this type of enquiry in the form of the registered list of patients maintained by general practitioners. In the working conditions of the United Kingdom the family doctor is in a unique position to furnish information about the great majority of the population. In this role he is also of potentially great importance in helping overcome one of the major obstacles in the way of epidemiological inquiry in the field of mental disorder, namely , the detection of a psychiatric 'case'. For operational purposes the 'case' is hereby defined as the patient whose symptoms, distress or discomfort lead to a medical consultation at which a psychiatric diagnosis is made by a qualified physician. Even though this concept is limited by the boundaries of what we have called 'conspicuous' morbidity it has stood the test of a series of rigorous investigations conducted by the General Practice Research Unit of the Institute of Psychiatry over the past decade. Two of the most important findings were first, that no fewer than 14 per cent of some 15 000 patients at risk during a twelve-month period consulted their doctor at least once for conditions diagnosed as largely or entirely psychiatric and falling principally into the neurotic or non psychotic categories: secondly, that only about one in twenty of the patients identified in the survey had been referred to any hospital or extra-mural facilities. A subsequent series of longitudinal studies of psychiatric illness in general practice populations have shown that chronic neurotic syndromes can occupy a prominent place on the spectrum of community sickness without coming to the attention of either the in-patient or out-patient facilities.

(4) Delineation of psychiatric syndromes:

The systematic recording of morbid phenomena in circumscribed populations has made it possible to examine the clustering of symptoms to provide a basis for delineating syndromes or abnormal patterns of beheviour. This is of particular importance when the items in question are widely distributed in the population at large; the features of patients with 'conspicuous' morbidity cannot then be assumed to be discontinuous from a range of similar characteristics exhibited by supposedly normal individuals. This problem is well illustrated

in the sphere of child psychiatry where, in the absence of a reliable system of classification, the clinician is compelled to rely on disturbances of behaviour as a principal guide to illness but where the identification of disorder may depend less on intrinsically abnormal conduct than on the exaggeration of normal traits or the persistence of certain forms of behaviour beyond the appropriate stage of development. In these circumstances the assessment of the possibly morbid significance of a behavioural item cannot be assessed without some knowledge of its frequency and intensity in individual age and sex groups of children. Such information has been systematically gathered on more than 6 000 school-children and on patients attending child-guidance clinics in a survey carried out in the English county of Buckinghamshire. With these data it has proved possible to construct a picture of behavioural norms whereby to assess symptoms or syndroms among the disturbed children.

(5) Illness-expectancy studies

The estimation of the individual expectation of mental disorder has been a traditional area of interest for population-geneticists who have long adopted epidemiological methods for their inquiries. Fremming, for example, writing of his well-known study of mental illness on the Danish island of Bornholm, wrote of survey-methods that "the most important purpose of such research is to provide reliable figures for the expectation of hereditary mental diseases in the general population". In addition, epidemiological techniques have been applied increasingly to 'high risk' groups in the community, e.g. the divorced, the bereaved and the 'accident prone'.

(6) Historical studies:

The study of time-trends has been employed to try and demonstrate changes in the distribution or character of mental disorders, and the possible relationship of such changes to social or therapeutic factors. Thus by analysing contemporary records and clinical descriptions Hare traced the spread of general paresis in Europe and furnished evidence in favour of the hypothesis of a neurotropic strain of spirochaete originating in France at the end of the fifteenth century. His interpretation of more recent statistical data, furthermore, indicates a decline in the prevalence of the condition which has long antedated modern methods of treatment.

(7) Aetiological studies:

Turning to the aetiological implications of epidemiological inquiry we may profitably recall the views of Griesinger: "....the province of aetiology in the narrow sense is only to enumerate empirically the known circumstances of causation; it belong to pathogeny to explain the physiological connection between cause and effect, to show the particular mechanical act by means of which insanity is induced through a given circumstance (for example, excessive depressing emotion, heart disease, etc.), a task towards which we have hitherto done little more than prepare the way".

Although this concept of 'aetiology' has come to be used more comprehensively it is clear that Griesinger used the term in what would now be accepted as an epidemiological sense to denote the study of statistical associations between various physical, social and psychological factors and the development of mental disorder. By so doing he anticipated the role of epidemiology as the method par excellence for the study of multiple causation. 'Pathogeny', the other approach to the study of causation comprises the study of pathological or psychophysiological mechanisms and is complementary to the elucidation of the associations of morbidity by epidemiological methods. In psychiatry, the most impressive example of combining 'aetiology' with 'pathogeny' remains the series of investigations by a professional epidemiologist, Joseph Goldberger, who first demonstrated pellagra to be a deficiency disease of diet by purely epidemiological methods. In this connection the four postulates which Goldberger regarded as requiring proof to clinch the association between cause and disease are worth repeating: "...first, that a difference in diet as between pellagrins and non-pellagrins be demonstrable; second, that the disease must be curable by a proper diet; third, that it must be preventable by such a diet, and fourth, that it may be experimentally produced by diet".

The provision of evidence in favour of all these postulates by the strict application of epidemiological principles to a thorough series of field surveys and experiments constitutes one of the most brilliant chapters of modern medicine. Only after having established the nexus between diet and disease did Goldberger and his co-workers set out to explore the whole chain of causal factors relevant to pellagra, including not only the nature of the specific deficiency but also the socio-economic factors affecting the family diet. By the time of Goldberger's death in 1929 there was already much evidence suggesting that the pellagra-preventive factor was to be found in the heat-resistant fraction of the 'water-soluble B' vitamin.

Eight years later, this substance was identified as nicotinic acid, There have, unfortunately been very few serious attempts to emulate Goldberger's achievement. In this context the commonest weaknesses have derived from reliance on unrepresentative samples and from the failure to use appropriate controls.

If much clinical research has been notoriously deficient in methodology, the same criticism is not usually levelled at biochemical investigations. Yet the early, enthusiastic reports on the 'pink spot' in schizophrenia were also based on highly unrepresentative case-material and recent work suggests that this phenomenon is related more to dietary factors than to the biochemistry of schizophrenia. It is clear that even in a field where laboratory investigation is highly developed, attention to survey techniques could have effected a considerable saving of time and money.

Despite these problems of method, however, there have been a number of epidemiological inquiries focussing on the associations of mental illness which have obvious aetiological implications. Examples may be taken which concern :

(i) biological factors, and

(ii) psychosocial factors.

(i) Biological factors:

It is not always appreciated that population genetics is an essentially epidemiological procedure which has been considerably handicapped by the inadequate attention paid to sampling methods. The re-awakening of interest in the transmission of schizophrenia acknowledges this fact and modern techniques of cytogenetics render it still more important. In mongolism, for example, the discovery of various chromosomal anomalies has already pointed the way towards an estimation of :

(a) the comparative incidence of Down's syndrome to examine the influence of such factors as ionizing radiation on non-disjunction;

(b) the chromosomal constitution of a representative sample of phenotypically normal subjects;

(c) the possible relationships between trisomy, translocation and maternal age, and

(d) the possible links between Down's syndrome, leukaemia and ionizing radiation.

The answer to all these questions depends on epidemiological enquiries.

The role of pre-natal and para-natal factors has been less well substantiated, despite the growth of an extensive literature on the subject. Nevertheless, the theory which has been advanced by Pasamanick and his co-workers of a 'continuum of reproductive casualty' has proved a stimulating challenge for the epidemiologist. In a series of studies based on the records of Baltimore maternity hospitals, Pasamanick and his co-workers have established connections between, on the one hand, such complications of childbirth as toxaemia of pregnancy, delayed labour, haemorrhage in pregnancy or labour and foetal malpresentation; and on the other hand, a range of conditions including cerebral palsy, epilepsy, mental retardation and reading disability. A tentative connection has also been established between obstetric complications and subsequent behaviour disorders of childhood, although here the findings are more open to question. Recent epidemiological studies in the United Kingdom have shed light on some of these hypotheses. In another sphere, although a variety of psychiatric syndromes are known to be linked to a deficiency of Vitamin B_{12} so far there have been very few epidemiological studies of this association. One exception has been provided by Henderson and his colleagues in Aberdeen, who screened 1 012 unselected psychiatric patients by means of a test for serum-antigastric-pariental-cell antibody. The nine patients with a positive A.G.A. result were then examined clinically and subjected to a series of further laboratory investigations in order to detect occult addisonian vitamin B_{12} deficiency in clinical practice.

(ii) Psychosocial factors:

The search for demographic and social correlates constitutes, in one sense, the lowest level of aetiological research; it is, indeed, simply an extension of the use of official statistics for public health planning. Despite the achievements of such pioneers as Lewis, Ødegaard and Faris and Dunham, whose work has done much to extend the range of psychiatric research, most surveys focussed on variables as crude as 'social class', 'social isolation' and 'social mobility' have added disappointingly little to our knowledge of the genesis of mental illness. It has, therefore, become increasingly apparent that more refined concepts and techniques will be required and recently the nature of temporal relationships has attracted some attention, especially in relation to the place of antecedent events and 'proximal precipitants' in the aetiology of mental disorder.

While the clinical concept of 'reactivity' has occasioned much dispute, from an epidemiological standpoint it is necessary to establish only one criterion, namely a significant association between the onset of illness in a population and the occurrence of clearly defined environmental change. In these terms there is very little evidence to justify limitation of the term 'reactive' to any specific diagnostic labels. In general, the epidemiological evidence on reactivity has been derived from two main types of investigation:

(a) studies of populations or large groups exposed to acute stress-situations;

(b) controlled studies of events antecedent to the onset of psychiatric disorder.

(a) Studies of acute stress-situations

In modern times, the most dramatic illustrations have come from military sources. The experience of the First World War led to official recognition of the importance of psychiatric casualties in the armed forces and in the second conflict a number of studies have demonstrated a close correlation between the psychiatric and the surgical casualty rates.

Under peacetime conditions, the effects on exposed populations have been documented for a variety of forms of social change but perhaps the most compelling evidence has come from research on child-bearing, a form of life-change which includes a major biological component. Thus in two American studies the data revealed a diminished frequency of mental disorder during pregnancy with a sharp increase during the immediate post-partum period, especially of psychotic disorders. The epidemiological evidence thus leaves little doubt that child-bearing can serve to precipitate mental illness, at least among predisposed women.

(b) Studies of antecedent events

In clinical psychiatry, a traditional approach to problems of reactive disorder has been through the individual biography in which major events in the patient's life are plotted against the occurrence of illness-episodes. The extension of this method to representative samples can provide a useful epidemiological tool if adequate records are available, as in industry, in the armed services and in general practice. The consensus of findings from such sources has been that illnesses are not randomly distributed over the life-span but that they occur in clusters, often of two or three years' duration, which can be related to periods of environmental change and individual difficulties of adaptation.

A promising technique for studying the relationship between environmental change and the accute onset of mental illness has been developed by Brown and Birley. By means of a careful check of all events and changes which had occurred over a three-month period, they were able to compare the recent life-experience of a sample of patients admitted to hospital for acute schizophrenia with that of a large group of normal controls. The findings have shown that the schizophrenics experienced a sharp increase in the number of life-events, including those of a fortuitous nature, in the three-week period prior to the onset of acute symptoms.

CONCLUSIONS

Bringing these various approaches together, Gordon has pointed out that there are three general categories under which all forms of epidemiological enquiry can be subsumed.

1. The first of these is the study of the prevalence and incidence of illness, along with their social and demographic correlates. While this aspect of the discipline is of major interest to workers in the field of public health and adminstration it is, in Gordon's words, "elementary epidemiology, and marks the beginning of epidemiologic analysis, the start to an understanding of any mass disease phenomenon".

2. Secondly, there is "the search for consistent relationships among factors in disease behaviour and the establishment of correlations to justify theories in accounting for distinguishing characteristics of the disease". It is here that the clinician makes his contribution and demarcates the sphere of clinical epidemiology.

3. The third approach is concerned with the testing of these relationships by controlled experiment, "sometimes by laboratory methods and sometimes by field procedures". Work at all three levels is now in progress in the developing as well as the more industrialised countries, and the need for expansion in this field is now generally recognised.