Anxiety Disorders: An Epidemiological Perspective

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Epidemiological studies provide important information about the patterns of disorders in communities. Until recently, there was very little information about the epidemiology of anxiety disorders in New Zealand. A large cross-sectional community survey of psychiatric disorders was undertaken in the Christchurch urban area in 1986. The data from this survey relevant to the epidemiology of anxiety disorders are presented, and compared with data obtained from other studies which used similar instruments and methodology. Anxiety disorders are shown to be very common, associated with significant morbidity and perhaps increased mortality. The disorders tend to be chronic or episodic. There are high rates of co-morbidity with depression, substance abuse and dependence disorders and other anxiety disorder. Persons with these disorders have increased use of all health services. The cost of these disorders to the individual, their families, the community and the health system is considerable.

Epidemiology has been defined as "the study of the distribution and determinants of health-related states or events in specified populations, and the application of this study to control of health problems" (Last,1988). Kleinbaum and colleagues (1982 p21) identify the general aims of epidemiologic research as:

"(1) to **describe** the health status of populations by enumerating the occurrence of diseases, obtaining the relative frequencies within groups, and discovering important trends; (2) **explain** the etiology of diseases by determining factors that "cause" specific diseases or trends and by discovering modes of transmission; (3) **predict** the number of disease occurrences and the distribution of health status within populations; and (4) **control** the distributions of diseases in the population by prevention of new occurrences, eradication of existing cases, prolongation of life with the disease, or otherwise improving the health status of afflicted persons".

Over the last two decades, there has been a renewed interest in the study of psychiatric epidemiology, as described in a number of excellent reviews in the area (Dohrenwend & Dohrenwend, 1982; Robins, 1978; Weissman, 1987; Weissman & Klerman, 1978). Improved methodology, survey design and survey instruments, coupled with the influence of recent advances in nosology, psychopharmacology and genetics, have led to a considerably increased investment in the field.

Epidemiology is both influenced by, and influences, concepts of disorder. Epidemiological studies may lead to a better understanding of the aetiology and natural history of disorders (Weissman, 1987). Such understanding may change how we define disorders. But before disorders can be studied in populations, decisions must be made as to how those disorders are to be defined. Unfortunately, the definition of "caseness" has been controversial in psychiatry. Wing and colleagues (1981) have reviewed the problem of case definition and noted that the problem has its roots in psychiatric nosology. As psychiatric disorders lack biological markers, attention has been directed to defining clinical syndromes on the basis of signs, symptoms and course. Over the years, some general agreement has developed over the classes of disorders that clinicians identify. However the boundaries between these classes remain blurred, as do the thresholds at which a symptom becomes significant or the number and exact types of symptoms which comprise a disorder. The problem in population surveys has been to translate these "shades of grey" into "black and white" to establish criteria for the purposes of case identification.

The DSM-III system and diagnosis of Anxiety Disorders

Within the American Psychiatric Association DSM-III, IIIR and IV systems there are a number of assumptions about the nosology of mental disorders. This is notable for the Anxiety Disorders, where a number of discrete types of anxiety disorder are described. Klerman and Weissman (1989) have described the historical development of concepts

of anxiety disorders. They note that, until the 1970s, anxiety states were regarded as occupying a continuum and categorical diagnoses were in disfavour. Subsequently, developments in psychopharmacology and multivariate statistical techniques led to an increased emphasis on the discontinuities in anxiety states. The work of Donald Klein (Klein, 1980) had a major influence on the development of the DSM-III definition of anxiety disorders. Klein separated panic disorder from other anxiety disorders on the basis of response to imipramine and this separation was incorporated into the DSM-III classification (see also McNaughton, this issue).

The History of Psychiatric Epidemiology

Dohrenwend and Dohrenwend (1982) have described three generations of psychiatric epidemiological studies. Each group of studies differed (1) in the way in which mental disorder was defined; (2) the manner in which, and by whom the individuals in the studies were assessed to determine whether impairment or disorder was present; and (3) what independent variables were considered as contributing to the development of mental ill-health. From these first two generations of studies, there remained an ongoing debate as to how to define and measure mental disorder in the community. There was great variability in the rates within the studies, and this variability was probably due to differences in the way impairment or caseness was defined and measured. However, Dohrenwend and Dohrenwend (1982) state that the first two groups of studies did have some findings in common. These were as follows.

(1) Psychological morbidity is not uncommon in the community. About 15% of adults have some type of disorder and an equal percentage may have symptoms at any one time.
(2) The majority of those with a disorder do not receive assistance from a mental health professional (about 75% are not treated).
(3) Mental ill-health is not distributed evenly in the community, and some populations seem to have higher prevalence of certain types of disorder.

The third generation of epidemiological studies has been conducted over the last two decades and is still continuing. The studies in this generation have far more explicitly defined methods for case identification and classification. As clinical samples differ significantly from community samples on a number of important factors, community surveys with sophisticated sampling strategies have been used to yield unbiased estimates of the population prevalence rates and risk factors. Smith and Weissman (1992) have described two traditions in these studies. The United Kingdom experience that has grown out of the work of Wing and his coworkers who developed the Present State Examination (PSE) (Wing, Cooper & Sartorius, 1974), and the United States experience has grown out of the Feighner criteria (Feighner et al., 1972). The Feighner criteria are operational rules to make psychiatric diagnoses in research, which were developed at the Washington University Department of Psychiatry. The Feighner criteria influenced the development of the Research Diagnostic Criteria (RDC) and the linked interview schedule, the Schedule for Affective Disorders and Schizophrenia (SADS) (Spitzer, Endicott & Robins, 1978). These were used in an epidemiologic study in New Haven, and it was demonstrated that the use of such operational diagnostic criteria and semi-structured interview schedules was possible and yielded very useful data (Myers & Weissman, 1980; Weissman & Myers, 1978). These in turn influenced the development of the Diagnostic Interview Schedule (DIS) (Robins, Helzer, Ratcliff & Seyfried, 1982), which was the instrument used for determination of caseness in the National Institute of Mental Health (NIMH) Epidemiologic Catchment Area (ECA) Program (Regier et al., 1984).

There are some important differences between the DIS and PSE. First, the DIS is a fully structured interview which can be administered by a trained non-clinician, while the PSE does allow the interviewer to ask their own questions to confirm the presence or absence of a symptom, and, therefore, requires both training and clinical expertise. Second, the PSE enquires about symptoms within the last month, and determines the presence of disorder within that month; the DIS enquires about symptoms over a lifetime, which allows the determination of the presence of disorder across different periods (i.e. two weeks, one month, six months, one year, and lifetime). Third, the DIS enquires about some groups of disorders which are not covered by the PSE, such as substance abuse/dependence and eating disorders.

The ECA Studies

The ECA program surveyed five separate sites in the United States, using comparable study design with multistage probability sampling, and a standardised interview schedule, the Diagnostic Interview Schedule (DIS).

The multistage probability sampling involved three stages: random selection, with probablity of selection proportional to size, of aggregations of households (known as 'primary sampling units' or PSUs); systematic sampling of households within the PSUs; and, with the use of special tables designed for the purpose, random selection of subjects for interview from the eligible adults within the selected households. The sampling procedure made it possible to calculate very exactly the probability of any individual in the population being selected for interview. Thus the rates of disorders could be adjusted for: (a) the probabilities of selection of an individual, and (b) response rates within different age-sex groupings of the sample compared to the known population age-sex structure from census data. This adjustment procedure (known as "weighting") was used in calculations of the estimates of the prevalence rates of disorders of the population from which the sample was drawn. The sample size was large, with each of the five sites sampling at least 3,500 subjects to give about 20,000 total.

The DIS was administered by lay interviewers and it generated DSM-III diagnoses. One of the stated goals of the ECA program was to obtain information re "the utility of DSM-III diagnostic categories, as currently defined, to discriminate useful sub-groups in both untreated and treated

populations - in essence a test of the DSM-III hypotheses that its operational criteria are useful discriminators..." (Regier et al., 1984). In this sense the ECA program can be regarded as utilising a "boot-strap" strategy to explore some of the current nosological concepts re mental disorders. Comparable studies, which used the same diagnostic instrument and community samples, have been completed in a number of countries including Christchurch, New Zealand.

Psychiatric Epidemiology in New Zealand

Until recently very little was known about the epidemiology of psychiatric disorder within New Zealand because of the lack of research and problems in the interpretation of the available information. The information that was available was derived from Health Department statistics, and this only referred to those disorders in persons who had been admitted to psychiatric hospitals, and certainly did not give a measure of the bulk of morbidity which existed in the community.

In the last ten years there have been two major epidemiological studies, which have used different methodologies, and provided information about mental disorder in the community. In 1985 and 1986, Romans-Clarkson and colleagues (Romans-Clarkson, Walton & Herbison, 1988; Romans-Clarkson, Walton, Herbison & Mullen, 1990) undertook a random community sample of women from five contiguous electoral rolls. The General Health Questionnaire (GHQ) (Goldberg, 1978; Goldberg & Hillier, 1979) was used to determine symptom levels, and the PSE was used to determine caseness. The Christchurch Psychiatric Epidemiology Survey (CPES) was a community survey of mental disorder which was undertaken by the Departments of Community Health and Psychological Medicine of the Christchurch School of Medicine in 1986 (Oakley-Browne, Joyce, Wells, Bushnell & Hornblow, 1989; Wells, Bushnell, Hornblow, Joyce & Oakley-Browne, 1989). The methodology of this study was based on that of the ECA program (Regier et al., 1984) and this made possible comparisons with other studies which had used similar design and methodology. The important advantages of the study were as follows.

1) It was a community survey which used a multistage sampling strategy (the same strategy as used in the ECA studies) and thus findings were not subject to the selection bias of help seeking behaviour which might bias the results of studies based on clinical populations.
2) The sample size was relatively large (1498 subjects) which allowed relatively precise estimates of the prevalences of major mental disorders.
3) The determination and definition of caseness was made using the DIS which generates diagnoses for different prevalence periods and also makes multiple diagnoses with DSM-III criteria. This allows exploration of the prevalence rates and risk factors for a number of diagnostic groupings and exploration of co-morbidity.

The Design and Methodology of the CPES

The design and methodology of the CPES has been described in detail in the paper by Wells et al (1989). The target population for the larger sample of the CPES was all adults aged 18-64 years living in the community in the Christchurch Urban Area. This is a geographic area (defined by for the census by the Department of Statisitics) which encompasses all of the Christchurch city area and most of the surrounding suburbs. People in long term institutional care for more than 1 year, that is not currently resident in the selected household, were excluded. The Christchurch Urban Area is divided up into blocks of households for the purposes of the census. These blocks were used to form primary sampling units (PSUs) which corresponded to an aggregation of contiguous blocks of households. First, 250 of these PSUs were randomly selected, with probability of selection being proportional to size. Then the households in each PSU were "enumerated" i.e. the exact address identified and the households listed sequentially. Second, systematic sampling was used to select approximately 12 households per PSU. This two-stage design ensured that each household in the Christchurch Urban Area had approximately the same probablity of being selected. Finally, from each selected household, one respondent was selected using special tables designed for the purpose, known as "Kish tables" (Kish,1965). This ensured that the interviewers had no choice in determining who of the eligible adults should be interviewed for the survey, and that the likelihood of being interviewed was determined by probability. Because affective disorders and eating disorders were of particular interest to the researchers, and decision was made to increase the sampling of persons most at risk for these disorders (i.e. women aged between 18 and 44 years). This "oversampling" was achieved by determining in advance that in every third household only women aged between 18-44 years were eligible for selection. The "oversampling" was adjusted for in calculation of the population prevalence rates.

Household listings of residents, including eligible subjects, were obtained for 94% of the sampled households. Of the eligible subjects, 74% were interviewed. This gives an overall response rate of 70% by the method of Von Korff (1985).

As stated earlier, the interview schedule used to assess psychiatric disorder and to provide DSM-III diagnoses was the DIS (Version IIIA) (Robins et al., 1985; Robins et al., 1982). All interviews were administered by trained lay interviewers (i.e. non-clinicians) who were supervised weekly by a clinician (either a psychiatrist or clinical psychologist). Sociodemographic factors were assessed with fully structured, closed questions that yielded categorical responses. The interviews took place from April 1986 until December 1986. All interviews attempted, were completed. Most interviews took 60 - 90 minutes.

Prevalence of Anxiety Disorders

The lifetime, and other period, prevalence rates for anxiety disorders, which were obtained in the CPES, have been published (Oakley-Browne et al., 1989; Wells et al., 1989).

Tables 1 and 2 summarise the lifetime rates by sex and age groups. All diagnoses were made without application

of DSM-III hierarchical rules. These hierarchical rules are based on certain inbuilt assumptions within DSM-III about the relationships between certain disorders. For instance, current generalized anxiety disorder cannot be diagnosed when major depression is also present. That is, there is an assumption that major depression has priority over GAD, or GAD is lower in a hypothesised diagnostic hierarchy than major depression. As these hierarchical rules were based on unproven assumptions, they were ignored in the survey (and the initial reports from the ECA sites).

It may be seen that females have higher rates than males of all the disorders except for social phobia. Only in one disorder (generalised anxiety disorder) is there a significant difference in rates between age groups.

Table 3 shows the different period prevalence rates for the total sample.

Comparison with Other Studies

There have been a number of studies that utilised the DIS and methodology similar to that of the ECA programme. Phobias are the most common anxiety disorder, with reported lifetime prevalence rates between 3.5 - 14.3% (Bland, Orn & Newman, 1988; Eaton, Dryman & Weissman, 1991; Hwu, Yeh & Chang, 1989; Karno et al., 1987; Robins et al., 1984; Wells et al., 1989). Agoraphobia has lifetime rates of between 3.8 - 4.3% (Bland et al., 1988; Oakley-Browne et al., 1989). Social phobia has lifetime prevalence rates of between 0.4 - 3.9% (Bland et al., 1988; Hwu et al., 1989; Oakley-Browne et al., 1989). Simple phobias have lifetime prevalence rates of between 2.7% and 7.2% (Bland et al., 1988; Hwu et al., 1989; Oakley-Browne et al., 1989).

The Cross National Collaborative Group have recently published data on the one year and lifetime prevalence rates for OCD from community surveys in seven countries (Weissman et al., 1994). The prevalence rates were consistent across sites, with most lifetime rates falling in the range of 1.9–2.5 %. For panic disorder, lifetime prevalence rates between 0.1 and 2.2% are reported (Bland et al., 1988; Eaton et al., 1991; Hwu et al., 1989; Wells et al., 1989).

GAD has lifetime prevalence rate of 3.8% (Blazer, Hughes, George, Swartz & Boyer, 1991). In the three samples from Taiwan the lifetime rates were between 3.7 and 10.5% (Hwu et al., 1989). In the CPES, lifetime rates of 31.1% were found (Wells et al., 1989). These latter rates are of similar to those reported by Breslau and Davis (1985) (lifetime rate of 45.0%) and found in an Australian twin study (Andrews, personal communication, 1989), which also utilised the DIS. Favarelli et al (1989) obtained lifetime rates of 5.4%. These rates are very similar to the ECA and Taiwan rates. The reasons for this marked variation in rates are unclear. They may relate in part to the DSM-III diagnostic criteria, which may set to low a threshold for caseness. Subsequent DSM revisions have used more stringent criteria; of importance has been the increase from 1 month to 6 months of the minimum duration of symptoms (Breslau & Davis, 1985). In their survey in Florence, Favarelli and

Table 1: Lifetime prevalence rates for DIS/DSM-III anxiety disorders whole sample and by sex. Rates are expressed as percentages with SEs in parentheses (derived from Wells *et al* (1989))

Anxiety disorder	*Female*		*Male*		*Overall*	
Panic	3.4	(0.7)**	0.9	(0.6)	2.2	(0.4)
Phobia (agora- or simple)	12.8	(1.2)***	3.4	(1.0)	8.1	(0.8)
Social phobia	3.5	(0.7)	4.3	(1.1)	3.0	(0.6)
Obsessive-compulsive	3.4	(0.7)*	1.0	(0.7)	2.2	(0.4)
Generalised anxiety	35.1	(1.7)**	27.1	(2.1)	31.1	(1.3)

***p<0.001 **p<0.01 *p<0.05 for comparisons between males and females

Table 2: Lifetime prevalence rates for DIS/DSM-III anxiety disorders by age group. Rates are expressed as percentages with SEs in parentheses (derived from Wells *et al* (1989))

Anxiety disorder	*18-24 years*		*25-44 years*		*45-64 years*	
Panic	2.2	(1.3)	2.7	(0.7)	1.3	(0.9)
Phobia (agora- or simple)	6.5	(1.9)	8.8	(1.1)	8.2	(1.6)
Social phobia	3.9	(1.6)	3.5	(0.8)	4.4	(1.3)
Obsessive-compulsive	1.8	(1.3)	2.8	(0.7)	1.6	(0.0)
Generalised anxiety	21.9	(3.2)**	33.5	(1.9)	33.8	(2.5)

*p<0.05 **p<0.01 ***p<0.001 for comparisons between adjacent groups.

Table 3: Total sample period prevalence rates (%) of DIS/DSM-III disorders (derived from Oakley-Browne et al. (1989))

Anxiety disorder	*2 weeks*	*1 month*	*6 months*	*1 year*	*Lifetime*
Panic	0.3	0.4	1.1	1.4	2.2
Agoraphobia	1.9	2.1	2.7	2.9	3.8
Social phobia	1.9	2.0	2.6	2.8	3.9
Simple phobia	2.9	3.2	4.3	4.8	5.9
Obsessive-compulsive	0.8	0.8	1.0	1.1	2.2
Generalised anxiety	3.4	5.3	9.6	12.7	31.1

colleagues also used DSM-IIIR criteria in the same sample, and found lower GAD lifetime rates (3.9%) compared to the DSM-III lifetime rates.

The CPES did not include questions about Post-traumatic stress disorder (PTSD). There have been two studies from the ECA program which have provided prevalence rates for post-traumatic stress disorder (PTSD). In St. Louis, Helzer et al (Helzer, Robins & McEvoy, 1987) found a lifetime prevalence of PTSD of 1% in the total population. In Piedmont, Davidson et al (1991) found six month prevalence rates of 0.4% and lifetime prevalence rates of 1.3%. The specific case of PTSD in Vietnam veterans is discussed by MacDonald, Chamberlain and Long in this issue.

There have been two epidemiological studies of adolescents which have provided prevalence rates for anxiety disorders. In a community study of 386 Caucasian working-class eighteen-year-olds, Reinherz et al (1993) found lifetime prevalence rates of 22.8% for DSM-III-R phobias (including both simple and social phobia). OCD was far less common with lifetime rates of 2.1%. The lifetime rates of PTSD were 6.3%. Feehan et al (1994) have presented the one year prevalence rates of DSM-III-R disorders in a sample of 930 eighteen-year-olds: GAD was found in 1.8%, panic disorder in 0.8%, agoraphobia in 4.0%, social phobia in 11.1%, simple phobia in 6.1% and OCD in 4.0%.

The Course of Disorder

The anxiety disorders appear to be chronic or episodic. Two cross-sectional studies have found low one year recovery rates (Bland, Newman & Orn, 1988; Oakley-Browne et al., 1989). A similar statistic, the one year remission rate, has been calculated for all disorders from the five ECA sites. These show that panic disorder, phobia and OCD are as likely, or less likely, to remit than major depression (Robins, Locke & Regier, 1991). A longitudinal study found that symptoms of anxiety disorders persist over many years (Murphy et al., 1989). Longitudinal studies of adult and child PTSD sufferers have also found a high percentage suffer from persistent symptoms (Davidson et al., 1991; McFarlane, 1988; McFarlane, Policansky & Irwin, 1987).

There are differences between the anxiety disorders in terms of onset. The phobic disorders have onset early in life (childhood and early teenage years) (Eaton et al., 1991) although incidence data suggests new cases are likely to occur across all age groups (Eaton et al., 1989). The onset of panic disorder peaks in late teenage years, continues through early and middle adulthood, but is infrequent after 40 years (Bland et al., 1988; Eaton et al., 1989; Von Korff, Eaton & Keyl, 1985). The onset of GAD is distributed across all age groups (Eaton et al., 1991). The onset age for social phobia is most often in the teenage years or early adult life (Marks, 1987). This would be supported by the high prevalence rates of social phobia found in the surveys of adolescents (Feehan et al., 1994; Reinherz et al., 1993). OCD has an early age of onset and prolonged duration (Bland et al., 1988; Karno, Golding, Sorenson & Burnam, 1988; Weissman et al., 1994). At this time there is no onset or incidence data available for PTSD. The community study of Davidson et al (1991) found that the majority of PTSD sufferers (76.5%) were below 45 years of age and less than 7% were older than 64 years. This strongly suggests that the onset of PTSD is usually in early or middle adulthood, possibly as a consequence of persons in this age group being at increased risk of experiencing traumatic life events.

Co-morbidity

Community surveys have shown that there is overlap between anxiety disorders and other disorders. The most common comorbid disorders are another anxiety disorder, a mood disorder and somatoform disorder. Data from the five ECA sites shows that 91% of those with panic disorder, 84% of those with agoraphobia, 79% of those with OCD and 63% of those with simple phobia have at least one other diagnosis (Robins et al., 1991). The odds ratio of co-occurrrence of disorder, is the ratio of the odds of persons with another disorder of interest also having an anxiety disorder, over the odds of a persons without the other disorder of interest having an anxiety disorder. High odds ratios for the co-occurrence of mood disorders with anxiety disorders were found: 25 for major depression and panic, 19 for mania and panic, 15 for mania and OCD, and 10 for depression and OCD (Robins et al., 1991). Persons with PTSD are approximately 10 times more likely to meet criteria for major depression (Davidson et al., 1991). These findings from surveys of adults are repeated in surveys of adolescents: Feehan and colleagues (1994) also found a high degree of co-morbidity of mood and anxiety disorders in their sample of adolescents.

When persons with anxiety disorders are found to have another anxiety disorder or other psychiatric disorder, at rates greater than expected by chance, doubts are caste on the discreteness of the disorders. There has been a strong argument put forward by some authors that the model that best fits the data is that of a "general neurotic syndrome" (Andrews, Stewart, Morris-Yates, Holt & Henderson, 1990; Tyrer, 1986) rather than of discrete disorders. Tyrer (1986) finds little evidence for the distinction between panic disorder and GAD. Andrews (1991) suggests that persons have general vulnerability to neurotic disorders and that this vulnerability has variable expression.

Morbidity

Markowitz et al (1989) found that a diagnosis of panic disorder was associated with negative consequences similar or greater than those associated with depression. The findings were not explained by comorbidity with major depression, agoraphobia, and substance abuse. Johnson et al (1990) found that the lifetime rates of suicide attempts in persons with "pure" panic disorder (7%) were consistently higher than for persons with no psychiatric disorder (1%) and very close to the rates of suicide attempt amongst persons with uncomplicated depression (7.9%). Davidson et al (1991) found suicide attempts were reported significantly more frequently in persons with PTSD. When co-morbid depression was controlled for, persons with PTSD were eight times more likely to attempt suicide than persons without PTSD.

Feehan et al (1994) found that of the adolescents with an anxiety disorder without depression, 14% reported suicidal thoughts compared with 18% with depression only, and 31% with mixed depression and anxiety. The frequency of suicidal thoughts in non-cases was between 2.1 % (for males) and 6.1% (for females). Reinherz et al (1993) found that adolescents with PTSD had the greatest number of areas of impaired functioning compared to others and reported significantly lower self-esteem and more interpersonal difficulties. Adolescents with phobias also reported significantly lower self-esteem and poorer interpersonal relationships. These studies suggest that in adolescents, as in adults, the deleterious effects of anxiety disorders are significant and non-trivial. The finding of increased rates of suicidal ideation suggests a continuity in this aspect of morbidity between adolescent and adult populations.

Mortality

There is evidence of excess mortality amongst persons with anxiety disorders, and this may be attributable to suicide. Allgulander and Lavori (1991) analysed the survival probability and causes of death among 3302 inpatients with "pure" anxiety neuroses who were tracked over a 14 year period. There was a significant excess of deaths due to verified and undetermined suicides, when all patients with other psychiatric diagnoses and substance abuse were excluded, and marital status controlled for. These unnatural deaths accounted for nearly one third of all deaths and a twofold excess in premature deaths. These results should be interpreted with caution as they are based on an inpatient clinical sample, which is likely to be different to an outpatient or community sample on a number of important indices (such as severity of disorder or presence of co-morbid disorders). Such variables may also be important "confounders" and this would lead to bias, which is likely to increase the strength of the apparent association between disorder and mortality.

Sex Differences

A consistent finding across all studies has been that females have approximately twice the rate than males of panic disorder. Agoraphobia and simple phobias are at least twice as common in females as males. The sex difference for social phobia is not as marked, with almost equivalent rates being found in the ECA study (six month prevalence rates of 1.7% males vs 2.6% females), CPES (lifetime prevalence rates of 4.3% males vs 3.5% females) and Edmonton (lifetime rates 1.4% males vs 2.0% females) (Bland et al., 1988). In Taiwan, all three samples had a higher female prevalence rate (Hwu et al., 1989). For GAD, females have been found to have higher rates in the ECA study (one year prevalence rates of 2.4% males vs 5.0% females), the CPES (lifetime prevalence rates of 27.1% males vs 35.1% females) and the Taiwan study (lifetime prevalence rates over three samples range from 2.4%-8.8% males vs 5.0%-12.4% females). The Cross National Collaborative Group found that generally the lifetime rates for OCD were higher in females than males (Weissman et al., 1994). Davidson et al (1991) found that more than two-thirds of PTSD sufferers were female. Breslau et al (1991) also found that the lifetime prevalence of PTSD was higher in females than males. Although the exposure to traumatic events was more common in males than females, amongst those exposed higher rates of females (30.7%) developed PTSD compared with males (14%). Similarly, among children exposed to a disaster, females were more likely to develop PTSD than males (Garrison, Weinrich, Hardin, Weinrich & Wang, 1993; Lonigan, Shannon, Taylor, Finch & Sallee, 1994; Shannon, Lonigan, Finch & Taylor, 1994).

Socioeconomic Disadvantage

It should be remembered that when significant associations between sociodemographic factors and disorder are found, that this does not imply a causal assocation. For instance, it is possible for socioeconomic disadvantage to be associated with onset of disorder or be the consequence of disorder. It is also possible for socioeconomic disadvantage to be a consequence, along with the disorder, of some other causal factor(s). The same caveat applies for the associations between other sociodemographic factors such as education attainment or marital status, and anxiety disorders.

For phobic disorder there does not seem to be an association between socio-economic status (SES) and prevalence rates. For panic disorder, males from lower SES have higher rates of disorder, whereas females from low SES have lower rates of disorder. Financially dependent individuals have higher rates of both panic and phobic disorder (Eaton et al., 1991). For GAD, lower SES and household income is associated with higher rates of disorder. Current unemployment, occupational type or status, and income level were not found to be related to prevalence rates for OCD. However, financially dependent individuals had

twice the one year prevalence rate compared with those not receiving such payments (Karno & Golding, 1991) and higher one year prevalence rates were found among those who were defined as underemployed (i.e. unemployed at least six months out of the prior five years). Davidson et al (1991) found that persons with PTSD were significantly more likely to report a history of job instability compared to persons without PTSD. In adolescents, Reinherz et al (1993) found that lower SES was associated with significantly higher risk of phobias.

Educational Level

For males, lower education tended to be associated with increased rates of phobia. There does not appear to be a relationship for females between educational level and prevalence rates of either panic or phobic disorder (Eaton et al., 1991). There is no association between educational level and prevalence rates for GAD (Blazer et al., 1991). Breslau et al (1991) found that there was an increased rate of exposure to traumatic events among persons who had not received a college education but this was not statistically significant. There was no relationship between risk of developing PTSD after exposure to a traumatic event and educational level. Reinherz et al (1993) found that adolescents who met criteria for PTSD within the last six months, reported poorer school performance compared to those without this diagnosis. Lower educational level tended to be associated with higher one year prevalence rates of OCD, except for college attenders, where those who successfully graduated had higher rates of OCD compared to those who attended but did not graduate (Karno & Golding, 1991).

Impact on the family

Prevalence rates for both panic and phobic disorders are higher among persons who are separated, divorced or widowed compared with those who are married or have never married. There are some differences between males and females in that married males have lower rates than never married males (and married females), whereas married females have higher rates than never married females (Eaton et al., 1991). For the three ECA sites which have presented data for GAD, it is found that persons who are married have the lowest prevalence rates (Blazer et al., 1991). Data from the ECA study did not show a statistically significant association between marital status and one year prevalence of OCD (Karno & Golding, 1991). Marital status had no statistically significant effect on either the risk of being exposed to traumatic events or of developing PTSD after exposure to such events (Breslau et al., 1991; Davidson et al., 1991).

Chakrabarti et al (1993) evaluated the pattern of burden in 90 families with a neurotic patient, 30 each with dysthymia, generalized anxiety disorder and obsessive compulsive disorder. The pattern of burden was similar among the three study groups and it was chiefly felt in four principal areas; financial burden, disruption of family routine, disruption of family leisure and family interactions. The burden was significantly greater in cases of married patients, married relatives, housewives and employed patients. The relatives of the patients expressed concern regarding routine household matters, restricted leisure and ill effects of the patient's illness on the family atmosphere.

Health care utilisation

In the CPES high rates of health service utilisation in the last six months were also reported amongst persons with anxiety/somatoform disorders: 81% had made a health visit for any reason, 36% a visit to a health professional for a mental health reason and 13% had visited a mental health specialist (Hornblow, Bushnell, Wells, Oakley-Browne & Joyce, 1990). Data from the five ECA sites (Eaton et al., 1991) have given information for the rates of use of health services within the previous six months for persons with specific types of anxiety disorder. Of note has been the finding of high rates of health service utilisation amongst persons who met criteria for panic disorder, as determined by the DIS. Boyd (1986) found that panic disorder was the disorder most likely to associated with persons receiving ambulatory mental health care. The treatment rates for persons with panic disorder were as high or higher than those for somatization disorder, schizophrenia, and major affective disorder. Eaton et al (1991) found that of persons with panic disorder within the last year, 86% had an outpatient visit for physical health reasons and 51% reported a visit to a mental health specialist in the past six months.

The use of health services is less for other types of anxiety disorders. Of persons with phobic disorders, 68% had made an outpatient visit for a physical reason and 17% had made a mental health visit in the past six months. These rates compare with rates of 58% (outpatient visit for any physical reason) and 8% (outpatient visit for any mental health reason) amongst individuals without either of panic or phobic disorders (Eaton et al., 1991). The presence of a diagnosis of GAD is also associated with significantly higher rates of outpatient mental health care in the past six months compared with rates amongst persons who did not meet criteria for GAD in the past year (Blazer et al., 1991). Amongst persons who have met criteria for OCD in the past year, 17.8% have visited a mental health specialist, which is a higher rate than those with phobic disorder but less than those with panic disorder (Blazer et al., 1991; Karno & Golding, 1991; Karno et al., 1988). As well as the evidence for increased rates of health care utilisation in primary care and mental health specialist settings, there is evidence that the presence of an anxiety disorder (or other mental disorder) may complicate and prolong periods of inpatient care in general medical inpatients, and consequently increase the costs of such services (Levenson, Hamer & Rossiter, 1990; Levenson, Hamer & Rossiter, 1992).

Health Care Costs

It is important to estimate the direct and indirect costs to the economy and health services of anxiety disorders, given the high rates of health service utilisation amongst persons with anxiety disorders. Croft-Jeffreys and Wilkinson (1989) have estimated the cost of "neurotic" disorder to UK general practice and the UK economy. The ICD-9 system was used to define the neuroses, which were comprised of anxiety, hysteria, phobic states, obsessive compulsive disorder,

neurotic depression, neurasthenia, other neuroses, hypochondriasis and physiological malfunction arising from mental factors. The total direct and indirect cost of all neuroses in UK general practice was estimated to be £373 million or just over 9% of the total spent on family practitioner services in 1984-5. The costs to the economy due to lost production of sufferers were estimated at £5.6 billion. It seems reasonable to assume that the anxiety disorders account for approximately one third of these costs. This approximation may be conservative as it does not account for the high co-morbidity between the anxiety disorders and the other neuroses.

Andrews (1991) used data on the treated prevalence and costs of treatment to estimate the mental health service costs for a catchment area of 200,000. It was found that the costs of services for schizophrenia (380 cases) were AUST$3.65 million, for affective psychosis (280 cases) AUST$1.28 million, and for neuroses (2840 cases, 50% anxiety disorders, 50% depressive neuroses) AUST$7.32 million. Although the cases of schizophrenia cost four times as much as anxiety disorders to treat (AUST$9,700.00 per schizophrenia case versus AUST$2600.00 per anxiety disorder case), the total direct treatment costs of all the anxiety disorder cases was approximately the same as that for all the schizophrenia cases, because the treated prevalence of anxiety disorders is much greater than that of schizophrenia. This model was based on a number of assumptions which might be challenged. However, it does highlight the importance of considering treated prevalence of disorders, as well as average cost of treatment for each type of disorder, when considering the total costs of all treatments.

Summary

Epidemiological studies have shown the anxiety disorders to be common in the community. The prevalence rates are generally higher among females. Because the disorders often have onset in adolescence and early adulthood and follow a chronic and episodic course, they have the potential for a deleterious impact on sufferers over many years. There is a high rate of co-morbidity with other disorders. The disorders are associated with significant morbidity and perhaps increased mortality. Indices of socio-economic and educational disadvantage, and family burden, suggest that some of these disorders are associated with significant personal and interpersonal costs. Persons with anxiety disorders are high consumers of all forms of health care and economic models suggest they make a significant contribution to the direct and indirect costs to the health care system and the economy.

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