Psychological Medicine, 2001, **31**, 791–801. Printed in the United Kingdom

One-month prevalence of depression and other DSM-IV disorders among young adults

T. AALTO-SETÄLÄ,[1] M. MARTTUNEN, A. TUULIO-HENRIKSSON, K. POIKOLAINEN AND J. LÖNNQVIST

From the National Public Health Institute, Department of Mental Health and Alcohol Research and Finnish Foundation for Alcohol Studies; Helsinki; and Department of Adolescent Psychiatry, Helsinki-Uusimaa Hospital District, Peijas Hospital, Vantaa, Finland

ABSTRACT

Background. We aimed to provide prevalence data on depression and other current mental disorders, impairment, need of psychiatric care and use of mental health services among young adults.

Methods. Based on a semi-structured clinical interview, current DSM-IV disorders, impairment, need of psychiatric care and use of mental health services were evaluated in a sample of 20–24-year-old young urban adults ($N = 245$), mean age 21·8, screened from a baseline population of 706. One-month prevalence estimates for disorders were calculated by the double sampling method, using various additional criteria to identify cases.

Results. One in four young adults (23·8%) suffered from a current mental disorder, the most prevalent being depressive (10·8%), anxiety (6·9%), substance use (6·2%) and personality disorders (6·0%). Prevalence estimates varied substantially according to the use of additional diagnostic criteria. Impairment (GAF < 61) together with DSM-IV symptom criteria produced an overall disorder prevalence of 10·3%, and 5·5% for depression. Prevalences were higher for females than males, except for alcohol abuse and personality disorders. Current co-morbidity was found in 39% of subjects with any disorder, and in more than half of those with depression. One-third of subjects with a current disorder reported an associated contact with psychiatric services and 16% had an ongoing contact.

Conclusions. Our findings support the use of additional criteria to produce clinically relevant prevalence data. Co-morbidity should receive special attention due to its amplification of both need for psychiatric care and severity of impairment. Finally, our results show disturbed young adults to be severely undertreated.

INTRODUCTION

The transition from adolescence to adulthood involves challenges in the domains of school and academic achievements, intimate relationships, and control of one's life. Depression, other psychopathology and accompanying psychosocial impairment may compromise success in these areas and have far-reaching consequences in adulthood (Harrington *et al.* 1990).

Prevalences of psychiatric disorders among late adolescent or young adult populations have been reported in only a few studies, estimates ranging from 10 to 40% (Canino *et al.* 1987; Regier *et al.* 1993; Blazer *et al.* 1994; Feehan *et al.* 1994; Newman *et al.* 1996; Wittchen *et al.* 1998). The reported point prevalence of major depression among adolescents and young adults has ranged from 2 to 9% (Goodyer, 1995). Most studies have noted widespread co-morbidity between disorders. Rates of mental disorders have been shown to increase from childhood through adolescence, and to peak in young adulthood (Newman *et al.* 1996). Only up to one-third of those with a disorder are estimated

[1] Address for correspondence: Dr Terhi Aalto-Setälä, Iirislahdenranta 30 A, FIN-02230 Espoo, Finland.

to receive psychiatric treatment (Newman *et al.* 1996).

Most recent epidemiological research has relied on operationalized diagnostic criteria to define cases. Yet, knowledge about diagnoses does not in itself provide sufficient information for public health purposes (Wittchen *et al.* 1999). To meet these requirements, an increasing body of literature also uses additional criteria, such as psychosocial impairment or need of psychiatric care. Using additional criteria may have a marked effect on prevalence estimates of disorders (Roberts *et al.* 1998) but is considered important for differentiating disorders requiring clinical attention from less severe disorders (Regier *et al.* 1998). Neither definition nor assessment of additional criteria are uniform between studies, however, and the effect of the latter on prevalence estimates may remain obscure.

Objectives

The principal aim of the present study was to estimate the prevalence and co-morbidity of current depressive and other psychiatric disorders in a non-clinical sample of 20–24-year-olds. Other aims were, with the focus on depressive disorder: (1) to examine the degree of psychosocial impairment and estimated need of psychiatric treatment in the main diagnostic categories; (2) to estimate the effect of impairment and need of psychiatric care on prevalence estimates when used in case definition; (3) to analyse the impact of co-morbidity on impairment and need of psychiatric care; and (4) to evaluate psychiatric treatment use among those with a current mental disorder. We expected disorders among young adults to be common, impairing and highly co-morbid; co-morbidity to relate to the degree of impairment and severity of need of psychiatric care; prevalence estimates to differ according to the quality of additional criteria; and psychiatric treatment use to be most prevalent among subjects with co-morbid disorders.

METHOD

Sample and procedure

The present study is part of a 5-year follow-up of high-school students first examined by questionnaire during a regular classroom hour in 1990 (Poikolainen *et al.* 2000). The subjects, mean age 16·8 years (S.D. 0·9, range 15–19), attended five urban high-schools in Helsinki (approx. 500000 inhabitants) and five in Jyväskylä (60000), located in southern and central Finland, respectively. Of the total of 1518 adolescents, 1493 responded (45% males, 55% females), of whom 47% ($N = 709$) (41% of males ($N = 267$), 54% of females ($N = 442$)) gave their written, informed consent to enter the follow-up study. No significant differences between the volunteering and non-volunteering respondents were found in terms of family social class, school grade-point average, age, number of recent life events, or scales measuring their self-esteem, state anxiety, or psychological defence styles, whereas somatic symptoms were slightly less reported by non-volunteering respondents (Poikolainen *et al.* 2000).

The follow-up in 1995 had a two-phase design. First, all but three of the 709 volunteers were mailed a new questionnaire; two were excluded from the follow-up due to incomplete questionnaires, and one male had died. After four reminders, the response rate was 92% ($N = 651$): 88% among males ($N = 233$) and 95% among females ($N = 418$). Based on their responses to five screening instruments (see below), subjects were divided into screening positive and negative subgroups. In the second phase, all screening positive respondents ($N = 292$) and a sample ($N = 111$) of screening negative respondents were invited by letter to participate in clinical interviews. The interviewers contacted and informed those who agreed to participate, and scheduled an appointment convenient for the subject.

Screening for interview

We invited respondents to interviews according to their score in the five different screening instruments that formed part of the 1995 questionnaire. The main screen was the General Health Questionnaire (GHQ) (Goldberg, 1972), a widely used self-administered rating scale for screening psychiatric symptomatology in individuals of the general population, validated in adult as well as adolescent samples (Winefield *et al.* 1989; Goldberg *et al.* 1997). The sensitivity of the questionnaire has been found to vary from 76 to 89%, and specificity from 80 to 87%, depending on the length of the version applied

(Bridges & Goldberg, 1989). The GHQ covers feelings of strain, depression, inability to cope, anxiety-based insomnia, lack of confidence and other psychological problems (Wall *et al*. 1998). We used the GHQ-36, which is reportedly accurate in detecting anxiety, and depression with anxiety (Katz *et al*. 1995).

For each item the respondents were asked whether they had experienced a particular symptom during the previous month. The response scale was: (1) less than usual; (2) no more than usual; (3) more than usual; and (4) much more than usual. We applied the standard GHQ scoring method (0–0–1–1), counting only the last two responses as pathological. Being positive by the GHQ implied a total GHQ score of five or more, as is the conventional threshold to indicate subjects at risk of psychiatric disorder (Huppert & Whittington, 1995). Cronbach's internal consistency coefficient alpha was 0·93 for females and 0·92 for males.

The four more minor screening instruments were as follows. Life-time self-reported referral to mental health services was charted by asking whether the respondents had ever contacted or intended to refer themselves to mental health services. All those who answered yes were regarded as screening positive (29 males and 104 females). Pathological eating behaviour was evaluated by the statement 'I purge myself after eating in order to maintain my weight', with a response scale: (1) no; (2) sometimes; (3) often; (4) almost always. Options 2–4 were considered as screening positive (27 females). A measure of alcohol use was created by calculating each respondent's estimated yearly intake of pure alcohol, based on the self-reported frequency of drinking alcohol and average alcohol consumption on each occasion. Based on results of a large cross-sectional study among Finnish first-year university students (Nyström *et al*. 1993), the threshold yearly intake of pure alcohol regarded as heavy, indicating positiveness in the screen, was 15 kg for males and 10 kg for females (14 males, 18 females). Recurrent depressive feelings were evaluated by two statements 'I am often depressed' and 'I am continuously depressed', with scoring options: (1) no; (2) somewhat; (3) moderately so; or (4) very much so. Total scores of five or more (out of eight) were regarded as screening positive (10 males, 38 females).

A positive rating in one or more of the five screens led to an invitation to clinical interview. Of the total of 651 respondents who returned the questionnaire, 31% ($N = 203$; 151 females and 52 males) were positive by GHQ scoring. The other four screens identified additional 89 subjects not positive by their GHQ score, giving altogether 292 subjects as screening positive. In all, 197 (68%) screening positive respondents (47 males, 150 females) and 48 screening negative respondents participated in the interviews, giving a total of 245 interviews (73 males, 172 females). The total mean GHQ score among interviewed screening positive subjects was 9·1 (S.D. 7·3), compared to 8·0 (S.D. 6·6) in the non-interviewed screening positives (mean difference −1·1, $P = 0·2$, 95% CI −2·9, 0·6). Among screening negative subjects, the corresponding figures were 0·7 (S.D. 1·1) for the interviewed and 0·9 (S.D. 1·3) for the non-interviewed (mean difference 0·2, $P = 0·4$, 95% CI −0·2, 0·7). The interviewed screening positive females reported at $P < 0·01$ level higher and respective males at $P < 0·05$ level lower yearly intake of alcohol than their non-interviewed screening positive counterparts. Also, interviewed screening positive females reported at $P < 0·01$ level more often having used mental health services than the non-interviewed screening positive females. No other differences were found between those interviewed and those invited but not interviewed in either screening positive or negative subgroups as regards other screening characteristics, or in their family social class, age or sex.

Assessment of mental disorders

Diagnoses of mental disorders were based on information from semistructured clinical SCAN interview (SCAN 2.0; the Schedules for Clinical Assessment in Neuropsychiatry) (WHO, 1994). The SCAN is primarily designed for use by psychiatrists and clinical psychologists and covers ICD-10 and DSM-IV axis I diagnostic categories. Its feasibility and reliability have been tested in international field trials (WHO, 1994). The three interviewers were trained at WHO-designated SCAN training centres. To minimize recall bias, only current disorders (occurring during the 4 weeks before interview) were evaluated in the present study.

All interviews were audiotaped, with four exceptions when the subject preferred not.

https://doi.org/10.1017/S0033291701004081 Published online by Cambridge University Press

Information was recorded as a list of scores on a special schedule, and a summary was written of each interview. Throughout the study, problematical issues were discussed by the two principle interviewers (T.A.-S. and A.T.-H.). To increase reliability these two interviewers rerated the 33 interviews of the third interviewer by consensus.

The best-estimate research diagnoses were generated from the diagnostic interview information. The diagnostic team, two principal interviewers (T.A.-S. and A.T.-H.) and a senior consultant (M.M.), made the diagnoses in two phases. First, based on the SCAN interview, the two principal interviewers made preliminary DSM-IV axis I research diagnoses by consensus, using DSM-IV hierarchy rules. Thereafter, all cases with a preliminary diagnosis and all unclear cases were reconsidered with the senior consultant. When necessary, the tapes were re-examined. In unclear cases additional data (clinical observations, other information form the interview, and questionnaire) were also used. By applying the use of SCAN interview by the best-estimate method, in accordance with the Longitudinal Expert All Data (LEAD) Standard (Spitzer, 1983), we aimed to maximize the validity of the research diagnoses. Diagnoses of DSM-IV personality disorders were made by consensus following the LEAD Standard; all available interview data and clinical observations were used, although strictly based on DSM-IV diagnostic criteria.

Psychosocial impairment and need of psychiatric care

The GAF scale (Global Assessment Functioning scale, DSM-IV) (APA, 1994) was completed for every subject. Current overall psychological functioning was rated on a scale of 0–100 according to DSM-IV axis V definitions. Ratings were made by consensus in the diagnostic team.

We scored the need for psychiatric care of each subject as follows: (1) indicated 'no psychopathology, no need for treatment'; (2) 'possibly mild psychopathology but no obvious need for psychiatric treatment'; (3) 'psychopathology, would benefit from treatment'; (4) 'psychopathology with severe need for psychiatric treatment; serious worsening of mental health likely without prompt treatment'. In the present paper 'need for treatment' refers to scores 3 or 4 irrespective of the severity of need of psychiatric care, while 'severe need for treatment' (score 4) only indicates those with the most severe need for treatment. The evaluations of level of need of psychiatric care were made by consensus between two members of the diagnostic team, both with clinical experience, and were based on all available interview data plus clinical impression.

Psychiatric treatment use

Data on use of mental health services were collected by questionnaire and complemented at interview when necessary. 'Contact during current episode' referred to any contact to specialty or general medical out-patient services for mental health problems during the current episode. Informal helping agencies were not included. 'Ongoing contact' meant any ongoing contact to psychiatric services at the time of interview. Use of psychotropic medication prescribed by a physician other than a psychiatrist ($N = 2$) was also considered as psychiatric treatment. None of the subjects reported current use of psychiatric in-patient services.

Data analysis

Data analyses on prevalence estimates were confined to the 647 subjects (414 females and 233 males) of the 651 subjects who returned the questionnaire, since in four cases (all females) data were incomplete. Prevalence estimates for disorders were calculated by the double sampling method (Levy & Lemeshow, 1991), giving different weights for disorders diagnosed in screening positive ($N = 197$) and screening negative ($N = 48$) interview subsamples. Therefore, prevalence estimates for disorders vary depending on the ratio of screening positive to negative subjects among those with a diagnosis.

Testing for associations between diagnosis, impairment and need of psychiatric care, as well as other comparisons of the clinical characteristics, was restricted to the interview sample ($N = 245$), using non-weighted data. Chi-square test and Fisher's exact test were used for categorical variables and the independent samples t test for continuous variables. A probability level of $\leqslant 0{\cdot}05$ was deemed to indicate statistical significance.

https://doi.org/10.1017/S0033291701004081 Published online by Cambridge University Press

RESULTS

Current prevalences of DSM-IV disorders

A total of 23·8% ($N = 80$ of 245; 74 screening positives + 6 screening negatives) was diagnosed with at least one current (1-month) DSM-IV axis I or II disorder: 20·2% of males ($N = 21$ of 73; 18 positives + 3 negatives) and 26·1% of females ($N = 59$ of 172; 56 positives + 3 negatives). The respective prevalences of any axis I disorder were 22·2%, 18·1% and 24·7% (Table 1). The most prevalent disorders in females were depressive disorders (12·7%) and anxiety disorders (10·3%), while in males depression, substance abuse and personality disorders were equally prevalent (7·3–7·4%). In females, prevalences of around 5% were found for substance use disorders, eating disorders and personality disorders (Table 1).

Current depressive disorder (MDD or dysthymia) was diagnosed in 9·6% (95% CI 5·7, 13·5): 6·7% (95% CI 0·8, 12·6) among males ($N = 7$; 6 positives + 1 negative); and 11·3% (95% CI 6·0, 16·5) among females ($N = 27$; 26 positives + 1 negative), the female to male ratio being approximately 1·7:1. The somewhat higher prevalences of depressive disorders in Table 1 are due to five subjects with both MDD

Table 1. *One-month prevalences of disorders by gender*

	M ($N = 233$)	%	95% CI	F ($N = 414$)	%	96% CI	Tot ($N = 647$)	%	96% CI
Depressive disorders, total	8	7·4	(1·4, 13·4)	31	12·7	(7·3, 18·0)	39	10·8	(6·8, 14·8)
MDD	5	5·4	(−0·3, 11·0)	17	7·8	(2·9, 12·7)	22	6·9	(3·2, 10·5)
Dysthymia	3	2·0	(−0·2, 4·3)	14	4·9	(2·4, 7·4)	17	3·9	(2·1, 5·7)
Bipolar disorders	1	0·7	(−0·7, 2·0)	3	1·0	(−0·1, 2·2)	4	0·9	(0·02, 1·8)
I	0	0		1	0·4	(−0·3, 1·0)	1	0·2	(−0·2, 1·1)
II	0	0		2	0·7	(−0·3, 1·7)	2	0·5	(−0·2, 1·1)
NOS	1	0·7	(−0·7, 2·0)	0	0		1	0·2	(−0·2, 1·8)
Anxiety disorders	3	2·0	(−0·2, 4·3)	19	10·3	(4·0, 16·6)	22	6·9	(3·2, 10·5)
Generalized	1	0·7	(−0·7, 2·0)	5	3·6	(−0·8, 7·9)	6	2·3	(−0·1, 4·7)
Panic	0	0		5	1·8	(0·2, 3·3)	5	1·2	(0·2, 2·1)
Social phobia	1	0·7	(−0·7, 2·0)	4	1·4	(0·04, 2·8)	5	1·2	(0·2, 2·1)
NOS	1	0·7	(−0·7, 2·0)	4	3·2	(−1·1, 7·5)	5	2·1	(−0·3, 4·5)
PTSD	0	0		1	0·4	(−0·3, 1·0)	1	0·2	(−0·2, 1·8)
Substance use disorders	5	7·3	(−0·03, 14·6)	10	5·3	(0·7, 9·9)	15	6·2	(2·1, 10·2)
Alcohol dependence	2	1·4	(−0·5, 3·2)	4	1·4	(0·04, 2·8)	6	1·4	(0·3, 2·5)
Alcohol abuse	2	3·3	(−1·9, 8·5)	3	1·1	(−0·1, 2·2)	5	2·1	(−0·3, 4·5)
Cannabis abuse	1	2·6	(−2·4, 7·6)	3	2·9	(−1·4, 7·1)	4	2·7	(−0·4, 5·9)
Eating disorders	1	0·7	(−0·7, 2·0)	15	5·2	(2·7, 7·8)	16	3·7	(1·9, 5·4)
Anorexia nervosa	1	0·7	(−0·7, 2·0)	2	0·7	(−0·3, 1·7)	2	0·5	(−0·2, 1·1)
Bulimia nervosa	0	0		6	2·1	(0·4, 3·8)	5	1·2	(0·2, 2·1)
NOS	0	0		7	2·5	(0·7, 4·2)	7	1·6	(0·4, 2·8)
Adjustment disorders	1	0·7	(−0·7, 2·0)	2	0·7	(−0·3, 1·7)	3	0·7	(−0·09, 1·5)
With depressed mood	1	0·7	(−0·7, 2·0)	2	0·7	(−0·3, 1·7)	3	0·7	(−0·09, 1·5)
Other	0	0		0	0		0	0	
Other axis I disorders	2	1·4	(−0·5, 3·2)	1	0·4	(−0·3, 1·0	3	0·7	(−0·09, 1·5)
Schizophrenia	0	0		1	0·4	(−0·3, 1·0)	1	0·2	(−0·2, 1·8)
Conversion disorder	1	0·7	(−0·7, 2·0)	0	0		1	0·2	(−0·2, 1·8)
Identity disorder	1	0·7	(−0·7, 2·0)	0	0		1	0·2	(−0·2, 1·8)
Personality disorders	8	7·4	(1·4, 13·4)	14	4·9	(2·4, 7·4)	22	6·0	(3·0, 8·9)
Cluster A	3	4·0	(−1·4, 9·3)	1	0·4	(−0·3, 1·0)	4	1·8	(−0·5, 4·2)
Cluster B	5	3·4	(0·5, 6·3)	11	3·8	(1·6, 6·1)	16	3·7	(1·9, 5·4)
Cluster C	0	0		2	0·7	(−0·3, 1·7)	2	0·5	(−0·2, 1·1)
Disorders, total									
Axis I or II disorders	29	27·6	(16·9, 38·3)	95	40·5	(31·5, 49·4)	124	35·7	(29·0, 42·5)
Axis I disorders	22	20·2	(10·6, 29·7)	81	35·6	(26·7, 44·4)	102	29·8	(23·3, 36·2)
Subjects total									
Any axis I or II disorders	21	20·2	(10·6, 29·7)	59	26·1	(18·0, 34·1)	80	23·8	(17·8, 29·9)
Any axis I disorder	18	18·1	(8·7, 27·5)	55	24·7	(16·7, 32·6)	73	22·2	(16·2, 28·2)

M, Male; F, Female; Tot, total.

https://doi.org/10.1017/S0033291701004081 Published online by Cambridge University Press

Table 2. *Effect of additional criteria on prevalence estimates*

	Prevalence based on DSM-IV symptom criteria % (S.E.)	Prevalence based on DSM-IV and			
		GAF < 71 % (S.E.)	GAF < 61 % (S.E.)	Treatment need % (S.E.)	Severe treatment need % (S.E.)
N interviewed = 245					
Depressive disorders	9·6 (2)	9·6 (2)	5·5 (1)	8·2 (2)	3·0 (1)
MDD	6·9 (2)	6·9 (2)	3·7 (1)	5·5 (1)	2·3 (0·7)
Dysthymia	3·9 (0·9)	3·9 (0·9)	3·0 (0·8)	3·9 (0·9)	1·8 (0·6)
Bipolar disorders	0·9 (0·4)	0·7 (0·4)	0·5 (0·3)	0·7 (0·4)	0·2 (0·2)
Anxiety disorders	6·9 (2)	5·7 (1)	3·4 (1)	5·3 (1)	2·3 (1)
Substance use disorders	6·0 (2)	6·0 (2)	3·0 (1)	4·6 (2)	1·4 (0·6)
Eating disorders	3·7 (1)	3·2 (1)	1·8 (1)	3·2 (1)	1·6 (0·6)
Adjustment disorders	0·7 (0·4)	0·7 (0·4)	0·5 (0·3)	0·5 (0·3)	0
Personality disorders	6·0 (1)	5·7 (1)	4·4 (1)	3·2 (1)	2·3 (1)
Any psychiatric disorders	24·0 (3)	22·4 (3)	10·3 (2)	17·9 (3)	5·0 (1)

and dysthymia, since the Table shows prevalence estimates for separate disorders, including subjects with several disorders.

Effect of additional criteria in case definition

We used several approaches in case definition to estimate the effect of additional criteria on prevalence rates. Table 2 shows the prevalence estimates for the major diagnostic categories, and separately for depressive disorders, according to whether case definition was based solely on DSM-IV symptom criteria or whether additional criteria were also applied.

Co-morbidity

Due to low number of males in some disorder categories, specific co-morbidity rates (for current DSM-IV axis I or II co-morbidity) are shown entirely for the most prevalent disorders, by gender (Table 3). For the same reason, results concerning gender differences in co-morbidity need to be interpreted with caution. Of subjects with any psychiatric disorder, 35% ($N = 28$ of 80) were diagnosed to have at least two current disorders, and 11% (9/80) three or more. No gender difference was found in the proportion of co-morbid disorders (33% in males and 36% in females) (Table 3).

All co-morbid cases, independent of diagnosis, showed at least mild impairment (GAF < 71) in functioning (Table 3). The mean GAF score for subjects with a co-morbid disorder was 53·1 (S.D. 6·9) and for those with only one disorder 65·0 (S.D. 7·3) (mean difference −11·9, 95% CI −15·2, −8·7, $P < 0·0001$). Severe need of psychiatric care was determined in 61% of co-morbid disorders ($N = 17$ out of 28) *versus* 10% of single disorders (5 out of 52) ($P < 0·0001$, Fisher's exact test).

Psychosocial impairment

The mean GAF score for subjects ($N = 80$) with any current disorder was 60·4 (S.D. 9·2). The lowest mean GAF scores (mean GAF score with standard deviation in parentheses) were found for depressive disorders (57·3 (7·8)), anxiety disorders (57·8 (9·6)), substance use disorders (57·4 (8·4)), and personality disorders (56·6 (9·9)). Of subjects with any disorder 91% showed at least mild impairment (GAF < 71), and more than half at least moderate impairment (GAF < 61) (Table 3). The mean GAF for subjects with no current DSM-IV disorder was 79·3 (S.D. 7·5): 82·5 (S.D. 6·9) in males ($N = 52$) and 77·8 (S.D. 7·4) among females ($N = 113$), 13% ($N = 22$ of 165) showing mild impairment (GAF 61–70).

Need and use of psychiatric treatment

A need for treatment was assessed in almost four-fifths and severe need of psychiatric care in over one-quarter of subjects with any DSM-IV diagnosis. Severe need of psychiatric care was found in nearly half of those with MDD, dysthymia, anxiety disorder, eating disorder or personality disorder (Table 3).

One-third of subjects with any DSM-IV axis I or II disorder had contacted mental health services at some phase during the current episode, and ongoing treatment contact was reported by 16% (Table 4).

Compared to subjects with a disorder but no contact with mental health services during the

https://doi.org/10.1017/S0033291701004081 Published online by Cambridge University Press

Table 3. *Co-morbidity, impairment and treatment need in disorders*

N interviewed = 245	Subjects *N*	With impairment GAF < 71 % (*N*)	With impairment GAF < 61 % (*N*)	With estimated need for treatment % (*N*)	With severe need for treatment % (*N*)
Any depressive disorder*					
Males	7				
Non-co-morbid	5	100 (5)	60 (5)	80 (4)	20 (1)
Co-morbid**	2	100 (2)	100 (2)	100 (2)	100 (2)
Females	27				
Non-co-morbid	12	100 (12)	42 (5)	92 (11)	17 (2)
Co-morbid	15	100 (15)	93 (14)	100 (15)	53 (8)
MDD					
Males	5				
Non-co-morbid	3	100 (3)	67 (2)	67 (2)	33 (1)
Co-morbid	2	100 (2)	100 (2)	100 (2)	100 (2)
Females	17				
Non-co-morbid	8	100 (8)	50 (4)	88 (7)	25 (2)
Co-morbid	9	100 (9)	89 (8)	100 (9)	56 (5)
Anxiety disorders					
Males	3				
Non-co-morbid	0	0	0	0	0
Co-morbid	3	100 (3)	100 (3)	100 (3)	67 (2)
Females	18				
Non-co-morbid	8	100 (8)	25 (2)	75 (6)	13 (1)
Co-morbid	10	100 (10)	100 (10)	100 (10)	70 (7)
Personality disorders					
Males	8				
Non-co-morbid	3	67 (2)	0	0	0
Co-morbid	5	100 (5)	80 (4)	60 (3)	40 (2)
Females	14				
Non-co-morbid	4	100 (4)	25 (1)	25 (1)	0
Co-morbid	10	100 (10)	100 (10)	100 (10)	80 (8)
Any psychiatric disorder					
Males	21				
Non-co-morbid	14	79 (11)	29 (4)	57 (8)	7 (1)
Co-morbid	7	100 (7)	86 (6)	71 (5)	57 (4)
Females	59				
Non-co-morbid	38	92 (35)	29 (11)	71 (27)	11 (4)
Co-morbid	21	100 (21)	95 (20)	100 (21)	62 (13)

*N of subjects with MDD of dysthymia, or both.
**DSM-IV Axis I or II current non-affective co-morbidity.

current episode, those with contact were discovered more often to exhibit a co-morbid disorder ($N = 16$ of 26 *v.* $N = 15$ of 54, $\chi^2 = 8{\cdot}4$, df 1, $P = 0{\cdot}004$) and had a lower mean GAF score (mean GAF 57·0 *v.* 62·0, mean difference −5·0 (S.D. 2·1), 95% CI −9·3, −0·8, $P = 0{\cdot}02$).

Current depressive disorders: clinical correlates

All subjects with a depressive disorder were at least mildly (GAF < 71) and more than two-thirds severely impaired (GAF < 61) (Table 3). Of subjects with current MDD or dysthymia, 59% had another current disorder. The most common concurrent disorders were anxiety disorders ($N = 8$), followed by substance use disorders ($N = 6$), eating disorders ($N = 5$) and personality disorders ($N = 4$). Double depression was discovered in five subjects (15% of all depressive disorders). One-third ($N = 7$ of 20) of co-morbid depressive disorder sufferers had more than one co-morbid disorder.

Co-morbidity was related significantly to the degree of impairment: the mean GAF score for a co-morbid depressive disorder was 53·0 (S.D. 6·1), compared to 63·4 (S.D. 5·5) for a non-co-morbid disorder (mean difference −10·5, 95% CI −14·6, −6·3, $P < 0{\cdot}001$). Marked impairment (GAF < 61) was found in 95% of subjects with a co-morbid and in 36% of those with a non-co-morbid depressive disorder ($P < 0{\cdot}001$, Fisher's exact test). All subjects with a co-morbid depressive disorder were estimated to be in need of psychiatric treatment, and severe need of psychiatric care was assessed in 65%. Eighty-

https://doi.org/10.1017/S0033291701004081 Published online by Cambridge University Press

Table 4. *Use of psychiatric services in major disorder categories*

	Depr. (MDD, DD)		Anxiety disorders		Substance use		Eating disorders		Any axis I or II	
	N	%	*N*	%	N	%	N	%	N	%
Total meeting DSM-IV criteria	34		21		14		16		80	
Contact	17	50	10	48	3	21	8	50	26	33
Ongoing	6	18	5	24	3	21	4	25	13	16
With severe impairment (GAF < 61)	24		15		9		8		41	
Contact	12	50	7	47	3	33	5	63	16	39
Ongoing	4	17	3	20	3	33	2	25	8	20
With treatment need (total)	32		19		12		14		62	
Contact	17	53	9	47	3	25	8	57	25	40
Ongoing	6	19	4	21	3	25	4	29	12	19
With severe treatment need	13		10		6		7		22	
Contact	9	69	5	50	3	50	4	57	13	59
Ongoing	4	31	3	30	3	50	2	29	8	36

Contact, i.e. contact during current episode.
Ongoing, i.e. ongoing treatment contact.

six per cent of non-co-morbid depressive disorders were estimated to need treatment (Table 3). Contact with mental health services during the current episode of depression was reported by one half, and ongoing treatment contact by less than one-fifth of subjects with a depressive disorder (Table 4).

DISCUSSION

Main findings

One in ten young adults aged 20 to 24 years was diagnosed as suffering from a current DSM-IV disorder with associated impairment. Mental disorders were often co-morbid and impairing, and generally more prevalent among females. Depression was the most common disorder in both sexes. The use of additional diagnostic criteria notably influenced the prevalence estimates for disorders. One-third of young adults with any DSM-IV disorder had contacted mental health services during the current episode.

Strengths and limitations

This study provides clinically relevant prevalence data not only by reporting prevalence estimates for current DSM-IV disorders but also by evaluating related co-morbidity and degree of impairment, and by giving data on psychiatric treatment use, in an urban sample of well-educated young Finnish adults. To our knowledge, prevalence data specifically on young adults, and relying on standardized psychiatric interviews and operationalized diagnostic criteria according to the DSM-classification, have previously emerged from very few studies (Newman *et al*. 1996; Kessler & Walters, 1998), while diagnoses according to DSM-IV criteria have been reported only by Wittchen and colleagues (1998) in a mixed adolescent-adult sample.

Being well-validated any widely used, as well as sufficiently sensitive and specific, the General Health Questionnaire was chosen as the main screening instrument for diagnostic interviews (Goldberg, 1997). Another methodological strength was the use of a double sampling design to calculate corrected prevalence figures. Furthermore, in our careful case ascertainment procedure all cases, including all subclinical cases, were discussed at least twice allowing clinical judgement to specify the research diagnoses, although DSM-IV criteria were strictly adhered to. We assume thereby to have been able to minimize overdiagnosing milder forms of psychiatric disorders common in community-based epidemiological studies (Regier *et al*. 1998), and believe this procedure improved the validity of the results. One-month prevalences were reported in order to minimize recall bias in assessing prevalences of disorders.

The main limitation of our study concerns the problems in sample representativeness. Of the original adolescent sample, only 47% volunteered for the follow-up, and although the

https://doi.org/10.1017/S0033291701004081 Published online by Cambridge University Press

response rate in the follow-up screening was as good as 92%, the attrition at the clinical interview stage was again substantial. Although analyses of the available data revealed no major differences between the respondents and the non-respondents along the three-phase sampling, it is possible that factors associating with the risk of psychopathology have indeed affected response readiness, non-respondents possibly having increased prevalences of psychiatric symptoms (Blazer *et al*. 1994). Due to the high-school background of our subjects, the rates of e.g. depression may be underestimates since high-school dropouts and non-attenders are omitted. Hankin and his colleagues (1998) have recently, however, reported depression rates and accompanying gender differences to be similar in university compared to non-university samples, supporting the generalizability of results from a non-representative sample, such as ours, in depression research. Other limitations are our sample comprising subjects entirely from urban and suburban environments, and the low number of males in the interview sample. These limitations deserve particular attention as our prevalence estimates were calculated in a follow-up sample.

Case definition concerning DSM-IV axis II personality disorders is another methodological restriction. However, prior studies have been inconsistent as to the validity of existant measures of these disorders (Zimmerman, 1994), and the use of the LEAD Standard (Spitzer, 1983) method, in which expert clinical judgement plays a central role has been recommended (Pilkonis *et al*. 1991; Grilo *et al*. 1998). Our results concerning personality disorders are validated by their concordance with previous research (Samuels *et al*. 1994).

Prevalence of disorders

Studies have reported 12-month estimates for any disorder of 36% among late adolescents (Feehan *et al*. 1994) and 40% among young adults (Newman *et al*. 1996). In mixed late adolescent-young adult samples, prevalences of 10% (Canino *et al*. 1987) and 17% (Regier *et al*. 1993) have been found. Mixed mid-adolescent-young adult samples have produced 12-month rates of 37% (Kessler *et al*. 1994) and 17·5% (Wittchen *et al*. 1998). Prevalence estimates from mixed adolescent-young adult samples are not, however, fully comparable with those of pure late adolescent or young adult samples, since developmental changes during adolescence may affect the expression of a disorder. Our study may clarify this area by providing prevalence data specifically for young adults.

We found every fourth subject (24%) to suffer from at least one DSM-IV psychiatric disorder, more than one-third of these having two or more disorders. In accord with with previous studies (Regier *et al*. 1993; Feehan *et al*. 1994; Kessler *et al*. 1994; Newman *et al*. 1996; Wittchen *et al*. 1998), depression and anxiety disorders were more prevalent among females, while substance use and personality disorders were more prevalent among males. As before, with the exception of the study by Wittchen and colleagues (1998), the overall prevalence of having a psychiatric disorder was higher in females. As for major depression, the NCS reported it being more prevalent among 21–22-year olds (7·7%) than in either somewhat younger (4·7%) or older (2·9%) age groups (Kessler & Walters, 1998). Newman and colleagues (1996) reported a 1-year prevalence of 16·8% for major depressive episode and 3·0% for dysthymia among 21-year olds. Our prevalences of 6·9% for MDD (5·4% in males and 7·8% in females) and 3·9% for dysthymia are at the high end of the range previously reported, being in line with previous findings showing disorder rates to be highest in early adulthood (Newman *et al*. 1996).

Due to the small number of interviewed males in our study, the low prevalence estimates for anxiety disorders among males need to be interpreted with caution. Also, anxiety disorders might have been less common than average among those who volunteered for interviews. Earlier, prevalences of anxiety disorders have ranged from a current estimate of 3·2% in mid-adolescents (Lewinsohn *et al*. 1993) to a 1-year estimate of 9·3% among 15–24-year-olds (Wittchen *et al*. 1998). As for substance use disorders, our current prevalence of 6·2% is comparable with 1-year prevalences of 11·4% in 15–24-year-olds (Wittchen *et al*. 1998), 10·4% among 18-year-olds (Feehan *et al*. 1994) and 9·8% in 21-year-olds (Newman *et al*. 1996). Finally, the relatively high rates of eating disorders in the present sample may partly be due to its urban setting.

Co-morbidity

Population studies have reported nearly half of young people with psychiatric diagnoses to have more than one concurrent disorder (Regier *et al*. 1993; Kessler *et al*. 1994; Newman *et al*. 1996), of whom one-fifth up to one-half are estimated to have more than one co-occurring disorder (Birmaher *et al*. 1996). Accordingly, our study produced a current overall co-morbidity rate of 35% across major disorder categories. Also congruent with previous studies (Kessler *et al*. 1994; Newman *et al*. 1996; Wittchen *et al*. 1998) we found subjects with a co-morbid disorder to exhibit the poorest psychosocial functioning.

Psychiatric treatment use

Previously, 25% of 21-year-olds (Newman *et al*. 1996) and 17% of a mixed adolescent-adult sample in the NCS (Kessler *et al*. 1999) reported some kind of out-patient contact for psychiatric problems, both studies providing 12-month service use rates for 12-month DSM-III-R disorders. Of young adults with any DSM-IV disorder with or without impairment (GAF $<$ 61) in the present study, one in five had an ongoing treatment contact at time of interview, and treatment contact at any phase of the current disorder was reported by one-third. Congruent with previous findings (Newman *et al*. 1996; Kessler *et al*. 1999), subjects with a depressive disorder were more likely to have sought treatment than their peers with any other disorder.

Clinical significance of disorders

It is well recognized that meeting the diagnostic symptom criteria of a disorder is not equivalent to needing clinical attention. In the present study, one in four young adults suffered from a current mental disorder, raising the question of how many disorders were clinically significant. Studies on non-clinical samples may over-diagnose milder disorders such as depression by diagnosing milder forms of the same disorders seen in clinical settings, or syndromes illustrating the boundary between mental disorder and psychological health (Regier *et al*. 1998; Spitzer, 1998). To differentiate clinically significant disorders from less severe ones thus requires use of additional criteria, although the concept of clinical significance is difficult to operationalize and definitions of additional criteria vary across studies. For example, studies by Newman (1996), Wittchen (1998) and Kessler (1999) and their colleagues differ from the present study and from each other in their definition of impairment. This issue is of importance not only when it hampers comparison of results across studies but also in the sense of providing reliable and clinically valid prevalence data for service planning and preventions purposes. We found that the GAF score following the definitions of DSM-IV well differentiated subjects according to their level of psychosocial functioning. The requirement of DSM-IV symptom criteria together with impairment defined by GAF scores $<$ 61 may produce clinically relevant prevalence estimates for disorders among young people.

Clinical implications

Despite discrepancies across studies in defining and assessing additional criteria, as well as clinical significance, our findings support the use of additional criteria in assessing mental disorders. Measurement of psychosocial functioning turned out to be an easy way to differentiate clinically significant disorders from less severe ones. Also, our results emphasize the clinical implications of co-morbidity. As co-morbidity is distinguished by its associations with greater impairment and more severe need of psychiatric care, it should be seriously considered when assessing mental disorders. Proper assessment of co-morbidity may offer a way to identify young adults in most urgent need of treatment. Finally, the finding that only one-fifth of young adults with a current, clinically significant disorder were receiving psychiatric treatment calls for more effort to offer treatment to those with the most severe need and greatest impairment.

The present study was financially supported by personal grants to Terhi Aalto-Setälä from the Medical Society of Finland (Finska Läkaresällskapet), the Yrjö Jahnsson Foundation, and the Finnish Cultural Foundation

REFERENCES

American Psychiatric Association (1994). *Diagnostic and Statistical Manual of Mental Disorders, 4th edn* (*DSM-IV*). American Psychiatric Association: Washington, DC.

Birmaher, B., Ryan, N. D., Williamson, D. E., Brent, D. A., Kaufman, J., Dahl, R. E., Perel, J. & Nelson, B. (1996). Childhood

and adolescent depression: a review of the past 10 years. Part I. *Journal of the American Academy of Child and Adolescent Psychiatry* **35**, 1427–1439.

Blazer, D. G., Kessler, R. C., McGonagle, K. A. & Swartz, M. S. (1994). The prevalence and distribution of major depression in a national community sample: the National Comorbidity Survey. *American Journal of Psychiatry* **151**, 979–986.

Bridges, K. & Goldberg, D. (1989). Self-administered scales of neurotic symptoms. In *The Instruments of Psychiatric Research* (ed. C. Thompson), pp. 157–176. John Wiley & Sons Ltd: Chichester.

Canino, G. J., Bird, H. R., Shrout, P. E., Rubio-Stipec, M., Bravo, M., Martinez, R., Sesman, M. & Guevara, L. M. (1987). The prevalence of specific psychiatric disorders in Puerto Rico. *Archives of General Psychiatry* **44**, 727–735.

Feehan, M., McGee, R., Raja, S. N. & Williams, S. M. (1994). DSM-III-R disorders in New Zealand 18-year-olds. *Australian and New Zealand Journal of Psychiatry* **28**, 87–99.

Goldberg, D. (1972). *The Detection of Minor Psychiatric Illness by Questionnaire*. Oxford University Press: Oxford.

Goldberg, D., Gater, R., Sartorious, N., Ustun, T. B., Piccinelli, M., Gureje, O. & Rutter, C. (1997). The validity of two versions of the GHQ in the WHO study of mental illness in general health care. *Psychological Medicine* **27**, 191–197.

Goodyer, I. M. (1995). The epidemiology of depression in childhood and adolescence. In *The Epidemiology of Child and Adolescent Psychopathology* (ed. F. C. Verhulst and H. M. Koot), pp. 210–226. Oxford University Press: Oxford.

Grilo, C. M., McGlashan, T. H., Quinlan, D. M., Walker, M. L., Greenfeld, D. & Edell, W. S. (1998). Frequency of personality disorders in two age cohorts of psychiatric inpatients. *American Journal of Psychiatry* **144**, 140–142.

Hankin, B. L., Abrahamson, L., Moffitt, T. E., Silva, P., McGee, R. & Angell, K. E. (1998). Development of depression from preadolescence to young adulthood: emerging gender differences in a 10-year longitudinal study. *Journal of Abnormal Psychology* **107**, 128–140.

Harrington, R., Fudge, H., Rutter, M., Pickles, A. & Hill, J. (1990). Adult outcomes of childhood and adolescent depression. I: Psychiatric status. *Archives of General Psychiatry* **47**, 465–73.

Huppert, F. A. & Whittington, J. E. (1995). Symptoms of psychological distress predict 7-year mortality. *Psychological Medicine* **25**, 1073–1086.

Katz, R., Stephen, J., Shaw, B. F., Matthew, A., Newman, F. & Rosenbluth, M. (1995). The East York health needs study. I: Prevalence of DSM-III-R psychiatric disorder in a sample of Canadian women. *British Journal of Psychiatry* **166**, 100–106.

Kessler, R. C. & Walters, E. W. (1998). Epidemiology of DSM-III-R major depression and minor depression among adolescents and young adults in the National Comorbidity Survey. *Depression and Anxiety* **7**, 3–14.

Kessler, R. C., McGonagle, K. A., Zhao, S., Nelson, C. B., Hughes, M., Eshleman, S., Wittchen, H.-U. & Kendler, K. S. (1994). Lifetime and 12-month prevalence of DSM-III-R psychiatric disorders in the United States. Results from the National Comorbidity Survey. *Archives of General Psychiatry* **51**, 8–19.

Kessler, R. C., Zhao, S., Katz, S. J., Kouzis, A. C., Frank, R., Edlund, M. & Leaf, P. (1999). Past-year use of outpatient services for psychiatric problems in the National Comorbidity Survey. *American Journal of Psychiatry* **156**, 115–123.

Lewinsohn, P. M., Hops, H., Roberts, R. E., Seeley, J. R. & Andrews, J. A. (1993). Adolescent psychopathology: I. Prevalence and incidence of depression and other DSM-III-R disorders in high school students. *Journal of Abnormal Psychiatry* **102**, 133–144.

Levy, P. S. & Lemeshow, S. (eds.) (1991). *Sampling of Population: Methods and Applications*. John Wiley & Sons: Chichester.

Newman, D., Moffitt, T. E., Caspi, A., Magdol, L., Silva, P. A. & Stanton, W. (1996). Psychiatric disorder in a birth cohort of young adults: prevalence, comorbidity, clinical significance, and new case incidence from ages 11 to 21. *Journal of Consulting and Clinical Psychology* **64**, 552–562.

Nyström, M., Peräsalo, J. & Salaspuro, M. (1993). Alcohol-use patterns in young university students in Finland. *Scandinavian Journal of Primary Health Care* **11**, 151–156.

Pilkonis, P. A., Heape, C. L., Ruddy, J. & Serrao, P. (1991). Validity in the diagnosis of personality disorders: the use of the LEAD Standard: psychological assessment. *Journal of Consulting and Clinical Psychology* **3**, 46–54.

Poikolainen, K., Aalto-Setälä, T., Marttunen, M., Tuulio-Henriksson, A. & Lönnqvist, J. (2000). Predictors of somatic symptoms: a 5-year follow-up of adolescents. *Archives of Diseases in Childhood* **83**, 388–392.

Regier, D. A., Farmer, M. E., Rae, D. S., Myers, J. K., Kramer, M., Robins, L. N., George, L. K., Karno, M. & Locke, B. Z. (1993). One-month prevalence of mental disorders in the United States and sociodemographic characteristics: the Epidemiologic Catchment Area Study. *Acta Psychiatrica Scandinavica* **88**, 35–47.

Regier, D. A., Kaelber, C. T., Rae, D. S., Farmer, M. E., Knauper, B., Kessler, R. C. & Norquist, G. S. (1998). Limitations of diagnostic criteria and assessment instruments for mental disorders. Implications for research and policy. *Archives of General Psychiatry* **55**, 109–115.

Roberts, R. E., Attkisson, C. C. & Rosenblatt, A. (1998). Prevalence of psychopathology among children and adolescents. *American Journal of Psychiatry* **155**, 715–725.

Samuels, J. F., Nestadt, G., Romanovski, A. J., Folstein, M. F. & McHugh, P. R. (1994). DSM-III personality disorders in the community. *American Journal of Psychiatry* **151**, 1055–1062.

Spitzer, R. L. (1983). Psychiatric diagnosis: are clinicians still necessary? *Comprehensive Psychiatry* **24**, 399–411.

Spitzer, R. L. (1998). Diagnosis and need for treatment are not the same. *Archives of General Psychiatry* **55**, 120.

Winefield, H. R., Goldney, R. D., Winefield, A. H. & Tiggeman, M. (1989). The General Health Questionnaire: reliability and validity for Australian youth. *Australian and New Zealand Journal of Psychiatry* **23**, 53–58.

Wall, T. D., Bolden, R. I., Borrill, C. S., Carter, A. J., Golya, D. A., Hardy, G. E., Haynes, C. E., Rick, J. E., Shapiro, D. A. & West, M. A. (1998). Minor psychiatric disorder in NHS trust staff: occupational and gender differences. *British Journal of Psychiatry* **171**, 519–523.

Wittchen, H.-U., Nelson, C. B. & Lachner, G. (1998). Prevalence of mental disorders and psychosocial impairments in adolescents and young adults. *Psychological Medicine* **28**, 109–126.

Wittchen, H.-U., Üstün, T. B. & Kessler, R. C. (1999). Diagnosing mental disorders in the community. A difference that matters? *Psychological Medicine* **29**, 1021–1027.

World Health Organization (1992). *The ICD-10-Classification of Mental and Behavioral Disorders. Clinical Descriptions and Diagnostic Guidelines*. World Health Organization: Geneva.

World Health Organization (1994). SCAN: Schedules for Clinical Assessment in Neuropsychiatry, Version 2.0. Psychiatric Publishers International/American Psychiatric Press: Geneva.

Zimmerman, M. (1994). Diagnosing personality disorders. A review of issues and research methods. *Archives of General Psychiatry* **51**, 225–245.