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Lifetime and Six-Month Prevalence of Mental Disorders in the Munich Follow-Up Study

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Summary. The Lifetime and 6 month DSM-III prevalence rates of mental disorders from an adult general population sample of former West Germany are reported. The most frequent mental disorders (lifetime) from the Munich Follow-up Study were anxiety disorders (13.87%), followed by substance (13.51%) and affective (12.90%) disorders. Within anxiety disorders, simple and social phobia (8.01%) were the most common, followed by agoraphobia (5.47%) and panic disorder (2.39%). Females had about twice the rates of males for affective (18.68% versus 6.42%), anxiety (18.13% versus 9.07%), and somatization disorders (1.60% versus 0.00%); males had about three times the rates of substance disorders (21.23% versus 6.11%) of females. Being widowed and separated/divorced was associated with high rates of major depression. Most disordered subjects had at least two diagnoses (69%). The most frequent comorbidity pattern was anxiety *and* affective disorders. Simple and social phobia began mostly in childhood or early adolescence, whereas agoraphobia and panic disorder had a later average age of onset. The majority of the cases with both anxiety and depression had depression clearly after the occurrence of anxiety. The DIS-DSM-III findings of our study have been compared with both ICD-9 diagnoses assigned by clinicians independently as well as other epidemiological studies conducted with a comparable methodology.

Key words: Epidemiology, lifetime and 6-month prevalence – DIS/DSM-III disorders – Comorbidity – Age of onset

Introduction

Although the field of epidemiology has made much progress in the last two decades, there are still a number of unresolved issues which make it difficult to make clear statements about the prevalence of mental disorders across different studies conducted in different countries and settings. The reasons for these difficulties include the use of (i) different diagnostic procedures, (ii) different sampling procedures, (iii) different criteria in defining caseness, (iv) different time frames for the diagnoses (e.g., lifetime, 6-month, current diagnoses), and (v) differences in the use of severity ratings for diagnostic decisions. Another critical issue is related to the use of different diagnostic classification systems. In European epidemiological studies, prevalence rates of mental disorders are almost exclusively based on the International Classification of Diseases (ICD-9), whereas older American studies are mostly based on the second edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-II), and more recent studies on the Research Diagnostic Criteria (RDC) or the DSM-III. Both the nosological concepts and the diagnostic decision trees in each of these systems differ from those of the ICD.

Our report presents findings from an adult general population survey of former West Germany, conducted in 1981. Unlike recent epidemiological studies in German-speaking countries (Angst and Dobler-Mikola 1985; Dilling 1980; Fichter 1990; Schepank 1983), our survey – the Munich Follow-up Study (MFS) – was based on a small, but nevertheless representative sample of West German households. The MFS used both a standardized diagnostic instrument for DSM-III, the Diagnostic Interview Schedule (DIS; Robins et al. 1981; German version, Wittchen and Rupp, 1981), and a clinical reappraisal by psychiatrists to classify cases according to the criteria of DSM-III and ICD-9. This makes it possible to compare our findings not only with the Epidemiological Catchment Area Program (ECA; Burnam et al. 1987; Myers et al. 1984; Regier et al. 1990a, b; Robins et al. 1984), but also with recent studies from different parts of the world such as Edmonton (Bland et al. 1988a, b), Puerto Rico (Canino et al. 1987), Taiwan (Hwu et al. 1989), Korea (Lee et al. 1990), and Christchurch (Wells et al. 1989) as well as German speaking countries (Traunstein Study, Fichter 1990).

More specifically, the aims of the present study were to address the following questions: (1) What is the lifetime and 6-month prevalence of mental disorders according to the DSM-III in an adult general population sample? (2) Which are the biosocial correlates of different DIS/DSM-III disorders? (3) What is the frequency of

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DIS/DSM-III disorders occuring alone or together? (4) What is the temporal relationship between anxiety and depression? (5) What is the severity of various DIS/DSM-III disorders? (6) How do the DIS/DSM-III diagnosis compare with ICD-9 diagnoses assigned by the psychiatristis?

Methods

Description of the Munich-Follow-up Study

The MFS is a 7-year prospective and retrospective follow-up study of: (a) a cohort of former psychiatric inpatients at the Max Planck Institute for Psychiatry in Munich (not reported here), and (b) a cohort of a general population sample of the adult population of what was West Germany, including West Berlin. The same evaluation methods were used for both samples (Wittchen 1986, 1987, 1988; Wittchen and von Zerssen, 1988; Wittchen et al. 1985, 1989) (Fig. 1). This paper describes results only from the epidemiological sample.

Phase 1: General Population Survey. The epidemiological sample was originally drawn in 1974, the year the Phase-1 investigation of the MFS took place. In this first phase, 1952 of 2524 subjects (77.3%) randomly drawn from the general population were interviewed for the first time (The rejection rate was 16.2%; 4.9% were either not available or did not complete the interview, 1.6% subjects had missing values in at least one of the scales used and thus were excluded from the further analysis). It should be noted that the original purpose of the 1974 survey was to standardize the Clinical Self Rating Scales (CSR-S; von Zerssen 1986) which comprised the Paranoid scale (Paranoid-Skala; P-S), the Depression scale (Depressivitätsskala; D-S), and the Somatic Complaints List (Beschwerdenliste; B-L). Since much of the other additional information collected proved to be very helpful for a prospective study, we decided to use this 1974 sample as a basis for our 1981 Phase-2 investigation for determining the prevalence rates of mental disorders.

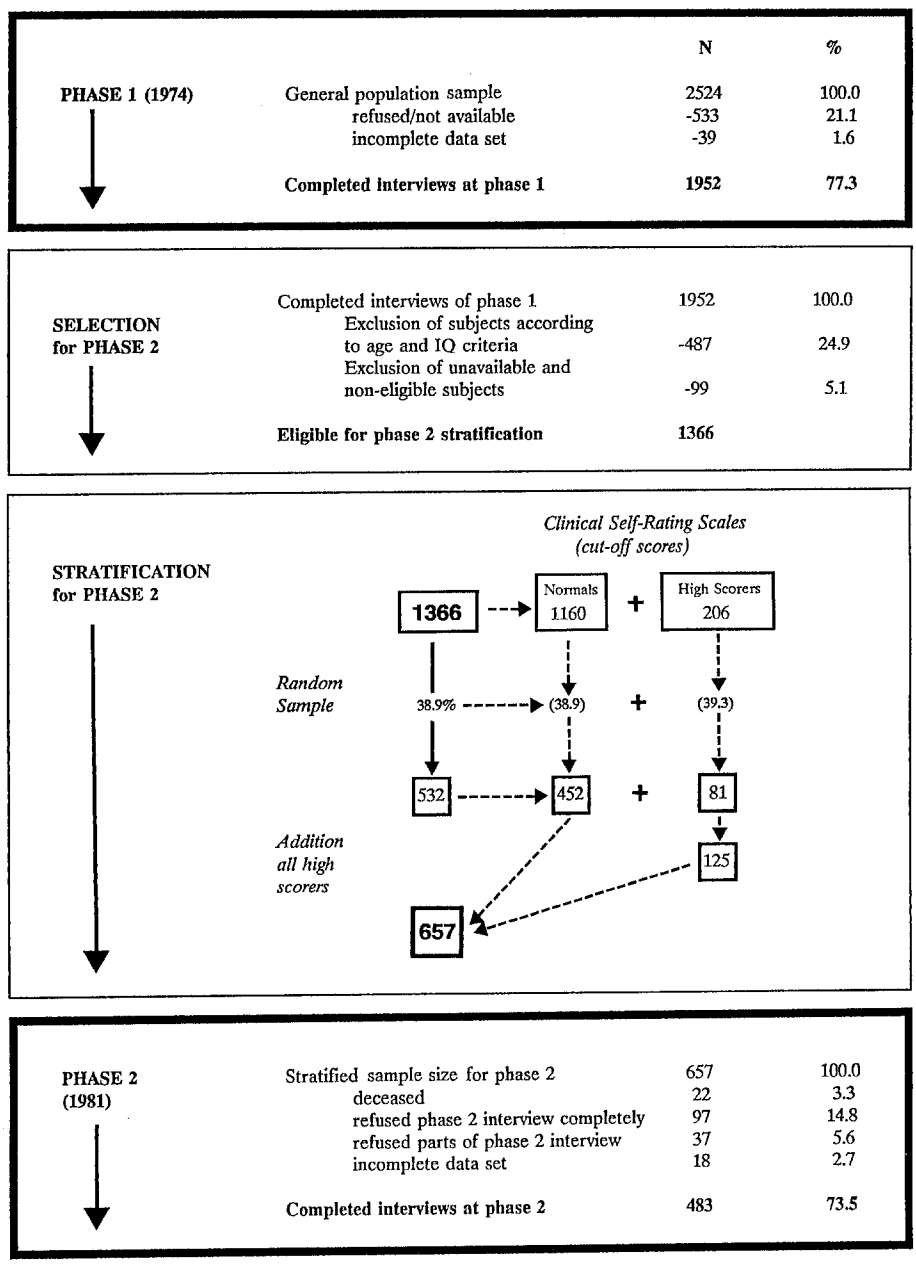

Fig. 1. Sampling and design of the MFS epidemiological sample

The Phase-1 interviews (Wittchen and von Zerssen 1988) were done by trained interviewers of a health reserarch survey company (Infratest/Gesundheitsforschung) using psychologists and other professionals from the social sciences. These interviews included questions to assess social, martial and occupational status, use of and attiudes towards health services, use of different types of medication, and lifestyle patterns (exercise, eating habits etc). Emphasis was laid on the assessment of specific psychopathological and clinical features, such as the evaluation of depressive and paranoid tendencies by using the CSR-S, and the assessment of the use of alcohol. An alcohol screening questionnaire was also given to assess symptoms for abuse of and dependence on alcohol (Münchner Alkoholismustest – MALT; Feuerlein et al. 1979). In addition the examination included a short verbal intelligence test to allow for later exclusion (see below) of subjects with IQ score below 85.

Selection and Stratification for Phase 2 (Follow-up Investigation). The Phase-2 examination in 1981 (7 years later) was designed as a clinical/psychiatric follow-up. To allow direct comparisons, continuous contact was estblished with the ECA Program, which was occurring at about the same time, so that training in the use of the DIS (version 2) could be given and comparisons made with the present study. The Phase-2 interviews were conducted exclusively by clinicians (psychiatrists and clinical psychologists). Because of this and limited financial and personnel resources, only some of the 1952 subjects of Phase 1 could be selected for the more intensive second phase. For reasons of comparability with our inpatient sample, it was decided to use the same inclusion criteria; thus, all subjects were excluded who: (a) at Phase 1 were younger than 18 or older than 57 years, or had an IQ below 85, resulting in 487 subjects being excluded, and (b) were not available ($n = 99$).

Secondly it was decided to stratify the remaining 1366 subjects. In order to ensure both a representative random sample and a high number of probable cases, the following stratification method was used, on the basis of the scores in the CSR-S (see Fig. 1). After analyzing the score distribution of the B-L, D-S, P-S, and MALT scales for all Phase-1 respondents, a 38.9% ($n = 532$) simple random sample was drawn. The cut-off scores for each of the four clinical rating scales were used to include all probable cases with mental disorders. One hundred and twenty-five subjects with scores above the cut-off threshold on at least one of the scales, who had not been randomly included in the straight random sample, were then added to the 532 subjects. Thus, 657 subjects were followed-up for 7 years (1974–1981) by monitoring health insurance records for the more detailed clinical follow-up investigation in 1981.

At Phase 2 in 1981, 22 subjects (3.3%) had died, 97 (14.8%) refused the whole interview, and 37 (5.6%) refused parts of it. Of the 657 subjects, 501 (response rate: 76.2%) could be interviewed in Phase 2. Of these 501 subjects, only 483 (73.5%) had a full data set, and so only these subjects were used for this study. Table 1 shows the sociodemographic charateristics of the general population in 1974, subjects who were interviewed in 1981, as well as those who rejected the interview, and those who died.

Table 1. Sociodemographic characteristics of the general population in 1974, rejectors, and subjects who died

	General pop. in 1974 %	Completed interviews[a] ($n = 483$) %	Rejectors ($n = 134$) %	Died ($n = 22$) %
Sex				
Male	50.1	48.0	40.3	59.1
Female	49.9	52.0	59.7	40.9
Age (years)				
18–29	28.1	23.6	23.8	4.5
30–39	32.6	36.9	26.9	18.2
40–49	26.5	25.5	28.4	27.3
50–55	12.8	14.1	20.9	50.0
Marital status				
Single	18.7	12.8	16.4	9.1
Married	76.1	81.6	71.6	68.2
Separated/ widowed	5.2	5.6	12.0	22.7

[a] Completed data sets

Design and Study Instruments

In addition to other instruments (for details see Wittchen and von Zerssen 1988), all subjects and patients were interviewed with the German version of the DIS (Wittchen and Rupp 1981). This instrument allows the use of computer programs for scoring DIS information to produce diagnostic information according to DSM-III for lifetime, 6-month, and current diagnoses. Anxiety (panic disorder, agoraphobia, simple and social phobia), depressive (major depression, single episode, recurrent, dysthymia, biopolar), substance disorders (alcohol abuse/dependence, drug abuse/dependence), somatization, schizophrenia, obsessive-compulsive disorder, psychosexual dysfunction, and eating disorders are included in the DIS used in the MFS, thus giving 16 possible DSM-III diagnoses. The DIS data on alcohol use are based on a modified alcohol section which included the results of a self-report questionnaire (MALT; Feuerlein et al. 1979), instead of some of the original DIS questions (for description, see Wittchen and Bronisch, in press) to ensure a high degree of comparability with the instruments used in Phase 1.

Although the DIS is designed for use by lay interviewers, only clinicians administered the DIS and all other instruments (Wittchen and von Zerssen 1988) in the MFS. These clinicians were either experienced physicians (more than 2 years of practical psychiatric training and experience after receiving their medical degree, $n = 8$) or clinical psychologists ($n = 12$). They were all trained in a 2-week video-assisted session in the use of the DIS, with the training material and a manual of instructions from the principal authors of the DIS. The interview training included further video-assisted practical experience under supervision throughout the whole study with the DIS as well as the other study instruments.

The Social Interview Schedule (SIS; Clare and Cairns 1978; modified German version, Hecht et al. 1987) was used to measure the severity of burdening objective social conditions (O), level of social management (M), and satisfaction (S) in 13 different social areas (e.g., work, social contact) during the 4 weeks before its administration. When applicable, each area is rated on a 4-point scale, ranging from 1 (no management difficulties) to 4 (severe management difficulties). Satisfaction with social roles is evaluated by the subjects themselves (1 = very satisfied, 4 = very unsatisfied). The reliablity of the instrument for each of the social role areas as well as the three resulting sum-scores for objective condition (O), management (M) and satisfaction (S) is satisfactory (Faltermaier et al. 1985).

The Global Assessment Scale (GAS; Endicott et al. 1976) was used to evaluate level of functioning and symptoms in the week preceding the interview. The GAS scores range from 1 (severely disabled) to 100 (excellent functioning). Subjects who scored 70 and below on the GAS were considered impaired and in need of psychotherapeutic or psychiatric help. The GAS has a relatively high inter-rater reliability; the intra-class correlation coefficients of reliability in studies from different populations range from 0.69 to 0.91 (Endicott et al. 1976).

Clinical Psychiatric Assessment and the Assignment of ICD-9 Diagnoses

All the cases (epidemiological sample) and patients (clinical sample) were also assessed on the basis of a psychiatric interview inde-

pendent of the instruments mentioned above. The psychiatrists were blind to the DIS diagnostic findings. This semi-structured clinical interview, with an approximate duration of 1.5 h, was based on a modified checklist referring to the "AMDP" system (Arbeitsgemeinschaft für Methodik und Dokumentation in der Psychiatrie 1979) for diagnostic classification issues. Its purpose was to evaluate additional information about the course of illness and treatment and to assessing ICD-9 diagnoses. Information from health insurance companies over the whole follow-up period of 7 years available to the interviewer was taken into account when estimating both the frequency of episodes and their severity. ICD-9 lifetime and 6-month diagnoses (up to 3 diagnoses) were assigned to each case from the general population. For a more detailed discussion of the methods see Wittchen et al. (1985).

Weighting and Analyses

In the following prevalence tables we report the raw *n* for each group and disorder. In addition prevalence rates in % are given. These percentages were weighted according to our stratification method used for Phase 2. Of the 1366 subjects, 1160 were normal and 206 were high scorers (see Fig. 1). Since all 206 high scorers in Phase 1 were chosen for the Phase-2 investigation (completed interviews 127) and only 452 (= 38.9%) of a random sample of the normals (completed interviews 356) cases from the high scorer groups received a weight of 206/127 (= 1.62), whereas cases from the normal group received a weight of 1160/356 (= 3.26). Thus the prevalence rates (%) for each disorder are weighted back to the original 1366 sample that formed the basis for our Phase-2 stratification.

Results

Lifetime and Six-Month Prevalence Rates of DIS/DSM-III Disorders

Table 2 shows the number of cases as well as the lifetime and 6-month weighted prevalence for DIS/DSM-III disorders together with their standard error estimations. Prevalence is calculated without the DIS/DSM-III exclusion rules, and thus any individual could have more than one diagnosis, and no diagnosis pre-empts the diagnosis of another. Thus, the sum of all individual disorders does not result in the overall prevalence rates.

Overall, 32.06% of the population met criteria for at least one of the 16 DIS/DSM-III disorders some time in their life (Table 2). Anxiety disorders (13.87%) were the most frequent lifetime mental disorders, followed by substance (13.51%) and affective (12.90%) disorders. The remaining disorders, including schizophrenia and somatization, were less frequent, with a lifetime prevalence under 1%. Among the individual anxiety disorders, the highest rates were obtained for simple phobia (8.01%), followed by agoraphobia (5.74%) and panic disorder (2.39%).

The 6-month rates for DIS/DSM-III were considerably lower than the lifetime rates; a remarkable difference can be seen for substance disorder (lifetime = 13.5%, 6 month = 1.5%). The drop in the 6-month rates may indicate that the subjects more easily admit having *had* substance problems but are less likely to admit a disorder they are currently experiencing. Very few of the subjects with substance disorder fulfilled criteria for dependence, and none of them fulfilled criteria for illegal drug use. No current (6-month) cases with schizophrenia were identified by the DIS.

Table 2. Lifetime and six-month prevalence rates of DIS/DSM-III disorders in the MFS ($n = 483$)

DIS/DSM-III diagnoses	Lifetime			6-months		
	n	%[a]	SE	*n*	%[a]	SE
Schizophrenic disorders	4	0.72	0.30	–	–	–
Schizophrenia	3	0.60	0.29	–	–	–
Schizophreniform disorder	1	0.12	0.07	–	–	–
Affective disorders	75	12.90	1.16	41	6.93	0.87
Major depression	54	8.96	0.96	20	2.98	0.52
Dysthymia	21	3.95	0.71	21	3.95	0.71
Bipolar disorder	1	0.24	0.20	1	0.24	0.20
Anxiety disorders	77	13.87	1.24	45	8.13	0.98
Panic disorder	14	2.39	0.53	6	1.08	0.37
Simple and social phobia	45	8.01	0.96	24	4.06	0.68
Agoraphobia	31	5.74	0.85	19	3.59	0.68
Obsessive-Compulsive disorder	12	2.03	0.48	10	1.79	0.47
Somatization	5	0.84	0.31	5	0.84	0.31
Substance use disorders	(73)	(13.51)	1.25	(10)	(1.55)	0.39
Alcohol ab/dep	(67)	(13.04)	1.27	(7)	(1.15)	0.35
Drugs/Medication ab/dep	10	1.79	0.47	4	0.60	0.24
Overall prevalence	(171)	(32.06)	1.73	(79)	(14.59)	1.29

SE = Standard error estimations; – = no current diagnoses; ( ) = alcohol abuse/dependence rating was modified from the original DIS; ab/dep = abuse/dependence

[a] Weighted

Among anxiety disorders, simple and social phobias were the most prevalent, followed by agoraphobia, panic disorder and obsessive-compulsive disorder. Generalized anxiety disorders were not assessed in our study.

Prevalence of DIS/DSM-III by Sex, Age, and Marital Status

Sex. Women (33.64%) slightly exceeded men (30.30%) for having any lifetime DIS/DSM-III disorders (Table 3). In the individual disorders, men clearly predominated in substance, and women in affective, anxiety, and somatization disorder. Specifically, lifetime rate for substance disorder (21.23% versus 6.11%) was more than three times higher in men than women; the rates of affective (18.68% versus 6.42%), anxiety (18.13% versus 9.07%), and somatization (1.60% versus 0.00%) were about two times higher in women than in men. The rates of drug abuse/dependence were also higher in females compared to males. A closer examination of this finding revealed that the females were, with one exception, medication abusers, especially those in the older age groups.

Age and Age of Onset. As shown in Table 3, older persons (45–65 years) had slightly higher rates of any DIS/

Table 3. Lifetime prevalence rates of DIS/DSM-III disorders by sex and age[a]

DIS/DSM-III diagnoses	Sex		Age (years)	
	Male % (SE) ($n = 232$)	Female % (SE) ($n = 251$)	25–44 % (SE) ($n = 250$)	45–64 % (SE) ($n = 233$)
Affective disorders	6.42 (1.25)	18.68 (1.94)	13.70 (1.82)	12.84 (1.14)
Major depression	3.96 (0.99)	13.58 (1.66)	10.06 (1.58)	8.61 (0.87)
Dysthymia	2.46 (0.80)	5.35 (1.20)	3.64 (1.02)	4.42 (0.81)
Bipolar disorder	0.00 (0.00)	0.49 (0.42)	0.45 (0.39)	0.00 (0.00)
Anxiety disorders	9.07 (1.49)	18.13 (1.97)	13.97 (1.80)	14.32 (1.38)
Panic disorder	1.70 (0.68)	2.92 (0.78)	2.09 (0.68)	2.85 (0.67)
Simple and social phobia	5.47 (1.14)	10.35 (1.57)	9.65 (1.51)	6.48 (0.98)
Agoraphobia	2.85 (0.93)	8.27 (1.41)	5.94 (1.25)	5.70 (0.93)
Obsess.-Comp.	1.79 (0.62)	2.29 (0.76)	1.85 (0.66)	2.35 (0.58)
Somatization	0.00 (0.00)	1.60 (0.62)	0.72 (0.31)	1.00 (0.47)
Substance use disorders	21.23 (2.09)	6.11 (1.16)	11.84 (1.74)	15.88 (1.44)
Alcohol ab/dep	21.02 (2.13)	5.13 (1.09)	10.90 (1.69)	16.01 (1.59)
Drugs/Medication ab/dep	1.42 (0.66)	2.01 (0.65)	2.03 (0.80)	1.64 (0.35)
Overall prevalence	30.30 (2.37)	33.64 (2.53)	30.69 (2.51)	34.62 (1.93)

Obsess.-Comp. = Obsessive-Compulsive disorder; ab/dep = abuse/dependence

[a] Lifetime prevalence by sex and age are weighted back to their distribution in the general population

DSM-III disorders compared to younger subjects (25–44 years). This difference may be explained by higher rates for alcohol abuse/dependence in the older group. Similar but less pronounced age differences were found for dysthymia, panic disorder, obsessive-compulsive disorder, and somatization. The rates for major depression, simple phobia, and drug or medication abuse/dependence, however, were slightly higher in the younger than in the older age groups.

Figure 2a shows the cumulative age of onset curves (%) of those fulfilling the criteria for affective, anxiety, and substance disorders, as well as for the subtypes of anxiety disorders. Taking the 75% limit as a criterion, the majority of anxiety cases clearly develop their disorder in childhood or early adulthood and very rarely beyond age of 30 years. The onset of affective disorder is considerably later; 25% of the samples had fulfilled criteria for major depression or dysthymia at the age of 20 years. Substance disorder revealed the steepest curves with only rare onset below age 25 years.

Within the subtypes of anxiety disorders, simple phobia showed the earliest age of onset (Fig. 2b). Panic disorder showed the highest risk in the late 20s and early 30s, as well as some indications for a second less clear increase after age of 50 years. The peak age of onset for agoraphobia lay between the ages of 20 and 30 years.

Marital Status. The highest rates for having any of the 16 DIS/DSM-III disorders were found in subjects who were widowed (50.33%), followed by those who were separated or divorced (44.77%). As shown in Fig. 3, the widowed had the highest rates for affective disorders, but rates were also slightly elevated for anxiety disorders. The highest rate for substance disorder was found in subjects who have never been married.

Comorbidity Rates

The comorbidity rates of lifetime DSM-III disorders were high. Taking into account all the 16 main DSM-III diagnoses covered by the DIS version used in the present study, 31% of the subjects had just one diagnosis, and 69% had at least two diagnoses; almost 10% of the subjects reported even more than four lifetime diagnoses (Fig. 4). The comorbidity rates were also high for the 6-month time frame, with 32% of the subjects having at least two diagnoses.

The most common comorbidity patterns found in the 171 cases with any DIS-DSM-III lifetime diagnoses and in the 79 subjects with any 6-month diagnoses with regard to the three major groups of lifetime disorders (i.e., any anxiety, any affective, any substance disorder), was that of anxiety *and* affective disorders (15.2%), followed by anxiety *and* affective *and* substance disorders (5.3%) (Table 4). Anxiety disorders "only" and affective disorders "only" were each reported in 19.9%. Similar comorbidity patterns were found cross-sectionally, with anxiety *and* affective (7.6%) being the most frequent comorbidity patterns, followed by anxiety *and* affective *and* substance (3.8%).

Temporal Relationship

Irrespective of whether we include simple and social phobia in our analyses, almost two thirds of all cases with a lifetime diagnosis of anxiety *and* depression re-

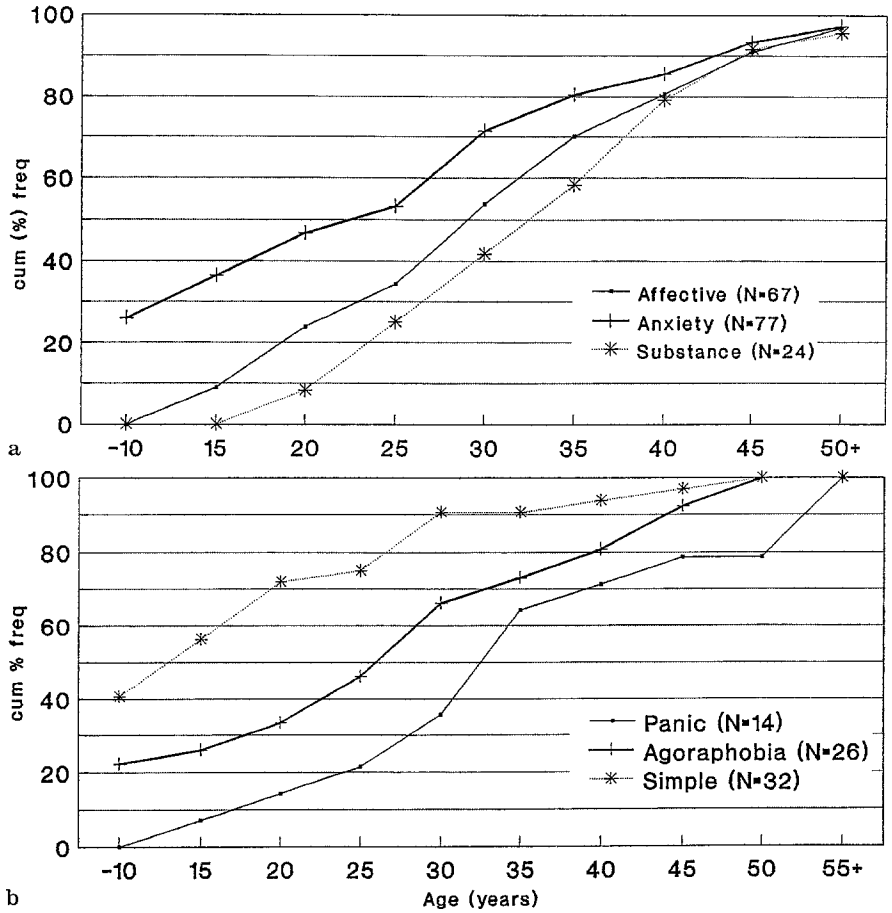

Fig. 2a, b. Cumulative Age of onset curves **a** for Affective, Anxiety, Substance Dis., **b** for Panic, Agoraphobia, Simple Phobia

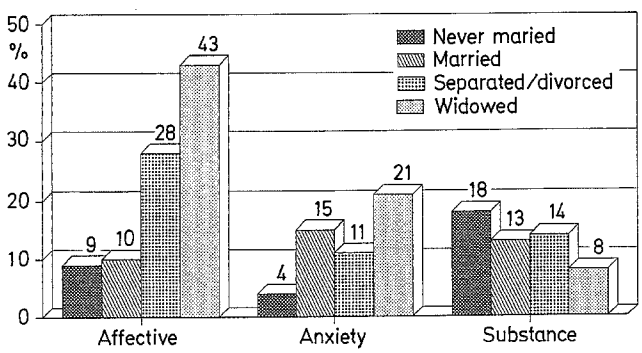

Fig. 3. Prevalence rates of DIS/DSM-III disorders by marital status

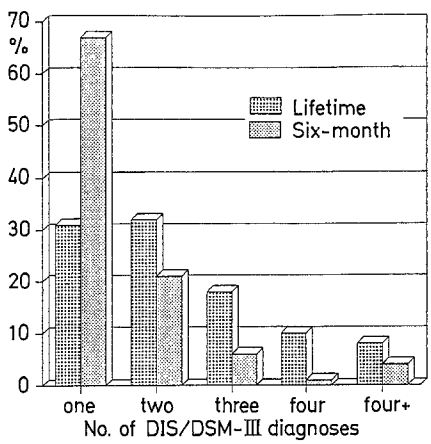

Fig. 4. Lifetime and 6-month comorbidity rates of DSM-III disorders

ported a clear age of onset of anxiety before that of depression (Fig. 5). In the majority of cases, more than 1 year went by before a depression developed after the onset of an anxiety disorder. Only for 2 cases no firm order effect could be established. In the group of cases who reported an onset of depression shortly after the onset of anxiety (same year +, $n = 7$ including simple phobia, 4 excluding simple phobia), 4 cases had a panic disorder, and 2 reported subthreshold panic attacks in the course of their simple and social phobia. This suggests that the occurrence of panic attacks increases the risk of developing a major depressive episode soon after as a complication of illness.

However, there were a few subjects who had a clear onset of depression before anxiety. A closer inspection of these subjects revealed a considerable heterogeneity. Two cases actually had panic attacks shortly before the onset of depression, but did not meet the diagnostic criteria for DSM-III panic disorder at that time (severity/number of symptoms), although they would have qualified for a diagnosis of panic disorder in DSM-III-R. Five cases had an unrelated first depressive episode in conjunction with severe life events (cancer, operation, severe illnesses, breast removal and death or suicide of a loved one). There was usually a clear remission and a long time lapse before the anxiety symptoms started. Depressive epi-

Table 4. Frequent comorbidity patterns in the MFS: cases with lifetime and 6-month diagnoses

DIS-DSM-III disorders	Lifetime ($n=171$)		Six-month ($n=79$)	
	n	%	*n*	%
Anxiety only	34	19.9	34	43.0
Affective only	34	19.9	14	17.7
Anxiety and affective	26	15.2	6	7.6
Substance only	12	7.0	3	3.8
Anxiety and substance	8	4.7	2	2.5
Affective and substance	6	3.5	2	2.5
Anxiety and affective and substance	9	5.3	3	3.8
Other diagnoses	42	24.6	15	19.0
	171	100.1%	79	99.9

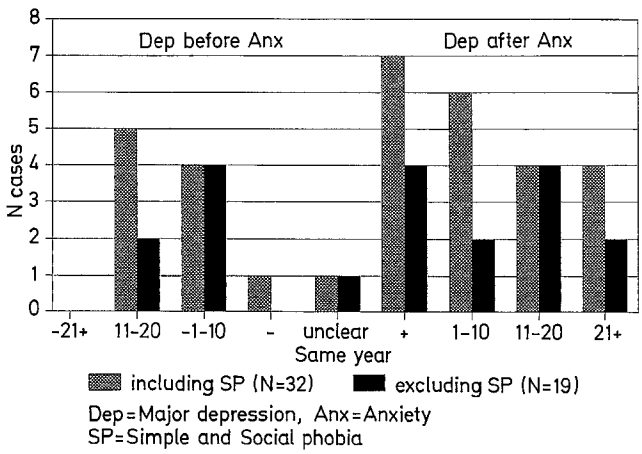

Fig. 5. Age of onset difference in comorbid anxiety and affective disorders. Dep = Major depression, Anx = Anxiety, SP = Simple and Social phobia

sodes were all short in duration (2–3 weeks), but they tend to recur. Four cases showed a complex and heterogeneous pattern of multiple somatoform symptoms (undifferentiated somatoform disorders) that started early in their life and before the occurrence of major depressive episode.

A separate analysis was performed to determine whether the same pattern of temporal relation between anxiety and depression emerges when excluding social and simple phobia because this disorder has an early age of onset. As shown in Fig. 5, this analysis did not change the pattern of the temporal relationship since most subjects with both disorders reported the onset of anxiety before that of depression rather than the reverse.

Psychosocial Impairment

Table 5 gives a breakdown of the current (1-week) GAS score for each of the diagnostic groups (lifetime). Irrespective of whether the disorder was present at the time of the follow-up investigation in Phase 2, there were considerably more cases with affective disorder (53.3%) showing marked current symptom-related impairments (GAS < 70) as assessed by the GAS than with anxiety (36.4%) or substance disorder (23.6%). Among anxiety disorders, obsessive-compulsive and panic disorder were the most impaired. Of all simple and social phobias, 53.5% showed almost no current symptom-related impairments.

Since the GAS score uses a mixture of psychosocial *and* symptom criteria for the determination of the severity rating, we additionally analyzed the mean score for the SIS rating dimension of social difficulties in different social role areas. This score does not take into account symptomatology and exlusively focuses on social role functioning. The SIS-M mean score for all affective disorders was significantly higher as compared to the scores of a healthy, matched control group. For anxiety disor-

Table 5. Psychosocial functioning and the DIS/DSM-III disorders[a]

DIS/DSM-III diagnoses	Degree of impairment (GAS)				SIS-M
	< 70 *n* (%)	70–79 *n* (%)	> 80 *n* (%)	Mean	Mean
Affective disorders	40 (53.3)	12 (16.0)	23 (30.7)	68.55	1.73*
Major depression	29 (53.7)	8 (14.8)	17 (31.5)	68.52	1.75**
Dysthymia	11 (52.4)	4 (19.0)	6 (28.6)	68.62	1.66*
Bipolar disorder	1 (100)	–	–	51.00	2.29**
Anxiety disorders	28 (36.4)	13 (16.9)	36 (46.7)	73.12	1.61
Panic disorder	6 (42.8)	4 (28.6)	4 (28.6)	65.43	1.65**
Simple phobia	13 (28.9)	8 (17.8)	24 (53.3)	74.71	1.57
Agoraphobia	12 (38.7)	5 (16.1)	14 (45.2)	72.19	1.54
Obsess.-Comp.	6 (50.0)	1 (8.3)	5 (41.7)	69.25	1.72**
Substance use disorders	17 (23.6)	13 (18.1)	42 (58.3)	77.82	1.53
Alcohol ab/dep	17 (25.7)	11 (16.7)	38 (57.6)	77.26	1.54
Drugs/Medication ab/dep	3 (30.0)	3 (30.0)	4 (40.0)	71.40	1.60

[a] The GAS scores range from 0 (disabled) to 100 (excellent functioning); the SIS-M scores range from 1 (no management difficulties) to 4 (severe management difficulties)

* $P < 0.05$, ** $P < 0.01$ as compared with a matched control group without a mental disorder

Table 6. Lifetime prevalence of mental disorders according to the ICD-9

ICD-9 no. and diagnoses	ICD-9 (lifetime)		DSM-III (lifetime) Equivalent		
	n	% (SE)		*n*	% (SE)
Schizophrenia, other psychotic disorders (295.0, 297.0, 298.0)	4	0.71 (0.30)	Schizophrenia/schizophreniform	4	0.72 (0.30)
Affective psychosis	4	0.59 (0.24)			
– Unipolar (296.0/2)	3	0.48 (0.22)	Major depression		(see below)
– Bipolar (296.3)	1	0.12 (0.07)	Bipolar disorder	1	0.24 (0.20)
Neurotic disorders (300.0)	83	15.01 (1.28)	*		
– Anxiety neurosis (300.0)	14	2.50 (0.55)	Panic disorder	14	2.39 (0.53)
– Phobia (300.2)	34	6.43 (0.90)	Phobia	45	8.01 (0.96)
– Obs.-comp. neurosis (300.3)	6	1.07 (0.37)	Obsessive-comp.	12	2.03 (0.48)
– Depressive neurosis (300.4)	36	6.07 (0.81)	Major depression[a]	54	8.96 (0.96)
			Dysthymia	21	3.95 (0.71)
– Other (300.5–300.9)	5	0.83 (0.31)	*	–	–
Personality disorders (301.0)	13	2.14 (0.49)	*	–	–
Sexual disorders (302.0)	2	0.24 (0.10)	*	–	–
Alcoholism (303.0)	5	0.95 (0.36)	Alcohol abuse/dependence	(67)	(13.04) (1.27)
Medication/drug (304.0, 305.0)	12	1.78 (0.40)	Drug abuse/dependence	10	1.79 (0.47)
Psychosomatic disorders (316.0, 306.0)	56	10.60 (1.13)	Somatization	5	0.84 (0.31)
Psychogenic reactions (308.0, 309.0)	14	2.50 (0.55)	*	–	–
Others	3	0.72 (0.34)	*	–	–
Overall prevalence	133	24.78 (1.59)		(171)	(32.06) (1.73)

% = Prevalence rates; SE = standard error estimations; *n* = number of subjects; * = no clear correspondence to DIS/DSM-III; [a] = Dysthymia as a single diagnosis was not included; ( ) = for DIS/DSM-III disorders, alcohol abuse/dependence rating was modified from the original DIS

ders, only obsessive-compulsive disorders and panic disorders had significantly higher SIS-M mean scores above the scores expected for the healthy, matched control group. Thus, our findings with GAS were substantiated by the more detailed SIS measure.

Comparison of Prevalence rates: ICD-9 Versus DSM-III

Table 6 summarizes the number of cases, weighted prevalence, and the standard error estimations for all ICD-9 diagnoses assigned by the psychiatrists independently and blindly to the DSM-III diagnoses. In the second column, each of the ICD class was matched to its comparable DSM-III equivalents.

One striking finding is that the clinicians identified fewer cases than the interviewers (133 versus 171). The major reason for this discrepancy was the diagnosis of alcohol abuse/dependence, where only 5 cases were assigned by the clinician as having this diagnosis compared with 67 cases using the DIS approach. There were several diagnoses identified by the psychiatrists with relatively high prevalence, but which unfortunately were not covered by the DIS. These included personality disorder, psychosomatic disorder, and psychogenic reactions.

There was almost a perfect correspondence for affective disorders; all subjects with affective psychosis or depressive neurosis also received DIS/DSM-III diagnosis of major depression, or bipolar disorder. Good concordance was also found for anxiety disorders, since all the 14 subjects with panic disorder also received a diagnosis of anxiety neurosis. The DIS approach identifies more phobias (especially agoraphobia) and obsessive-compulsive disorder.

Discussion

Before summarizing our main findings and drawing conclusions, some limitations of the present study need to be considered. (i) The main purpose of the 1974 survey was originally to standardize the CSR-S, and was not intended for determining the prevalence of mental disorders, although it is unlikely that this has had an impact on our data. (ii) The sample size of the MFS was relatively small, especially when examining disorders with low prevalence rates and their associations with sociodemographic factors (e.g., marital status). (iii) Owing to the fact that the sampling procedure took place in 1974, the present findings were based on an older age cohort, the youngest being 25 and the oldest 64 years old. (iv) Comorbidity rates and patterns were examined primarily on the basis of a lifetime approach by using the DIS. Since comorbidity and the age of onset data were collected retrospectively and were based on subject's recall, their validity may be questionable. Furthermore, the DIS does not allow a precise determination of the temporal relationship of the disorder when they occur in the

Table 7. Lifetime prevalence rates of DIS/DSM-III disorders from recent epidemiological studies[a]

DSM-III diagnoses	MFS % (SE)	ECA sites					Puerto Rico % (SE)	Edmon. % (SE)	Seoul %	Christchurch % (SE)
		ECA (Total)[b] % (SE)	St. Louis % (SE)	New Haven % (SE)	Baltimore % (SE)	Los Angeles[c] % (SE)				
Schizophrenic disorders	0.72 (0.30)	1.5 (0.1)	1.1 (0.2)	2.0 (0.3)	1.9 (0.3)	0.7 (0.2)	1.8 (0.4)	0.6 (0.1)	0.34	0.4 (0.2)
Schizophrenia	0.60 (0.29)	1.3 (0.1)	1.0 (0.2)	1.9 (0.3)	1.6 (0.2)	0.6 (0.2)	1.6 (0.4)	0.6 (0.1)	0.31	0.3 (0.2)
Schizophreniform	0.12 (0.07)	0.1 (0.0)	0.1 (0.1)	0.1 (0.1)	0.3 (0.1)	0.1 (0.0)	0.2 (0.1)	0.1 (0.0)	0.03	<0.01 (0.1)
Affective disorders	12.90 (1.16)	8.3 (0.3)	8.0 (0.7)	9.5 (0.6)	6.1 (0.4)	8.9 (0.6)	7.9 (0.7)	10.2 (0.6)	5.52	14.7 (1.0)
Major depression	8.96 (0.96)	5.8 (0.3)	5.5 (0.6)	6.7 (0.5)	3.7 (0.3)	6.4 (0.5)	4.6 (0.6)	8.6 (0.5)	3.31	12.6 (1.0)
Dysthymia	3.95 (0.71)	3.3 (0.2)	3.8 (0.4)	3.2 (0.4)	2.1 (0.2)	4.2 (0.4)	4.7 (0.6)	3.7 (0.3)	2.42	6.4 (0.7)
Bipolar disorder	0.24 (0.20)	0.8 (0.1)	1.1 (0.3)	1.1 (0.2)	0.6 (0.2)	0.5 (0.1)	0.5 (0.2)	0.6 (0.1)	0.40	0.7 (0.3)
Anxiety disorders	13.87 (1.24)	14.6 (0.4)	11.1 (0.7)[d]	10.4 (0.6)[d]	25.1 (0.8)[d]	13.5 (0.7)	13.6 (1.0)	11.2 (0.6)[d]	9.19	10.5 (0.9)[d]
Panic disorder	2.39 (0.53)	1.6 (0.1)	1.5 (0.3)	1.4 (0.2)	1.5 (0.2)	1.5 (0.3)	1.7 (0.4)	1.2 (0.2)	1.11	2.2 (0.4)
Simple phobia	8.01 (0.96)	–	–	–	–	–	8.6 (0.8)	7.2 (0.5)	5.35	–
Agoraphobia	5.74 (0.85)	–	–	–	–	–	6.9 (0.7)	2.9 (0.3)	2.08	–
Phobia	–	12.5 (0.3)	9.4 (0.6)	7.8 (0.4)	23.3 (0.8)	11.7 (0.6)	12.2 (0.9)	8.9 (0.5)	–	8.1 (0.8)
Obsess.-Comp.	2.03 (0.48)	2.5 (0.2)	1.9 (0.3)	2.6 (0.3)	3.0 (0.3)	2.1 (0.3)	3.2 (0.5)	3.0 (0.3)	2.29	2.2 (0.4)
Somatization	0.84 (0.31)	0.1 (0.0)	0.1 (0.1)	0.1 (0.1)	–	–	0.7 (0.2)	0.0 (0.0)	0.03	<0.1 (0.1)
Substance use disorders	(13.51) (1.25)	16.4 (0.4)	18.1 (0.9)	15.0 (0.7)	17.0 (0.7)	18.5 (0.7)	–	20.6 (0.8)	31.75	21.0 (1.3)
Alcohol ab/dep	(13.04) (1.27)	13.3 (0.4)	15.7 (0.9)	11.5 (0.6)	13.7 (0.7)	14.9 (0.7)	7.0 (0.8)	18.0 (0.8)	21.71	18.9 (1.3)
Drugs/Medication ab/dep	1.79 (0.47)	5.9 (0.2)	5.5 (0.6)	5.8 (0.4)	5.6 (0.5)	7.3 (0.5)	–	6.9 (0.5)	0.88	5.7 (0.7)
Overall prevalence	(32.06) (1.73)	32.3 (0.5)	31.0 (1.2)	28.8 (0.9)	38.0 (0.9)	33.2 (1.0)	28.1 (1.4)[e]	33.8 (0.9)	39.81	36.6 (1.5)

[a] Taiwanese study (Hwu et al. 1989) was not included in this table because their rates are broken down into three geographical areas: metropolitan Taipei, small towns, and rural villages

[b] These rates are taken from Regier et al. (1988)

[c] These rates are taken from Karno et al. (1987)

[d] Anxiety/Somatoform disorders

[e] Excludes drug abuse/dependence, antisocial personality, anorexia nervosa, and psychosexual dysfunction

– = Not reported; SE = standard error estimations; Obsess.-Comp. = Obsessive-Compulsive disorder; ab/dep = abuse/dependence; ( ) in the MFS = alcohol abuse/dependence rating was modified from the original disorders

same year. If the onset of the disorder is more than a year ago, there is also a lack of precision in determining how symptom patterns cluster within a specific time frame if disorders are either not present in the last 6 months or are less than a year apart. Thus, a few subjects may have been classified inappropriately in our analysis of the temporal relationship between anxiety and depression. These caveats should be borne in mind in our discussion.

The MFS's lifetime and 6-month prevalence rates for most mental disorders showed remarkable similarities with that of the ECA (Burnam et al. 1987; Myers et al. 1984; Regier et al. 1990a; Robins et al. 1984) and recent epidemiological studies (Bland et al. 1988a, b; Canino et al. 1987; Hwu et al. 1989; Lee et al. 1990; Wells et al. 1989) which used the same diagnostic instrument, the DIS (Table 7). The convergence of findings of these studies with those of the MFS underlines the importance of using standardized diagnostic instruments in cross-national epidemiological comparisons and promises a more valid detection of true differences between studies. As in all the studies listed, the most frequent mental disorders in the MFS were lifetime anxiety disorders followed by substance disorders and affective disorders. Within anxiety disorders, simple phobias were found to be the most common, followed by agoraphobia and panic disorder. Although there were only very few detectable differences between our findings and those of other epidemiological studies using the DIS, there are two differences that deserve further attention: a) the rates for major depression and b) the rates for drug abuse and dependence. Comparing the MFS rates for drug abuse and dependence with those of other studies, remarkably lower rates can be seen, especially if compared with the ECA site Los Angeles and the Canadian Edmonton Study. Similarily, the MFS prevalence for major depression is slightly higher, except in comparison with the New Zealand Study of Christchurch. Both prevalence differences might be partially explained by an age cohort effect. Since the MFS data are based on an older cohort, with the youngest being 25 years old at the time of the interview, whereas all the other studies included subjects aged 15 years and older, this might be the most reasonable explanation. The prevalence rates for drug abuse and dependence, especially for illegal drug abuse, was found in the ECA-Study to be highest in the youngest cohorts of 15–25 years. Furthermore, our data show that the highest risk for developing major depression is after the age of 25 years. Thus we could expect for our study higher rates for drug abuse if subjects younger than 25 years had been included (see Bronisch and Wittchen in press for a more comprehensive discussion). Another likely hypothesis to explain these differences might be that there are true differences in the frequency of these two disorders between countries. With regard to drug abuse and dependence, our lower rates might indicate that illegal drugs are less available in Germany as compared with some of the US areas, especially Los Angeles.

We found marked sex differences in the prevalence of specific disorders. Females had about twice the rates of affective, anxiety and somatization than males. The males had about three times higher rates in substance disorders than females. These sex differences are consistent with other epidemiological studies (Bebbington et al. 1981; Canino et al. 1987; Hwu et al. 1989; Robins et al. 1984; Wells et al. 1989; Weissman and Klerman 1977). Being widowed and divorced/separated was associated with the highest rates of major depression (Bland et al. 1988a; Regier et al. 1990a; von Korff et al. 1983), and being single with substance disorder.

Although the DIS version used covers only 16 of the many DSM-III diagnoses and did not provide criteria for generalized anxiety disorder, most subjects (69%) had at least two diagnoses (Wittchen and Essau 1989). This finding is in full agreement with other epidemiological studies (Johnson et al. 1990; Markowitz et al. 1989; Regier et al. 1990b, c; Vollrath and Angst 1989). The most frequent pattern of comorbidity was anxiety *and* affective disorders (20%). Like the ECA findings (Christie et al. 1988; Helzer and Canino, in press; Helzer and Pryzbeck 1988), a substantial proportion of anxiety disorders also fulfilled the criteria for substance use disorders (13.2%). However, unlike recent findings from the ECA (Regier et al. 1990b), the use of illegal drug was not reported, instead abuse of and dependence on barbiturates and benzodiazepines was the most frequent subtype of abuse observed in our study.

Simple and social phobia begin mostly in childhood or early adolescence, whereas the highest risk for agoraphobia lies between age of 20 and 30 years, and for panic disorders slightly later, between 25 to 35 years (Burke et al. 1990). The majority of the cases with both anxiety and depression had depression clearly after the occurrence of anxiety. Thus, depression may be regarded as mostly secondary to anxiety (Angst et al. 1990; Clancy et al. 1978). This finding suggests that even mild anxiety syndromes (e.g., social and simple phobia) may put the subjects at a long-term risk for developing other disorders.

However, almost 10% of the comorbid cases had depression before the onset of anxiety disorders. A closer inspection of this group of subjects revealed considerable heterogeneity with regard to psychopathological features (Wittchen 1991, Wittchen et al., 1991). In some of these cases, the occurrence of both disorders was obviously unrelated; the depressive episodes were short in duration, often related to severe life events and remitted completely. Thus, the type of depression that was reported by those who first had depression before anxiety was mostly reactive in nature (i.e., reactive depression). In others, depression was mainly preceded by somatoform syndromes, thereby suggesting major depression as a long-term complication of other mental disorders.

In summary, our results show remarkably similar results to that of the ECA sites and studies from different parts of world where the same diagnostic instrument was used. Further research should consider using the same diagnostic criteria and instruments when comparing prevalence rates and comorbidity of mental disorders in different countries or settings.

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