

Generalized anxiety disorder and clinical worry episodes in young women

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ABSTRACT

Background. This article presents epidemiological data on the prevalence of DSM-IV generalized anxiety disorder (GAD) and sub-threshold GAD (fulfilling three out of four GAD criteria) in young women together with data on co-morbidity and psychosocial functioning. The prevalence of clinically relevant worry and its predictive validity for the diagnosis of GAD were also examined.

Method. Young women ($N = 2064$), aged between 18 and 25, from a representative German community sample were diagnosed with a structured clinical interview (ADIS-L, German research version). An additional interview questioned all the participants about the frequency/intensity and uncontrollability of diverse worry topics.

Results. Thirty-seven participants (1.8%) fulfilled the criteria of current GAD (1 week point prevalence) and 56 received a lifetime diagnosis (2.7%); a further 50 participants (2.3%) were diagnosed with sub-threshold GAD. Co-morbidity between GAD and other disorders was high for current (68%) and lifetime GAD (91%). GAD, as well as sub-threshold GAD, showed clearly reduced levels of psychosocial functioning. Whereas worries of low intensity and high controllability were ubiquitous in all subsamples, clinically defined worrying was rarely present in healthy subjects (0.89%) and of adequate predictive accuracy for GAD.

Conclusions. Full GAD and sub-threshold GAD were moderately frequent in young women. Although DSM-IV worry criteria proved to be highly useful, the strictness of the complete GAD-criteria should not lead to absence of attention from subclinical generalized anxiety states in research and practice.

INTRODUCTION

Although 'generalized anxiety' is a traditionally recognized clinical phenomenon (Rapee, 1991), generalized anxiety disorder (GAD) is a relatively new category for the description of a distinctive mental disorder. GAD was originally defined operationally in the third version of the Diagnostic and Statistic Manual of Mental Disorders (DSM-III) (American Psychiatric Association, 1980) and has been refined twice since in DSM-III-R and DSM-IV (APA, 1986, 1994). Important changes refer to the duration criterion (6 months instead of 1; APA, 1986), to the changes in the definition of worry (see below) and to the number and type of accompanying

somatic symptoms (reduced from six to three; APA, 1994).

In general population surveys, on the basis of DSM-III and DSM-III-R the lifetime prevalence was mostly estimated between 4% and 7%, the 1-year prevalence between 3% and 5%, and the point prevalence between 1.5% and 3% (Blazer *et al.* 1991; Wittchen *et al.* 1994; Offord *et al.* 1996; Bijl *et al.* 1998; Kessler *et al.* 1999).

Epidemiological studies presenting data on the prevalence of GAD according to the actual criteria of DSM-IV are rare, and it is unclear whether the refinements in DSM-IV lead to different prevalence estimations as compared to DSM-III-R: Bhagwanjee *et al.* (1998) found a point prevalence of 3.7% in a small community study in South Africa (slightly higher than in DSM-III-R studies); Carter *et al.* (2001) found a 12-month prevalence of 1.5% (slightly lower

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than in DSM-III-R studies). It is important to note that Carter *et al.* (2001) attributed their lower prevalence rates to the use of stronger diagnostic criteria in their study (all criteria of a 12-month diagnosis were assessed explicitly) and not to the change of the diagnostic algorithm between DSM-III-R and DSM-IV.

Besides the question of shifts in prevalence between DSM-III-R and DSM-IV, there is specific interest in having further estimates of the prevalence of GAD in younger adults. Previous studies of this age group were mostly retrospective in nature (Rogers *et al.* 1999). They indicate that the typical onset of GAD can be located in the decade between the late teens and the late twenties but studies in which young adults are directly interviewed are rare. Most relevant in this respect is the Early Developmental Stages of Psychopathology (EDSP) study, which is a prospective longitudinal study of a representative sample of adolescents and young adults (ages 14 to 24) (Wittchen *et al.* 1998). A lifetime prevalence of GAD of 0.8% was reported for both sexes. GAD point prevalence was slightly higher in women (0.6%) than in men (0.5%). Prevalence rates appear to be surprisingly low, but are in concordance with the view that GAD is a disorder that emerges later in adolescence.

The present study provides further data on the prevalence of GAD according to DSM-IV. However, due to the specific interest in understanding early stages of psychopathology and the fact that mental disorders are more frequent in women, the study was based on a representative sample of young females, aged 18 to 25.

Given that GAD may have an insidious onset (Wittchen *et al.* 1994), the aim was also to examine GAD on a subclinical level to get a full picture of its prevalence. GAD has been described as a chronic condition that shows a 'waxing and waning' of some of the symptoms between the more exacerbated episodes of the disorder (Wittchen *et al.* 2000). This would suggest that the percentage of subjects who do not fulfil all criteria relevant for GAD but may suffer from the majority of its symptoms should be determined. In similar vein, it has been argued that generalized anxiety even at a subclinical level may cause severe psychosocial impairment (Angst, 1999; Carter *et al.* 2001) and

that this issue should be more thoroughly investigated.

Co-morbidity plays a central role in characterizing and understanding GAD. For example, co-morbidity is an important predictor for help-seeking in GAD because the condition may not be recognized as an emotional problem until other secondary disorders develop (Wittchen *et al.* 1994). Consistently, epidemiological studies found high rates of co-morbidity in GAD, a pattern that has been discussed critically with respect to the nosological status of GAD. However, as Kessler (2000) pointed out, high rates of co-morbidity are a phenomenological feature pervading most anxiety and affective disorders. In the present study, co-morbidity of GAD will be examined for current, lifetime and sub-threshold GAD.

Another major issue of this article concerns the prevalence of clinical worry because it is defined as a key criterion of GAD. Unlike everyday worries, these worries are clinically relevant (according to DSM-IV) because they are uncontrollable and excessive (Craske *et al.* 1989; Hoyer *et al.* 2001a). Furthermore, worry as a diagnostic criterion for GAD should not include content concerning other Axis I disorders such as the worry of having a panic attack (panic disorder) or the worry of behaving in an embarrassing way in social situations (social phobia). In comparison, worries that are typical for GAD are less content-specific, comprise several life domains (at least more than more) and are expected to be more fluctuating across domains. Given these considerations, it appears to be a very special subset of worries that defines 'clinical worry relevant for GAD'. Little is known about the prevalence of worry in this specifically defined clinical sense. While at least some studies have been conducted on the specificity (or non-specificity) of worry characteristics and processes comparing GAD patients (or analogue samples) and healthy participants (Craske *et al.* 1989; Roemer *et al.* 1997; Wells & Papageorgiou, 1998), few data comparing GAD and different clinical groups, in which worry seems more probable, are available. Hoyer *et al.* (2001a) have shown that worry topics in GAD are indeed more widespread and worry processes more uncontrollable and excessive than in social phobia. However, Starcevic (1995) found no differences concerning the amount of worrying

between GAD and depression by using the Penn State Worry Questionnaire (Meyer *et al.* 1990). To contribute to this issue of whether worrying and its uncontrollability is specific for GAD, in the present investigation the prevalence of worry is systematically examined and includes diverse clinical subsamples.

In summary, the present investigation addresses the following questions concerning GAD and worry among young women: (1) What is the point prevalence and lifetime prevalence of GAD and sub-threshold GAD?; (2) How frequent is co-morbidity in GAD and sub-threshold GAD?; (3) What is the level of psychosocial functioning in GAD and sub-threshold GAD compared to other disorders and healthy controls?; (4) What is the prevalence of clinically relevant worry episodes among diverse (healthy and distressed) subgroups of young women?; and, (5) How specific are these episodes for GAD?

METHOD

Overview

Data were derived from the Dresden Predictor Study (DPS) (Becker *et al.* 2000). The DPS is a prospective epidemiological study designed to collect data on the prevalence, incidence, course, and risk factors of mental disorders. The present article refers to baseline data (July 1996 to September 1997) only.

Sample

The sample was drawn from the Dresden government registry of residents. Participants had to be German females, between age 18–24 at the time of sampling in order to be eligible to participate (18–25 during the study). Of the addresses received from the registry office, 5204 women were located and eligible for the study. Of these, 2064 took part in the interview and another 998 filled out questionnaires only, resulting in a total response rate of 58.9%. Participants who were interviewed showed a slightly higher educational status than those who filled out questionnaires; nevertheless, this group proved representative with regard to education and no weighting strategies were applied. Furthermore, no age differences were found. The questionnaire data were not part of this study.

The majority of the women ($N = 2064$) were not married (94.9%), but had a partner (66.5%). About half of the women were living with their parents, a third with a partner and 14% lived alone. Very few dropped out of school without a school-leaving certificate (3.3%), consistent with mandatory school law. The minority went to a *Hauptschule* (secondary modern) (6.5%), about one-third to the medium level of schooling (comprehensive and technical college) and about half left school with the equivalent of A-levels. Almost half of the young women were working, 31.5% full-time and 15.3% part-time. A few women were still at school (4.3%), about 40% were university students and around 5% were currently unemployed.

Diagnostic assessment

The diagnostic assessment was based on the *Diagnostisches Interview für Psychische Störungen – Forschungsversion*, F-DIPS (Margraf *et al.* 1996). The F-DIPS is a modified version based on the DIPS (Margraf *et al.* 1991) and on the ADIS-IV-L (DiNardo *et al.* 1995). It is a structured interview to diagnose Axis I disorders according to DSM-IV, for life-time and point prevalence. The following disorders can be diagnosed: all anxiety disorders; all affective disorders; the research-diagnosis mixed anxiety–depression; hypochondriasis; somatization disorder; conversion disorder and pain disorder; substance abuse and dependence; bulimia and anorexia; and some childhood disorders (separation anxiety, attention-deficit/hyperactivity and disruptive behaviour disorders, elimination disorders). Furthermore there is a sociodemographic section, a screening for psychosis, a screening for the general medical condition and medication, a short section for the family history of mental disorders and a section on treatment. Axis IV (psychosocial and environmental problems) and axis V (global assessment of functioning) are also registered or rated. In this study, the interview additionally contained a broadened section on worry (see below) that was obligatory for all participants. On average the interviews took 111 min, with a standard deviation of 40 min.

Reliability and validity

For the DIPS, the retest-reliabilities across the groups of disorders were between $\kappa = 0.68$ and

0.79 and Yule's $Y = 0.67$ and 1.0 (Schneider *et al.* 1992). Besides a few exceptions the single diagnoses also reach satisfactory values (κ between 0.68 and 0.73 and Y between 0.71 and 1.0). For the F-DIPS, reliability and validity tests have still to be concluded. Available data for GAD show a κ of 0.67 (Satlow, 1996), and a Yule's Y of 0.61 (Keller, 2000), respectively. For the original American version of the interview, a κ of 0.83 for GAD was reported (DiNardo *et al.* 1995).

Interviewers, training procedure and supervision

The interviewers were either psychology students in their last year of study or physicians, all of whom underwent extensive training for about 1 week. During the training the different disorders were explained, emphasizing DSM-IV criteria and differential diagnoses. All F-DIPS sections were practised and pre-field training was done. This was followed by rating four practice interviews. Two practice interviews were carried out before commencing the field work. The interviewers were supervised once every 2 weeks, all interviews were taped and some tapes were checked randomly by the supervisors. Most importantly, every single interview was proof-read by supervisors.

Psychosocial functioning

The level of psychosocial functioning was rated by the interviewers using the Global Assessment of Functioning (GAF) scale according to DSM-IV Axis V, which is also part of the F-DIPS. No direct rating of psychosocial impairment was included.

Worry interview

The GAD section of the F-DIPS included separate questions about frequency/degree and uncontrollability of worry for the following life domains: minor problems, work or education, family, finance, social/interpersonal, personal health, health of others, society and world, and other (miscellaneous) topics. For each of these domains, the presence of worry was enquired about and worry frequency/intensity had to be ranked between 0 (never, no problems) to 8 (all the time, very strong problems). If a worry item was answered positively (intensity/frequency at least '1'), an additional question was asked for

uncontrollability ('How controllable are these worries?').

Definition of sub-threshold GAD

Participants were classified as sub-threshold GAD if one of the following four diagnostic criteria was not fulfilled: (1) frequent worries about more than one topic (excluding topics related to Axis I disorders); (2) persistence of anxiety and worrying for more than 6 months; (3) difficulties controlling worry; and, (4) anxiety and worry accompanied by at least three somatic symptoms.

Definition of clinically relevant worry episodes

In both dimensions, that is frequency/intensity and uncontrollability, a worry topic was defined as clinically relevant when it was at least rated as '4' on the respective 0–8-scale. A clinical worry episode according to DSM-IV was diagnosed if there were at least two domains of intense/frequent worry for > 6 months. (A criterion) and at least one of these worries was uncontrollable (B criterion). Worries that were attributable to another Axis I disorder (D criterion) were not counted.

Samples and comparisons

In addition to the groups having GAD or sub-threshold GAD, comparative data are presented for groups with other disorders reaching a minimum sample size of 15 participants (agoraphobia, social phobia, specific phobia, obsessive-compulsive disorder and major depression) and for healthy individuals. In all non-healthy subsamples other than GAD, co-morbid GAD, was not included to allow for meaningful comparisons.

Statistical analysis

In addition to prevalence rates (percentages), odds ratios for related co-morbid conditions were computed, including confidence intervals (Dunn, 2000). For statistical comparisons of data among subgroups, t tests were computed.

Indices of predictive accuracy

The predictive accuracy, i.e. sensitivity, specificity, positive predictive power (PPP) and negative predictive power (NPP), of clinically relevant worry episodes for identifying GAD patients among healthy subjects and a composite group

of all other patients was also analysed. All indices were computed according to Baldessarini *et al.* (1983). The 'hit rate' and the Youden index are also reported: the hit rate counts the percentage of correct diagnostic decisions; the Youden index sums up sensitivity and specificity (Youden index = (sensitivity + specificity) - 1).

RESULTS

Point prevalence and lifetime prevalence of GAD and sub-threshold GAD

With respect to 1 week point prevalence, 1.8% ($N = 37$) of the total sample fulfilled criteria of GAD and 18.9% of any mental disorder. Most frequent were specific phobia (9.8%, $N = 203$) and social phobia (7.0%, $N = 144$). Agoraphobia without panic disorder was of similar prevalence (1.8%) to GAD; panic disorder with agoraphobia (0.4%) and without agoraphobia (0.3%), OCD (0.7%), and PTSD (0.5%) were less prevalent. Furthermore, 1.3% had a diagnosis of major depression.

With respect to lifetime prevalence, 2.7% of the total sample fulfilled GAD criteria ($N = 56$), and 41.3% criteria for any disorder. Of these 56 participants, 17 (32.9%) currently had neither GAD nor sub-threshold GAD.

Fifty participants (2.4%) were identified as 'sub-threshold GAD', while a further 41 participants (1.9%) had a history of sub-threshold GAD. Of these, three had a current diagnosis of GAD (OR = 4.62, 95% CI = 1.4-15.70), nine any other anxiety disorder (OR = 1.55, NS), and three any other mental disorder (OR = 3.36, NS).

It was also tested whether participants formerly having a GAD now fall into the sub-threshold GAD category. Only two (4%) of the 50 participants labelled sub-threshold-GAD had a former diagnosis of GAD (OR = 4.89, 95% CI = 1.10-21.78) indicating that sub-threshold GAD is not necessarily a residual of former GAD.

Although these are cross-sectional data, a picture of relatively fluctuating states of generalized anxiety in young women can be inferred, since: (a) a relevant proportion of participants were already fully recovered from GAD (although not older than 25); or (b) had a history of sub-threshold GAD but were recovered and never developed full GAD.

Co-morbidity in GAD and sub-threshold GAD

Co-morbidity between GAD and other disorders was generally high. Of the 37 GAD patients, 67.6% had a co-morbid disorder, 45.9% had one other disorder, and 21.6% had two to four other disorders. Among the co-morbid disorders, anxiety disorders reach the highest absolute frequency, particularly social phobia (27.0%, OR = 5.2, 95% CI = 2.5-11.0) and specific phobia (18.9%, NS), although the statistical association is higher for less frequent disorders such as PTSD (8.1%, OR = 25.5, 95% CI = 6.3-102.6), major depression (13.5%, OR = 14.9, 95% CI = 5.3-42.1), or hypochondriasis (5.4%, OR = 38.6, 95% CI = 6.2-238.0). Overlap with other disorders was most accentuated when former (lifetime) diagnoses were analysed (91.0%). A history of a mental disorder is clearly associated with the risk of developing GAD even in younger people.

Co-morbidity in sub-threshold GAD was less pronounced. Twenty-nine participants (58%) showed only symptoms of sub-threshold GAD, 21 (42%) had other disorders. Again there was no clear indication for any specific relationship between any of the other disorders and (sub-threshold) GAD.

Psychosocial functioning

As indicated in Table 1, co-morbid GAD is among those disorders with the lowest psychosocial functioning and presents with significantly lower GAF scores than participants with other anxiety disorders. Only participants with a major depression showed a similarly pre-eminently reduced functioning. Non-co-morbid GAD was also characterized by a severe reduction of psychosocial functioning but did not differ from the other disorders in this regard. Interestingly, participants with sub-threshold GAD also showed considerably reduced psychosocial functioning that was comparable, e.g. to the scoring of other anxiety disorders and clearly lower than in healthy subjects ($t(1603) = 7.45$, $P < 0.001$ for those with sub-threshold GAD only).

Prevalence of single GAD criteria

Six hundred and eighty-five participants (33.3% of the total sample) stated that they were strongly worried about a number of topics (stem question

Table 1. *Global assessment of functioning (GAF): means (M), standard deviations (s.d.) and comparisons (t, P) between GAD (total) and other groups*

Subsamples†	N‡	M	(s.d.)	t	P
GAD p	11	73.73	(11.50)	—	—
GAD total	35	66.63	(10.56)	—	—
Sub-threshold GAD p	29	77.03	(10.11)	4.00	***
Sub-threshold GAD total	50	75.32	(10.24)	3.80	***
Agoraphobia	33	74.48	(9.55)	3.22	**
Social phobia	130	75.87	(11.24)	4.37	***
Specific phobia	194	78.46	(10.53)	6.12	***
OCD	15	73.87	(12.11)	2.13	*
Major depression	21	70.85	(14.29)	1.25	NS
Healthy subjects	1605	88.53	(8.53)	14.95	***

p, 'Pure' disorder, no participants with co-morbid disorders included; GAD/sub-threshold GAD total, all participants with GAD/sub-threshold GAD (including p); OCD, obsessive-compulsive disorder.

† Subsamples from agoraphobia to healthy subjects include sub-threshold GAD but not co-morbid GAD.

‡ Missing values: GAD-p 1, GAD total 2, agoraphobia 3; social phobia 4; specific phobia 2, healthy participants 25.

* $P < 0.05$; ** $P < 0.01$; *** $P < 0.001$; NS, not significant.

Table 2. *Clinically intense/frequent worry topics: means (M) (s.d.) and comparisons (t, P) between GAD (total) and other groups*

Subsamples†	N‡	M	(s.d.)	t§	P
GAD p	12	3.25	(1.22)	—	—
GAD total	37	3.32	(1.45)	—	—
Sub-threshold GAD p	29	2.59	(1.12)	2.26	NS
Sub-threshold GAD total	49	2.92	(1.43)	1.30	NS
GAD history	19	1.26	(1.66)	4.79	***
Agoraphobia	36	0.56	(0.94)	9.69	***
Social phobia	133	1.24	(1.61)	7.10	***
Specific phobia	194	1.14	(1.49)	8.19	***
OCD	15	1.67	(1.91)	3.39	**
Major depression	21	0.95	(1.32)	6.17	***
Healthy subjects	1614	0.43	(0.92)	12.04	***

p, 'Pure' disorder, no participants with co-morbid disorders included; GAD/sub-threshold GAD total, all participants with GAD/sub-threshold GAD (including p); OCD, obsessive-compulsive disorder.

† Subsamples from agoraphobia to healthy subjects include sub-threshold GAD but not co-morbid GAD.

‡ Missing values: sub-threshold GAD total 1; social phobia 1; specific phobia 2, healthy participants 16.

§ Number of topics was log-transformed to reduce skewness.

P values for the one-sided test: ** $P < 0.01$, *** $P < 0.001$; NS, not significant.

positive, more than one topic) and that they felt anxious about these topics during the past 6 months. One hundred and seventy-five participants (8.5%) felt impaired more than half the time, 308 participants (14.9%) had difficulties controlling worry in at least one domain. Only 81 participants (3.9%) had at least three GAD-relevant somatic symptoms that persisted for > 6 months. Overall, the data indicate that even if worry is defined as widespread and uncontrollable it is clearly more frequent than full GAD criteria.

An analysis of the symptom characteristics of the sub-threshold GAD group ($N = 50$) showed that 16% ($N = 8$) of these did not reach full

GAD criteria due to lack of the time criterion, 38% ($N = 19$) did not fulfil the impairment criterion, 30% did not fulfil the criterion of at least 3 persisting (see above) concomitant somatic symptoms. Furthermore, 10% ($N = 5$) did not have more than one area of intense worry, and 6% ($N = 3$) did not experience their worry as at least 'moderately' uncontrollable.

GAD-relevant worry episodes among young women

As shown in Table 2, GAD and sub-threshold GAD do not significantly differ in the number of intense/frequent domains of worry. In all other disorders intense/frequent worry episodes are

Table 3. Clinically relevant worry episodes with regard to uncontrollability: mean (M) (s.d.) and comparisons (t, P) between GAD (total) and other groups

Subsamples†	N‡	M	(s.d.)	t§	P
GAD p	12	2.33	(0.78)	—	—
GAD total	37	2.24	(1.14)	—	—
Sub-threshold GAD p	29	1.76	(1.15)	1.70	*
Sub-threshold GAD total	49	1.98	(1.31)	0.97	NS
GAD history	19	0.74	(1.32)	4.42	***
Agoraphobia	36	0.22	(0.54)	9.63	***
Social phobia	133	0.59	(1.16)	7.70	***
Specific phobia	194	0.47	(0.96)	10.02	***
OCD	15	0.93	(1.62)	3.31	**
Major depression	21	0.38	(0.81)	6.60	***
Healthy subjects	1611	0.15	(0.53)	11.13	***

p, 'Pure' disorder, no participants with co-morbid disorders included; GAD/sub-threshold GAD total, all participants with GAD/sub-threshold GAD (including p); OCD, obsessive-compulsive disorder.

† Subsamples from agoraphobia to healthy subjects include sub-threshold GAD but not co-morbid GAD.

‡ Missing values: sub-threshold GAD total 1; social phobia 1; specific phobia 2, healthy participants 19.

§ Number of topics was log-transformed to reduce skewness.

P values for the one-sided test: * P < 0.05; ** P < 0.01; *** P < 0.001; NS, not significant.

Table 4. Percentage of participants per subsample having one or two intense/frequent or uncontrollable domains of worry

Subsamples†	N‡	Intense/frequent		Uncontrollable	
		One %	Two %	One %	Two %
GAD p	12	100	100	100	91.7
GAD total	37	100	100	100	73.0
Sub-threshold GAD p	29	100	86.2	93.1	44.8
Sub-threshold GAD total	50	100	90.0	94.0	55.0
Agoraphobia	36	33.3	13.9	16.7	5.6
Social phobia	133	51.9	33.1	30.8	14.3
Specific phobia	194	51.5	32.0	26.8	11.9
OCD	15	66.6	46.7	40.0	30.6
Major depression	21	61.5	41.7	38.5	15.4
Healthy subjects	1614	24.3	11.6	9.9	3.6

p, 'Pure' disorder, no participants with co-morbid disorders included; GAD/sub-threshold GAD total = all participants with GAD/sub-threshold GAD (including p); OCD, obsessive-compulsive disorder.

† Subsamples from agoraphobia to healthy subjects include sub-threshold GAD but not GAD.

‡ Missing values: social phobia 1; specific phobia 2, healthy subjects 16.

less prevalent. The data pattern with regard to the average number of uncontrollable worry episodes is similar, although non-co-morbid sub-threshold GAD cases displayed fewer uncontrollable domains than full GAD (see Table 3).

Furthermore, the number of individuals experiencing intense/frequent or uncontrollable worry in one or two domains was analysed per subsample. Table 4 shows that despite the clear differences with regard to clinical relevance, other samples are not totally unacquainted with worry. Even in the healthy sample, intense/frequent worry episodes concerning a single topic have a current prevalence of 24.8%.

Percentages are even higher in most clinical subsamples (not in agoraphobia). The current experience of uncontrollable worry episodes (within at least one domain) is at 9.7% less prevalent in healthy subjects. In about a quarter of the non-co-morbid samples, there is at least one worry topic that is not easily controlled, indicating that worry, although distinguishable between GAD and non-GAD, plays a role in a relevant portion of those having other disorders.

Finally, the prevalence of clinically defined worrying (worry syndrome combining the DSM-IV A and B criterion, controlling for the D criterion, see method section) was determined.

Table 5. Number of intense/frequent worry topics and their uncontrollability: predictive accuracy for selecting GAD patients (N = 37) versus all other individuals including those with sub-threshold GAD (N = 2008)

Cut-off	Sensitivity	Specificity	PPP	NPP	Hit rate	Youden index
Intense/frequent*						
1	1.00	0.71	0.06	1.00	0.71	0.71
2	1.00	0.85	0.11	1.00	0.85	0.85
3	0.68	0.93	0.15	0.99	0.93	0.61
4	0.32	0.97	0.17	0.99	0.96	0.29
Uncontrollable†						
1	1.00	0.87	0.12	1	0.87	0.87
2	0.73	0.95	0.20	0.99	0.94	0.68
3	0.32	0.98	0.24	0.99	0.97	0.30
4	0.14	0.99	0.24	0.99	0.98	0.13

* Number of intense/frequent worry topics.

† Number of uncontrollable worry topics.

PPP, Positive predictive power; NPP, negative predictive power.

The following prevalence rates of a worry syndrome in subsamples excluding co-morbid GAD were found: 2.8% for agoraphobia (OR = 0.92, NS), 9.7% for social phobia (OR = 4.13, 95% CI = 2.13–7.83), 7.1% for specific phobia (OR = 2.95, 95% CI = 1.58–5.41), 20% for OCD (OR = 8.42, 95% CI = 2.31–30.65), 9.5% for major depression (OR = 3.47, NS) and 2.15% for healthy subjects (OR = 0.31, 95% CI = 0.19–0.53). The low prevalence of the worry syndrome in non-GAD samples was even clearer if sub-threshold GAD was counted as a disorder and not included in subgroups, reducing rates (except for agoraphobia: 2.8%, OR = 2.26, NS) to 4.0% for social phobia (OR = 3.37, 95% CI = 1.36–9.89), 3.2% for specific phobia (OR = 2.95, 95% CI = 1.17–7.45), 15.4% for obsessive-compulsive disorder (OR = 14.7, 95% CI = 3.09–69.9), 5% for major depression (OR = 4.07, NS) and 0.9% for healthy subjects (OR = 0.27, 95% CI = 0.12–0.58). Generally, clinical worry does not seem to be pervasive throughout clinical disorders. Moreover, it was demonstrated that the worry syndrome, if present, is in most cases indicative of sub-threshold GAD.

Specificity of worry episodes for GAD and sub-threshold GAD

The extent to which the number of clinically relevant worry topics and the degree of their uncontrollability are of diagnostic use for identifying GAD is analysed in Table 5. Concerning the number of frequent/intense worry topics, a

criterion of two topics, as defined by DSM-IV, yielded the best diagnostic discriminative function. If the diagnostic threshold were raised (i.e. greater number of worry topics), this would increase the total hit rate, but at the expense of failing to identify a number of GAD patients (decreased sensitivity).

The optimal cut-off for the number of topics that are difficult to control is just 1, as is indicated by the Youden index. Again, raising the cut-off would decrease the risk of falsely selecting an individual as having GAD, but at the same time a relevant proportion of GAD individuals would miss detection.

In summary, the number of intense/frequent or uncontrollable topics achieves a relatively high diagnostic use for the identification of GAD. Diagnostic indices are clearly better than those of a number of reliable and valid anxiety questionnaires applied in the same sample (compare Hoyer *et al.* 2002).

DISCUSSION

The point prevalence of GAD in young female adults aged 18 to 25 reached 1.8% in our sample. GAD as a full diagnosis is obviously a frequent disorder and not as seldom in young people (women) as previous studies have indicated (Wittchen *et al.* 1998), a difference that may in part be due to this sample being considerably older (18 to 25 instead of 14 to 24 in the EDSP study of Wittchen *et al.* 1998). The finding that there is a significant group of

participants (2.4%) showing three of four symptoms of GAD, thus fulfilling the criteria of 'sub-threshold GAD', further highlights the importance of GAD and the associated psychopathological syndrome in this age group.

Additionally, there was an even higher GAD lifetime prevalence and a proportion of participants already in remission (having a lifetime diagnosis of GAD, but no current GAD). This finding, along with that of a sizeable group of participants with only a history of sub-threshold GAD, seems to contradict the view that GAD is usually a chronic condition with an onset in late adolescence and will be discussed in detail below.

Previous results on the high co-morbidity in GAD as well as the common features of GAD with other anxiety disorders and with depression were clearly confirmed. This is notable since it shows that co-morbidity does not only appear later in the course of GAD but can occur early during the developmental stages of the disorder.

GAD was found to be associated with severe reductions in psychopathological functioning regardless of whether accompanied by co-morbid disorders or not. This is in accordance with earlier findings of a high impairment characterizing GAD (Judd *et al.* 1998; Kessler, 1999; Wittchen *et al.* 2000). Sub-clinical GAD was also accompanied by reduced psychosocial functioning and did not differ in this regard from other clinical groups even when analysed as a non-co-morbid condition.

Further analyses showed that individuals of the latter group did not reach the full GAD criteria due to a number of reasons, and not just because of the stringent time criterion in DSM-IV as was expected by Angst (1999). Most important for failing to identify these subjects as clinically disordered is the fact that they do not see themselves as being at least moderately impaired (38%). However, because of the 'insidious' character of GAD (Wittchen *et al.* 1994), this 'self-evaluation' of symptoms may be critical. As Wittchen *et al.* (1994) pointed out, younger people may find it normal to worry about a variety of life domains but this subjective appraisal does not need to correspond to the clinical assessment of the impairment. A further major exclusion criterion is the number and persistence of the accompanying somatic symptoms. A sizeable number of persons ($N = 15$) do frequently and uncontrollably worry but do

not experience accentuated physical symptoms, which is reminiscent of the 'discordance between different components of fear' which is sometimes seen clinically (Marks, 1987, p. 8).

Worries are often regarded as an unspecific symptom pertinent to most clinical 'problems', and at the same time defined as the key criterion of GAD. Although this sounds contradictory, prevalence of clinical worry in non-GAD groups was never explicitly tested. Therefore, all participants of our study underwent an interview about their worry to derive more information on the prevalence of worry, not only in GAD. The data clearly show that some kind of sub-syndromal 'worrying' is common (e.g. 24.3% in healthy participants, see Table 4) while clinically defined worry (according to DSM-IV) is not (2.15% or, when excluding sub-threshold GAD, 0.9% in healthy people), not even for other clinical disorders. Thus, our data indicate that the DSM-IV algorithm leads to a comparatively valid identification of a specific 'worry syndrome' that is highly distinguishable from everyday worry.

It is a matter of concern that worry frequency and controllability was found to be of discriminative validity when a clinical definition and categorical data were used as in the present study while the use of dimensional questionnaire data indicated less predictive accuracy of worry (Starcevic, 1995). The concurrent use of questionnaire data in the present study would have helped to elucidate whether this discrepancy is simply a methodological artefact (e.g. patients may identify different cognitive phenomena with interview *versus* questionnaire items). Since this could not be done in the present study, it remains an open question for future research.

One surprising finding was the identification of a subsample of participants having a lifetime diagnosis of GAD, but no current diagnosis, and not even a sub-threshold diagnosis of GAD: GAD can occur early and can disappear early – a finding that does not correspond to the majority of previous findings, which indicated that GAD, once it is established, tends to persist. However, it has to be considered that due to the young age of the participants the time range of retrospection is much smaller in the present study than in most of the studies that used retrospective data. Episodes of relatively constant worry that would have fulfilled all the strict DSM-criteria

may not be remembered correctly after the topic of worrying has passed or has itself been forgotten. Moreover, there are other studies indicating that GAD may be a more flexible or waxing and waning condition in younger cohorts than in older (Wittchen *et al.* 2000). More decisive information on the subject will be derived by the analysis of the second point of measurement of the Dresden study which is presently being conducted.

Our study is limited in a number of ways. First of all, only women were examined. Since GAD is more frequent in women (Carter *et al.* 2001), lower prevalence in young men may therefore be expected, but there is clearly no way to infer this directly from our study or to generalize any of our other findings to men. Another specific characteristic of our study is that it was conducted in Eastern Germany. Young women in Eastern Germany in the 1990s have all experienced the deep socio-economic, social and political changes associated with the German reunification. As Margraf & Poldrack (2000) have shown, the risk of developing an anxiety disorder is higher in Eastern Germany, higher in women, and higher in older and younger people. Having mental disorders, particularly social and specific phobia or major depression early in life, increases the risk of developing GAD or sub-threshold GAD (Kessler, 2000), which may serve as another explanation for our relatively high prevalence rates.

Other issues refer to methodological aspects of the study that can be critically considered. One is the operationalization of 'clinically relevant' worry topics that was used. Frequency and intensity of worry were confounded in the item format used. This precludes any information as to whether 'frequency' and 'intensity' of a worry topic are truly amalgamated in the subjective experience of worrying (as the item format suggested), and it is therefore left unclear whether the distinctive use of both variables could lead to a more fine-grained description of clinically relevant worry.

Also, in contrast to some recent studies, beyond the DSM-rating of psychosocial functioning, no other, more direct and objective measures of impairment (such as days off work) were derived, so that related findings must be considered less robust.

In summary, our data indicates that more attention should be paid to GAD in younger people. Full GAD and sub-threshold GAD were shown to be considerably frequent and also associated with a relevant reduction in psychosocial functioning in young women. More specifically, from the different ratios of lifetime, current, and sub-threshold GAD it can be inferred that generalized anxiety states in younger women are less persistent than in older age groups, which speaks against the view of generalized anxiety disorder as a temperament type (Akiskal, 1998) and should be studied using a longitudinal approach. However, the poor psychosocial functioning suggests that GAD as well as its sub-threshold manifestation should be more precisely recognized and treated. A recent primary care study showed that GAD is much less recognized (34.4%) than depression (64.4%) by the general practitioner (Hoyer *et al.* 2001 *b*).

As a major finding of this study it should be emphasized that the discriminative function of the DSM-IV worry definition was convincing across all our clinical subsamples and the specificity of clinical worry for GAD was generally and clearly confirmed. This may help to unravel the myth of worry as simply being an everyday phenomenon of little clinical importance.

However, at the same time, the relatively strict DSM-IV-criteria for GAD have also led to the non-identification of a large group of participants with sub-clinical GAD as clinical cases. People suffering from a worry syndrome should not be neglected in research and practice even if they do not meet all criteria of a full GAD syndrome.

This study was supported by grant DLR 01EG9410, from the Ministry of Science, Research and Education. We would like to thank the many people who helped with the study.

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