Current Comorbidity of Psychiatric Disorders Among DSM-IV Major Depressive Disorder Patients in Psychiatric Care in the Vantaa Depression Study

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Background: While numerous studies have documented the high comorbidity of major depressive disorder (MDD) with individual mental disorders, no published study has reported overall current comorbidity with all Axis I and II disorders among psychiatric patients with MDD, nor systematically investigated variations in current comorbidity by sociodemographic factors, inpatient versus outpatient status, and number of lifetime depressive episodes.

Method: Psychiatric outpatients and inpatients in Vantaa, Finland, were prospectively screened for an episode of DSM-IV MDD, and 269 patients with a new episode of MDD were enrolled in the Vantaa Depression MDD Cohort Study. Axis I and II comorbidity was assessed via semi-structured Schedules for Clinical Assessment in Neuropsychiatry, version 2.0, and Structured Clinical Interview for DSM-III-R personality disorders interviews.

Results: The great majority (79%) of patients with MDD suffered from 1 or more current comorbid mental disorders, including anxiety disorder (57%), alcohol use disorder (25%), and personality disorder (44%). Several anxiety disorders were associated with specific Axis II clusters, and panic disorder with agoraphobia was associated with inpatient status. The prevalence of personality disorders varied with inpatient versus outpatient status, number of lifetime depressive episodes, and type of residential area, and the prevalence of substance use disorders varied with gender and inpatient versus outpatient status.

Conclusion: Most psychiatric patients with MDD have at least 1 current comorbid disorder. Comorbid disorders are associated not only with other comorbid disorders, but also with sociodemographic factors, inpatient versus outpatient status, and lifetime number of depressive episodes. The influence of these variations on current comorbidity patterns among MDD patients needs to be taken account of in treatment facilities.

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Epidemiologic studies[1–3] indicate that co-occurrence of major depressive disorder (MDD) with other mental disorders is not only highly prevalent, but also a substantial determinant of the use of psychiatric services.[4,5] Clinical studies have reported that comorbidity is 1 of the major factors associated with poor outcome of MDD by increasing the risk for relapse or recurrence,[6] chronicity,[7,8] residual symptoms,[9] suicide,[10–14] and psychosocial impairment.[15] The current comorbidity pattern may also influence the choice of treatment modality, as suggested in the Revised Practice Guideline for the Treatment of Patients with Major Depressive Disorder set forth by the American Psychiatric Association.[16] In psychiatric settings, the reported prevalence of current comorbid disorders among patients with MDD has varied widely (Tables 1 and 2).[15,17–34] Overall, about half of the patients with MDD in psychiatric care have a current anxiety and personality disorder, and about one fifth have a current substance use disorder (see Tables 1 and 2).[15,17–34]

While some aspects of psychiatric comorbidity have been thoroughly investigated, several important gaps in our knowledge remain. Many of the early studies focused on a single type of comorbid disorder, e.g., anxiety disorders, a design that may well inflate the prevalence of comorbidity found. For example, the estimates for prevalence of current panic disorder are 2-fold (weighted mean = 23%) in the studies[15,22,23] that focused only on comorbid panic disorder, compared with the studies[17,19,21,24] focusing concurrently on several comorbid anxiety disorders (weighted mean = 11%). Furthermore, prevalence of

Table 1. Current Axis I Comorbidity of Major Depressive Disorder (MDD) in Psychiatric Settings[a]

Study Reference	N	Outpatients (%)	Sex/Female (%)	Diagnostic Method	% of Subjects With Comorbidity
Any anxiety disorder					
Sanderson et al,[17] 1990	197	100	56	SCID (DSM-III-R)	42
Pini et al,[18] 1997	38	100	75	SCID-P (DSM-III-R)	92
Schatzberg et al,[19] 1998	85	38	49	SCID-P (DSM-III-R)	29
Fava et al,[20] 2000	255	100	NR	SCID-P (DSM-III-R)	45
Zimmerman et al,[21] 2000	373	100	67	SCID (DSM-IV)	57
Vantaa Depression Study	269	83	73	SCAN (DSM-IV)	57
Total	1217	…	…	…	51
Panic disorder					
Van Valkenburg et al,[15] 1984	114	NR (inpatients and outpatients)	44	Semistructured interview (Feighner, DSM-III)	27
Coryell et al,[22] 1988	523 (387[b])	NR (mostly inpatients)	60	SADS (RDC)	19
Sanderson et al,[17] 1990	197	100	56	SCID (DSM-III-R)	10
Grunhaus et al,[23] 1994	176 (136[b])	NR (inpatients and outpatients)	71	SADS (RDC)	34
Fava et al,[24] 1996	396	100	66	SCID-P (DSM-III-R)	8
Schatzberg et al,[19] 1998	85	38	49	SCID-P (DSM-III-R)	7
Fava et al,[20] 2000	255	100	NR	SCID-P (DSM-III-R)	8
Zimmerman et al,[21] 2000	373	100	67	SCID (DSM-IV)	17
Vantaa Depression Study	269	83	73	SCAN (DSM-IV)	17
Total[c]	1957	…	…	…	16
Generalized anxiety disorder					
Sanderson et al,[17] 1990	197	100	56	SCID (DSM-III-R)	20
Fava et al, 1996 [24]	396	100	66	SCID-P (DSM-III-R)	9
Fava et al, 2000 [20]	255	100	NR	SCID-P (DSM-III-R)	10
Zimmerman et al,[21] 2000	373	100	67	SCID (DSM-IV)	15
Vantaa Depression Study	269	83	73	SCAN (DSM-IV)	14
Total[c]	1235	…	…	…	14
Social phobia					
Sanderson et al,[17] 1990	197	100	56	SCID (DSM-III-R)	15
Fava et al,[24] 1996	396	100	66	SCID-P (DSM-III-R)	26
Alpert et al,[25] 1997	243	100	55	SCID-P (DSM-III-R)	27
Schatzberg et al,[19] 1998	85	38	49	SCID-P (DSM-III-R)	13
Fava et al,[20] 2000	255	100	NR	SCID-P (DSM-III-R)	26
Zimmerman et al,[21] 2000	373	100	67	SCID (DSM-IV)	33
Vantaa Depression Study	269	83	73	SCAN (DSM-IV)	20
Total[c]	1563	…	…	…	25
Simple phobia					
Sanderson et al,[17] 1990	197	100	56	SCID (DSM-III-R)	2
Fava et al,[24] 1996	396	100	66	SCID-P (DSM-III-R)	14
Schatzberg et al,[19] 1998	85	38	49	SCID-P (DSM-III-R)	5
Fava et al,[20] 2000	255	100	NR	SCID-P (DSM-III-R)	15
Zimmerman et al,[21] 2000	373	100	67	SCID (DSM-IV)	14
Vantaa Depression Study	269	83	73	SCAN (DSM-IV)	25
Total[c]	1320	…	…	…	14
OCD					
Sanderson et al,[17] 1990	197	100	56	SCID (DSM-III-R)	4
Fava et al,[24] 1996	396	100	66	SCID-P (DSM-III-R)	4
Schatzberg et al,[19] 1998	85	38	49	SCID-P (DSM-III-R)	9
Fava et al,[20] 2000	255	100	NR	SCID-P (DSM-III-R)	5
Zimmerman et al,[21] 2000	373	100	67	SCID (DSM-IV)	10
Vantaa Depression Study	269	83	73	SCAN (DSM-IV)	7
Total[c]	1320	…	…	…	5
PTSD					
Sanderson et al,[17] 1990	197	100	56	SCID (DSM-III-R)	0
Schatzberg et al,[19] 1998	85	38	49	SCID-P (DSM-III-R)	4
Zimmerman et al,[21] 2000	373	100	67	SCID (DSM-IV)	13
Vantaa Depression Study	269	83	73	SCAN (DSM-IV)	1
Total	924	…	…	…	6
Alcohol use disorders					
Sanderson et al,[17] 1990	197	100	56	SCID (DSM-III-R)	8
McDermut et al,[26] 2001	373	100	67	SCID (DSM-IV)	9
Vantaa Depression Study	269	83	73	SCAN (DSM-IV)	25
Total	839	…	…	…	14

[a]Only studies (1) using semistructured or standardized diagnostic interviews for both MDD and comorbid disorders, (2) with a sample size of at least 25 patients, (3) using unipolar MDD as their main sampling inclusion criterion or including a subset of MDD patients for whom the prevalence of comorbid disorders could be separately calculated, (4) involving patients of adult age (usually ≥ 18 years), and (5) conducted in psychiatric settings are included. Total percentages given for each disorder represent weighted means. Abbreviations: NR = not reported; OCD = obsessive-compulsive disorder; PTSD = posttraumatic stress disorder; RDC = Research Diagnostic Criteria; SADS = Schedule for Affective Disorders and Schizophrenia; SCAN = Schedules for Clinical Assessment in Neuropsychiatry, version 2.0; SCID = Structured Clinical Interview for DSM-III-R (or DSM-IV; refer to parentheses); SCID-P = Structured Clinical Interview for DSM-III-R, patient version.
[b]Subjects with MDD (the first N represents the total sample).
[c]Fava et al.,[20] 2000, not included because of overlapping of patients with Fava et al.,[24] 1996.

Table 2. Current Axis II (any personality disorder) Comorbidity of Major Depressive Disorder (MDD) in Psychiatric Settings[a]

Study Reference	N	Outpatients (%)	Sex/Female (%)	Diagnostic Method	% of Subjects With Comorbidity
Kocsis et al,[27] 1986	26	100	69	Semistructured interview (DSM-III)	40
Alnaes and Torgersen,[28] 1988	289 (97[b])	100	71	SCID (DSM-III), SIDP (DSM-III)	86
Sanderson et al,[29] 1992	197	100	56	SCID-P (DSM-III-R), SCID-II (DSM-III-R)	50
Stuart et al,[30] 1992	59	100	75	SADS (RDC), PDE (DSM-III-R)	24
Flick et al,[31] 1993	352 (165[b])	100	60	SCID (DSM-III-R), SCID-II (DSM-III-R)	61
Golomb et al,[32] 1995	316 (117[c])	100	66	SCID-P (DSM-III-R), SCID-II (DSM-III-R)	56
Pepper et al,[33] 1995	45	100	67	SCID (DSM-III-R), PDE-R (DSM-III-R)	18
Sato et al,[34] 1996	96	100	57	SCID-P (DSM-III-R), SCID-II (DSM-III-R)	55
Vantaa Depression Study	269	83	73	SCAN (DSM-IV), SCID-II (DSM-III-R)	44
Total[d]	1071	…	…	…	51

[a]Only studies (1) using semistructured or standardized diagnostic interviews for both MDD and comorbid disorders, (2) with a sample size of at least 25 patients, (3) using unipolar MDD as their main sampling inclusion criterion or including a subset of MDD patients for whom the prevalence of comorbid disorders could be separately calculated, (4) involving patients of adult age (usually ≥ 18 years), and (5) conducted in psychiatric settings are included. Total percentage given represents weighted mean. Abbreviations: OCD = obsessive-compulsive disorder; PDE = Personality Disorder Examination; PDE-R = Personality Disorder Examination-Revised; PTSD = posttraumatic stress disorder; RDC = Research Diagnostic Criteria; SADS = Schedule for Affective Disorders and Schizophrenia; SCAN = Schedules for Clinical Assessment in Neuropsychiatry, version 2.0; SCID = Structured Clinical Interview for DSM-III-R; SCID-II = Structured Clinical Interview for DSM-III-R personality disorders; SCID-P = Structured Clinical Interview for DSM-III-R, patient version; SIDP = Structured Interview for DSM-III Personality Disorders.
[b]Subjects with MDD (the first N represents the total sample).
[c]The SCID-II was used for 117 subjects; only the results from the SCID-II sample are reported here.
[d]Total percentage represents weighted mean.

current substance use disorders has been reported in only a few studies[17,26] on comorbidity among MDD patients in psychiatric settings. In fact, no previously published study has reported overall current comorbidity with all Axis I and II disorders assessed simultaneously in a large sample of psychiatric patients with MDD, and only 1 study[17] has examined even the full range of Axis I disorders. Moreover, variations in patterns of comorbidity in terms of sociodemographic factors such as age, gender, marital status, education, income, and type of residential area, as well as clinical characteristics such as number of lifetime depressive episodes, Axis I versus Axis II, age at onset, and severity of depression, have been little investigated in clinical populations. Since these factors are known to affect either the prevalence of mental disorders or the outcome of MDD in epidemiologic and clinical studies,[1,24,32,34–43] they may well also influence current MDD comorbidity patterns. Since most previous studies have been conducted in tertiary-level treatment centers, the generalizability of their findings to secondary-level psychiatric settings in which referrals mainly come from primary care is not self-evident, because of more selected patients in the tertiary level. One crucial neglected area of research is the difference in clinical features between inpatients and outpatients. This area of research is particularly important because the most influential clinical outcome studies of depressed patients have been based on inpatient populations.[44,45] Finally, almost all studies on comorbidity of depression have been based on DSM-III-R criteria; very few studies[21] based on DSM-IV criteria exist.

In the present study, we investigated a large sample of patients with DSM-IV MDD to determine the overall current comorbidity with all Axis I and II disorders. The subjects effectively represented psychiatric care patients in the city of Vantaa in southern Finland. We hypothesized that current comorbidity would vary by age, gender, marital status, inpatient versus outpatient status, and number of lifetime depressive episodes and would be concentrated among those with lower socioeconomic or educational status, and therefore also among those who live in the somewhat disadvantaged socioeconomic areas of eastern Vantaa. We also expected to find specific co-occurrences between Axis I disorders and various Axis II clusters.

METHOD

The Vantaa Depression Study (VDS) is a collaborative depression research project between the Department of Mental and Alcohol Research of the National Public Health Institute, Helsinki, and the Department of Psychiatry of the Peijas Medical Care District (PMCD), Vantaa, Finland. The catchment area comprises the city of Vantaa (population of 169,000 in 1997), bordering Helsinki. The PMCD Department of Psychiatry offers secondary care psychiatric services to all Vantaa citizens. These include a psychiatric inpatient unit; a general hospital outpatient

clinic; 6 community mental health care centers, each covering a specified catchment area; and 2 day hospitals. The VDS includes the naturalistic and prospective MDD Cohort Study, the baseline findings from which are reported here.

The first phase of patient sampling for the VDS MDD Cohort Study involved screening all patients in the PMCD who had a possible new episode of DSM-IV MDD between February 1, 1997, and May 31, 1998. During that period, every patient aged 20 to 59 years (N = 806) (1) seeking treatment at, (2) being referred to, or (3) already receiving care and now showing signs of deteriorating clinical state in the Department of Psychiatry, but without a clinical diagnosis of ICD-10 schizophrenia or bipolar I disorder, was screened for the presence of depressive symptoms by his or her attending mental health professional. The screening instrument included the 5 screening questions for depression from the World Health Organization (WHO) Schedules for Clinical Assessment in Neuropsychiatry, version 2.0 (SCAN).[46] The Scale for Suicide Ideation (SSI)[47] was also completed to identify patients with moderate-to-severe suicidal ideation or plans. After either a positive response to any of the SCAN screening questions or a score of 6 or more on the SSI, irrespective of the presence of depressive symptoms, the patient was fully informed about the study project and written informed consent was requested. Of the 703 eligible patients, 161 (22.9%) refused to participate in the study, but 542 (77.1%) agreed and gave written informed consent. The patients who refused did not differ significantly ($p > .05$) in age or gender from those who consented.

In the second phase of sampling, the 542 participating patients were interviewed face-to-face by 1 of the researchers (U.S.L., P.S.L.-M., T.K.M., H.J.R., or T.P.S.) using the SCAN.[46] The interviewers had all received relevant training at a WHO-certified training center. They examined whether the current mood episode fulfilled the criteria for (unipolar) DSM-IV MDD. All psychiatric and medical records in the PMCD, including a standardized set of laboratory tests, were also available at the interview. The patients who were currently abusing alcohol or other substances were interviewed after 2 to 3 weeks of abstinence, to exclude those with substance-induced mood disorder. On this basis, 269 of the 542 patients participating in the second phase of sampling were diagnosed with DSM-IV MDD and included in the MDD Cohort Study. Diagnostic reliability was investigated using 20 videotaped diagnostic interviews; the kappa coefficient for MDD was 0.86 (0.58–1.00) with a 95% observed agreement rate.

The decision to include a patient in the study cohort was made by the researcher during the interview, after which the entire SCAN interview[46] was conducted to achieve a full picture of Axis I comorbid disorders. In addition, the Structured Clinical Interview for DSM-III-R personality disorders (SCID-II)[48] was used to assess diagnoses on Axis II. The 17-item Hamilton Rating Scale for Depression (HAM-D)[49] and the 21-item Beck Depression Inventory[50] were used to assess severity of depression.

We divided the catchment area into eastern and western Vantaa based on the established service areas in Vantaa health care. Eastern Vantaa includes some socioeconomically disadvantaged areas and has about a 10% lower average income per person, 25% higher unemployment, 20% fewer persons with a university education, and 40% more persons of ethnic minorities than western Vantaa. However, access to community psychiatric services is free of charge for all citizens in Finland.

Testing our primary hypothesis involved 8 planned comparisons. In our secondary analyses, we further explored co-occurrences between Axis I and II disorders. Between-group comparisons involving categorical data were computed using the chi-square statistic with Yates correction for continuity and the Fisher exact test when appropriate (expected cell count less than 5 in a 2×2 table), while between-group comparisons using continuous data were computed with the Student t test. Multivariate methods included logistic regression models. SPSS software, version 9.0,[51] was used.

RESULTS

Demographic Characteristics and Overall Patterns of Comorbidity

The majority of the patients in the MDD cohort were women (73%) and outpatients (83%); half (50%) were married or cohabited, and 60% were currently employed (Table 3). Most (79%) of the patients had at least 1 current comorbid disorder, and the majority (54%) had 2 or more. Over half (57%) had an anxiety disorder, a quarter (25%) had alcohol abuse or dependence, and nearly half (44%) had at least 1 personality disorder diagnosis (Figure 1).

Axis I and Axis II Comorbidity

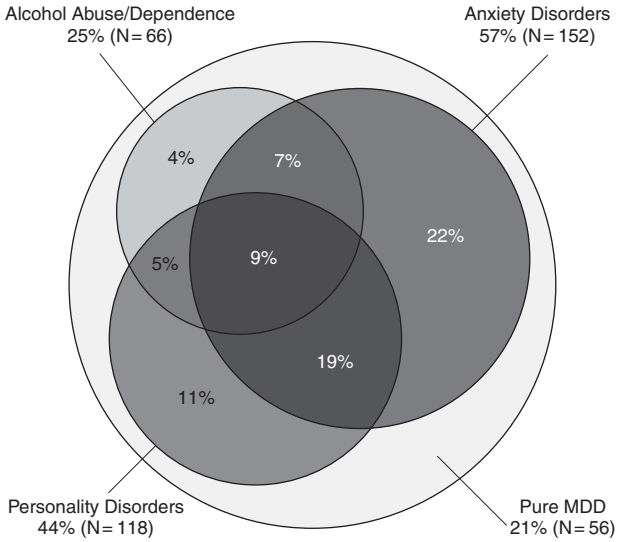
Patients with cluster B personality disorder had significantly more anxiety disorders (29/39 [74%] vs. 123/230 [53%]; $\chi^2 = 5.10$, df = 1, p =. 024), especially panic disorder (12/39 [31%] vs. 33/230 [14%]; $\chi^2 = 5.33$, df = 1, p =. 021), than others. Patients with cluster C personality disorder had a significantly higher prevalence of social phobia (27/85 [32%] vs. 26/184 [14%]; $\chi^2 = 10.34$, df = 1, p = .001), agoraphobia without panic disorder (16/85 [19%] vs. 15/184 [8%]; $\chi^2 = 5.49$ df = 1, p = .019), and specific phobia (29/85 [34%] vs. 39/184 [21%]; $\chi^2 = 4.48$, df = 1, p = .034) than other patients. All of the clusters were significantly associated with alcohol use disorders. Cluster B personality disorders were significantly associated with alcohol dependence (12/39 [31%] vs. 26/230 [11%]; $\chi^2 = 8.87$, df = 1, p = .003), and clusters A and C personality disorders were significantly associated with alcohol abuse or dependence (cluster A: 19/51 [37%] vs. 47/218 [22%]; $\chi^2 = 4.68$, df = 1, p =. 030; cluster C: 29/85

Table 3. Sociodemographic and Clinical Characteristics in the Vantaa Depression Study[a]

Characteristic	Women (N = 197)	Men (N = 72)	Total (N = 269)
Age, mean (SD), y	39.5 (11.4)	39.9 (10.0)	39.6 (11.1)
Age at onset of first MDE, mean (SD), y	31.6 (12.6)	31.5 (12.4)	31.6 (12.5)
17-Item HAM-D score, mean (SD)	19.7 (5.6)	19.0 (6.8)	19.5 (5.9)
21-Item BDI score, mean (SD)	28.2 (8.4)	26.3 (8.9)	27.7 (8.6)
Outpatients	165 (84)	58 (81)	223 (83)
Inpatients	32 (16)	14 (19)	46 (17)
Marital status			
Unmarried and not cohabiting	43 (22)	17 (24)	60 (22)
Married or cohabiting	99 (50)	36 (50)	135 (50)
Divorced	49 (25)	17 (24)	66 (25)
Widowed	6 (3)	2 (3)	8 (3)
Residential area[b]			
Eastern Vantaa	125 (63)	43 (61)	168 (63)
Western Vantaa	72 (37)	28 (39)	100 (37)
Currently employed[c]	113 (59)	44 (62)	157 (60)
Family income[d]			
Low	91 (51)	25 (39)	116 (48)
High	87 (49)	39 (61)	126 (52)
Total no. of lifetime MDEs[e]			
1 (intake)	72 (37)	21 (30)	93 (35)
2	58 (30)	25 (35)	83 (31)
≥ 3	66 (34)	25 (35)	91 (34)
Axis I diagnosis			
Dysthymia	21 (11)	11 (15)	32 (12)
Any anxiety disorder	118 (60)	34 (47)	152 (57[f])
Panic disorder	36 (18)	9 (13)	45 (17)
Agoraphobia without panic	26 (13)	5 (7)	31 (12)
Social phobia	39 (20)	14 (19)	53 (20)
Simple phobia	52 (26)	16 (22)	68 (25)
OCD	15 (8)	3 (4)	18 (7)
GAD	24 (12)	13 (18)	37 (14)
PTSD	2 (1)	0 (0)	2 (1)
Bulimia nervosa	2 (1)	0 (0)	2 (1)
Somatoform disorder	0 (0)	0 (0)	0 (0)
Any alcohol use disorder	38 (19)	28 (39)	66 (25[g])
Dependence	23 (12)	15 (21)	38 (14)
Abuse	15 (8)	13 (18)	28 (10[h])
Axis II diagnosis			
Cluster A	34 (17)	17 (24)	51 (19)
Paranoid	31 (16)	16 (22)	47 (17)
Schizoid	4 (2)	1 (1)	5 (2)
Schizotypal	0 (0)	0 (0)	0 (0)
Cluster B	31 (16)	8 (11)	39 (14)
Antisocial	2 (1)	2 (3)	4 (2)
Histrionic	5 (3)	0 (0)	5 (2)
Borderline	25 (13)	7 (10)	32 (12)
Narcissistic	2 (1)	2 (3)	4 (2)
Cluster C	63 (32)	22 (31)	85 (32)
Obsessive-compulsive	13 (7)	4 (6)	17 (6)
Dependent	13 (7)	5 (7)	18 (7)
Avoidant	49 (25)	15 (21)	64 (24)
Passive-aggressive	7 (4)	6 (8)	13 (5)
Any personality disorder	87 (44)	31 (43)	118 (44)
MDD with no comorbid disorder	37 (19)	19 (26)	56 (21)
Melancholic features	72 (37)	25 (35)	97 (36)
Psychotic features	18 (9)	4 (6)	22 (8)

[a]All data shown as N (%) unless otherwise noted. Abbreviations: BDI = Beck Depression Inventory, GAD = generalized anxiety disorder, HAM-D = Hamilton Rating Scale for Depression, MDD = major depressive disorder, MDE = major depressive episode, OCD = obsessive-compulsive disorder, PTSD = posttraumatic stress disorder.
[b]Data missing for 0.4% of patients; N = 268.
[c]Data missing for 2.2% of patients; N = 263.
[d]Data missing for 10.0% of patients; N = 242.
[e]Data missing for 0.7% of patients; N = 267.
[f]$\chi^2 = 2.95$, df = 1, p = .086.
[g]$\chi^2 = 9.91$, df = 1, p = .002.
[h]$\chi^2 = 5.10$, df = 1, p = .024.

Figure 1. Current Comorbidity Among Patients With DSM-IV Major Depressive Disorder (MDD) in the Vantaa Depression Study



[34%] vs. 37/184 [20%]; $\chi^2 = 5.43$, df = 1, p = .020). We also conducted logistic regression analyses in which all 3 clusters, as well as age and gender, were entered simultaneously into models predicting the current Axis I disorder to determine whether the associations significant in univariate analyses were still present when other clusters were controlled for. The associations for overall anxiety and panic disorder and alcohol dependence with cluster B personality disorders and for social and specific phobia and agoraphobia without panic disorder with cluster C personality disorders remained statistically significant (Table 4).

Sociodemographic Characteristics and Comorbidity

Some gender variations in comorbidity were found: significantly more men (39%) than women (19%) suffered from alcohol use disorders, whereas women tended to have more anxiety disorders (Table 3). The prevalence of none of the disorders differed significantly by age, although patients aged under 40 years tended to have borderline personality disorders more often than patients aged ≥ 40 years (21/132 [16%] vs. 11/137 [8%]; $\chi^2 = 3.27$, df = 1, p = .071).

We also found that current comorbidity varied somewhat by marital status. Patients who were not married or cohabiting had a personality disorder slightly more often (67/134 [50%] vs. 51/135 [38%]; $\chi^2 = 3.60$, df = 1, p = .058) than married or cohabiting patients. All results above persisted in logistic regression models adjusting for age and/or gender.

Inpatient and Outpatient Status and Comorbidity

Inpatients and outpatients were similar with respect to age, gender, marital status, education, and number of

Table 4. Current DSM-IV Axis I Disorders and Comorbid Personality Disorder Clusters in 269 Patients With Major Depressive Disorder[a]

	Cluster A		Cluster B		Cluster C	
Axis I Disorder	OR	95% CI	OR	95% CI	OR	95% CI
Any anxiety disorder	0.7	0.4 to 1.4	2.4	1.1 to 5.3[b]	1.7	1.0 to 3.1
Panic disorder	1.2	0.5 to 2.9	2.4	1.0 to 5.4[b]	1.0	0.5 to 2.0
Agoraphobia	0.8	0.3 to 2.4	0.6	0.2 to 2.0	2.9	1.3 to 6.4[c]
Social phobia	0.8	0.3 to 1.7	1.0	0.4 to 2.4	3.1	1.6 to 5.9[d]
Specific phobia	0.9	0.4 to 1.8	1.3	0.6 to 2.9	1.9	1.0 to 3.4[b]
GAD	1.5	0.6 to 3.7	1.1	0.4 to 3.3	0.5	0.2 to 1.3
OCD	0.5	0.1 to 2.0	2.3	0.7 to 7.4	2.3	0.8 to 6.5
Alcohol abuse or dependence	1.5	0.7 to 3.2	1.5	0.7 to 3.4	1.7	0.9 to 3.2
Alcohol dependence	1.2	0.5 to 2.9	3.1	1.3 to 7.5[c]	1.5	0.7 to 3.2
Alcohol abuse	1.8	0.7 to 4.9	0.3	0.1 to 1.4	1.7	0.7 to 4.0
Dysthymia	0.8	0.3 to 2.3	1.2	0.4 to 3.6	1.3	0.5 to 2.9

[a]All logistic regression models controlled for age, gender, and all other clusters. Abbreviations: CI = confidence interval, GAD = generalized anxiety disorder, OCD = obsessive-compulsive disorder, OR = odds ratio.
[b]Significant at the .05 level.
[c]Significant at the .01 level.
[d]Significant at the .001 level.

lifetime MDD episodes. No differences were found in the overall comorbidities of anxiety disorders, although a markedly greater proportion of inpatients than outpatients had an alcohol use disorder (18/46 [39%] vs. 48/223 [22%]; $\chi^2 = 5.47$, df = 1, p = .019), cluster B personality disorder (12/46 [26%] vs. 27/223 [12%]; $\chi^2 = 4.94$, df = 1, p = .026), or panic disorder with agoraphobia (8/46 [17%] vs. 12/223 [5%]; $\chi^2 = 6.34$, df = 1, p = .012). The prevalence of melancholic (25/46 [54%] vs. 72/223 [32%]; $\chi^2 = 7.12$, df = 1, p = .008) and psychotic features (12/46 [26%] vs. 10/223 [4%]; Fisher exact test, df = 1, p < .001) was also higher among hospitalized patients, who were also more severely depressed at the time of the interview than outpatients (mean ± SD HAM-D score = 24.9 ± 5.0 vs. 18.4 ± 5.4; t = 7.493, df = 267, p < .001). All results remained statistically significant after controlling for gender and age in logistic regression models.

Lifetime Depressive Episodes and Comorbidity

Subjects with more lifetime depressive episodes had a greater likelihood of personality disorders (41% vs. 36% vs. 55% for 1, 2, and ≥ 3 episodes, respectively; $\chi^2 = 6.86$, df = 2, p = .032). Patients with 1 or 2 lifetime episodes of depression more often had pure MDD than those with 3 or more episodes (27% vs. 24% vs. 12%, respectively; $\chi^2 = 7.24$, df = 2, p = .034). In multinomial regression models adjusted for age and gender, these differences remained significant (Table 5).

Type of Residential Area and Comorbidity

The patients from the somewhat socioeconomically disadvantaged eastern Vantaa were significantly more often living outside the family than those in western Vantaa

Table 5. Current Comorbidity and Recurrent Depression in 269 Patients With Major Depressive Disorder (MDD)[a]

		Recurrent MDD (2 episodes)		Recurrent MDD (≥ 3 episodes)	
Diagnostic Category	1 MDD Episode OR (reference category)	OR	95% CI	OR	95% CI
Personality disorder[b]	(1.0)	0.9	0.5 to 1.7	1.9	1.0 to 3.4
Anxiety disorder	(1.0)	1.2	0.6 to 2.2	1.4	0.8 to 2.6
Alcohol use disorder	(1.0)	0.8	0.4 to 1.8	1.3	0.7 to 2.6
Pure MDD[c]	(1.0)	0.8	0.4 to 1.6	0.4	0.2 to 0.8

[a]All analyses controlled for age and gender; missing data for 0.7% of patients; N = 267. Abbreviations: CI = confidence interval, OR = odds ratio.
[b]p = .026.
[c]p = .022.

(74/168 [44%] vs. 29/100 [29%]; $\chi^2 = 5.38$, df = 1, p = .020). There were no significant differences in comorbidity of any anxiety or alcohol use disorders by type of residential area; however, slightly more patients (30/155 [19%] vs. 10/95 [11%]; $\chi^2 = 2.79$, df = 1, p = .095) in eastern Vantaa were drinking heavily (defined as ≥ 16 and ≥ 24 standard [12 g of alcohol] drinks/week for women and men, respectively). Eastern Vantaa patients more often met the criteria for personality disorder (94/168 [56%] vs. 24/100 [24%]; $\chi^2 = 24.69$, df = 1, p < .001) and had more severe MDD than residents in western Vantaa (mean HAM-D score = 20.30 ± 5.33 vs. 18.04 ± 6.44; t = 3.101, df = 266, p = .002). The difference in Axis II comorbidity remained significant after controlling for age, gender, marital status, severity of depression, family income, employment, and education by logistic regression models.

DISCUSSION

A large proportion (79%) of psychiatric patients with MDD were found to have at least 1, and the majority (54%) at least 2, current comorbid disorders, often with specific patterns of association. Furthermore, we found comorbid disorders to vary markedly by a number of relevant background factors such as gender, inpatient versus outpatient status, and type of residential area and somewhat by lifetime number of depressive episodes.

The major strength of our study is that it involved a large sample of secondary-level care psychiatric patients with MDD who effectively represented psychiatric patients of a Finnish city that provides free-of-charge services in community mental health centers. We are, moreover, unaware of previously published studies of patients with MDD that have reported complete current Axis I and II comorbidity assessed with standardized semistructured interviews. However, some methodological features of the study should be noted. First, 23% of the patients who screened positive for MDD refused to participate in the diagnostic interview, a fact that might limit the generaliz-

ability of our findings somewhat. Fortunately, those who refused did not differ significantly in age or gender from those who consented. Second, we assessed Axis II diagnosis by the SCID-II for DSM-III-R, as the SCID-II for DSM-IV was not yet available for the first interviews in February 1997. We took the differences between DSM-III-R and DSM-IV into account by excluding masochistic personality disorder. Passive-aggressive personality disorder was included because it belongs to the personality disorder not otherwise specified category in DSM-IV. Third, we interviewed patients with the SCID-II during their depression, which may[30,52,53] or may not[54] inflate the prevalence of personality disorders. This was done deliberately, in order to investigate the persistence of personality disorders in the cohort follow-up. Fourth, in contrast to most previous studies, we deliberately included patients with current alcohol use disorders, although patients with substance-induced mood disorder were excluded. Nevertheless, although the prevalence of current nonalcohol substance use disorders is quite low in Finland,[55] these are possibly underestimated in the VDS. Only 4% of the patients admitted to occasional misuse of sedatives or use of illicit drugs. Fifth, patients with eating disorders and those who have experienced acute psychological traumas are treated by distinct specialized services. These 2 patient groups are probably underrepresented in the VDS. Further, some patients seek treatment from private psychiatrists. As reported elsewhere, patients at the Department of Psychiatry of the PMCD represent two thirds of all depressed subjects in the general population of Vantaa seeking treatment from psychiatrists.[56] Sixth, besides our 8 planned primary comparisons, in our secondary analyses we further explored co-occurrences between Axis I and II disorders. In these analyses, the number of comparisons is high, and the risk of spurious associations needs to be considered. However, we used multivariate methods in all our comparisons, and only findings that persisted after adjusting for possible confounders are discussed. Finally, although the reliability of the MDD diagnosis was excellent in our study, the reliability of comorbid disorder diagnoses is unknown.

We found that when presenting for treatment for a new depressive episode, a typical psychiatric patient with MDD had 1 to 3 comorbid Axis I or II disorders; only one fifth had pure depression without any comorbid disorder. Prevalences of current comorbid anxiety disorders (57%), alcohol use disorders (25%), and personality disorders (44%) in the VDS were more convergent than we expected with those reported in previous studies, most of which were conducted in tertiary-level treatment centers.[15,17–34] However, the prevalence of personality disorders in our study was somewhat lower (44% vs. 52%) and the prevalence of alcohol use disorders was somewhat higher (25% vs. 8%) than the weighted means of prevalences reported in the earlier studies. Moreover, we found comorbid anxiety and personality disorders to commonly be further complicated by current alcohol abuse or dependence, particularly among subjects with cluster B personality disorders. Also, significantly more anxiety disorders, notably about a 2-fold prevalence of panic disorders, were found among patients with cluster B personality disorders. This is consistent with 3 recent studies, 2[57,58] reporting high prevalence of lifetime and current anxiety disorders among borderline personality disorder patients and 1[38] reporting this association among psychiatric patients with cluster B or C personality disorders. Moreover, the patients with cluster C personality disorders in our study had social phobia, specific phobia, and agoraphobia without panic disorder more often than the other patients; this accords with findings from studies of psychiatric patients with different Axis I diagnoses[28,39] or MDD.[25] We further found that gender was markedly associated with current comorbidity. Men had twice the prevalence of current alcohol use disorders as women (39% vs. 19%), which is consistent with a study[24] reporting more lifetime alcohol use disorders among men. The prevalences of none of the comorbid disorders differed significantly by age or marital status. However, younger patients tended to have a borderline personality disorder more often than older patients, and those who were unmarried and not cohabiting were more often personality disordered than those married or cohabiting. In summary, among psychiatric patients with MDD the presence of a comorbid disorder is associated not only with certain other comorbid disorders, but also with some sociodemographic factors.

Current comorbidity varied markedly by inpatient versus outpatient status and, more modestly but still significantly, by lifetime number of depressive episodes. Inpatients had not only more severe and more often melancholic or psychotic depression than outpatients, but also a higher prevalence of alcohol use disorders (39% vs. 22%), cluster B personality disorders (26% vs. 12%), and panic disorder with agoraphobia (17% vs. 5%). It seems obvious that current comorbidity varies by inpatient versus outpatient status, which needs to be taken account of when interpreting findings from studies on psychiatric patients with MDD. Our findings also indicated that the more recurrent the depression, the lower the prevalence of pure MDD. This accords with earlier prospective outcome studies that have reported a negative impact of multiple disorders on MDD outcome.[6–9,41,42] Furthermore, we expected to find higher rates of alcohol use and personality disorders among MDD patients living in the somewhat socioeconomically disadvantaged areas of eastern Vantaa. Markedly higher personality disorder prevalence and a somewhat less striking trend of heavy drinking in eastern Vantaa were indeed found. This finding suggests that current comorbidity of MDD may vary even by the type of residential area.

In conclusion, comorbidity among psychiatric patients with MDD is very common and often multiple. One

comorbid disorder tends to associate with certain other comorbid disorders and also with sociodemographic factors, inpatient versus outpatient status, and lifetime number of depressive episodes. The influence of these variations on the prevalence of comorbidity among patients in different psychiatric settings and the likely effect of comorbidity on outcome need to be considered when interpreting findings from naturalistic outcome studies, as well as when planning and operating treatment facilities for psychiatric patients with MDD.

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