

## ORIGINAL PAPER

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# Social anxiety disorder above and below the diagnostic threshold: prevalence, comorbidity and impairment in the general population

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**Abstract** *Background* There is a lack of data systematically describing subthreshold expressions of social anxiety disorder (SAD) with regard to prevalence, comorbidity, and impairment. *Methods* This analysis was based on data from the German Health Survey (GHS) and its Mental Health Supplement (GHS-MHS). Social anxiety disorder and its syndromes as well as other mental disorders were assessed with a standardized diagnostic interview (M-CIDI) in 4,174 adults. *Results* The 12-month prevalence rate for threshold SAD was 2.0%, subthreshold and symptomatic social anxiety (one DSM-IV criterion missing/two or more criteria missing) was found in 3.0 and 7.5% of the participants, respectively. As expected, threshold SAD was characterized by an elevated risk for comorbid disorders and associated with impairment in diverse areas of life. However, this was also true for the two subthreshold expressions of social anxiety, which were also significantly associated with higher comorbidity and greater impairment compared to the control group. *Conclusions* Our results suggest that social anxiety below the diagnostic threshold is clearly associated with adverse outcomes. Prospective designs should examine the exact temporal and possible causal pathways of this burden in order to inform prevention and early intervention programs.

**Key words** epidemiology – prevalence – social anxiety disorder – social anxiety-impairment

## Introduction

Social anxiety disorder (SAD) is one of the most frequent anxiety disorders (see [16] for an European overview; [2] for a recent overview; [23, 24] for results from a representative US sample). The core feature of SAD is a marked and persistent fear of one or more social and performance situations and the fear to act in a humiliating or embarrassing way, as described by criterion A in the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) [1]. Further criteria include that the feared situations almost invariably induce anxiety (criterion B), that the affected person recognizes the anxiety as being excessive or unreasonable (criterion C), that the feared situations are avoided, or endured with intense distress (criterion D) and that the anxiety or its concomitants interfere with everyday functioning, or elicit marked distress (criterion E). Additional criteria indicate a minimum duration of six months for individuals under age 18 (criterion F) and specify exclusions, such as substance effects and other mental disorders (criterion G) or general medical conditions that may elicit similar anxiety symptoms (criterion H).

Women are more frequently affected by SAD than men [9, 29, 35, 50]. In clinical samples, usually no gender differences appear, which has led to the assumption that SAD more strongly interferes with daily functioning in men than in women [38, 44].

It is commonly agreed that the onset of SAD occurs during adolescence and early adulthood [11, 12, 15, 35, 50]. The stability of the disorder has yet to be determined as retrospective designs and clinical samples usually report a chronic course with low recovery rates, e.g., [8]. In contrast, prospective longitudinal studies in epidemiological samples suggest

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that the stability on the full diagnostic level is rather low [12, 28, 31].

Social anxiety disorder is associated with a higher risk for a variety of other disorders, primarily other anxiety disorders, affective disorders and substance-related disorders (see [17] for an overview). Especially for depressive disorders, SAD is temporally primary in the majority of cases [18, 21, 34, 35, 39, 43]. In addition, there is first evidence for a potential causal relationship between SAD and the development and a more malignant course of comorbid depressive disorders [4, 6, 37].

Social anxiety disorder has been shown to be associated with marked reduction in quality of life, not only in social, but also in educational and occupational domains [13, 26, 27, 30, 32, 36, 48, 50].

All current knowledge outlined above has been gathered with regard to threshold SAD, that is, individuals fulfilling all diagnostic criteria. Only one earlier study, relying on DSM-III criteria, examined subthreshold expressions of SAD [10]. The authors found that subthreshold cases with SAD reported considerable impairments and disabilities and suggested to include these cases in the prevalence rate for SAD. The present study seeks to extend these findings in a larger sample with more differentiated levels of subthreshold expressions.

Thus, using data from a nationally representative study, the aims of this paper are (1) to describe prevalence and comorbidity patterns of both DSM-IV SAD and its subthreshold expressions, and (2) to examine in detail associated impairments and disabilities.

## Methods

### ■ Design and sample

Mental disorders were assessed in the Mental Health Supplement of the 1998/99 German National Health Interview and Examination Survey (GHS-MHS) [5, 19, 20, 47]. Its sample was a stratified random sample from 113 communities throughout Germany with 130 sampling units [sampling steps: (1) selection of communities, (2) selection of sampling units, and (3) selection of inhabitants from population registries].

**Table 1** Number of individuals in the three diagnostic groups failing to meet the DSM-IV criteria for social anxiety disorder (SAD)

Lack of criterion	SAD					
	Symptomatic (N = 314)		Subthreshold (N = 127)		Threshold (N = 83)	
	n	%	n	%	n	%
A-1 fear of social/performance situation	0	0.00	0	0.00	0	0.00
A-2 fear of humiliation/embarrassment	125	39.80	0	0.00	0	0.00
B anxiety reaction	167	53.23	10	7.61	0	0.00
C excessive or unreasonable	240	76.43	22	18.24	0	0.00
D avoidance or endurance with intense anxiety/distress	232	73.84	53	41.41	0	0.00
E impairment/distress	274	87.36	42	32.74	0	0.00

n and % weighted

Respondents of the German Health Survey (GHS) older than 65 years were excluded because the psychometric properties of the interview used in the study have not yet been satisfactorily established for use in older populations [25]. The eligible sample size for the GHS-MHS was N = 4,773. The conditional response rate of the GHS-MHS was 87.6%, resulting in a total of 4,181 respondents who completed the mental health assessment. For seven individuals, the information in the SAD section was incomplete, which resulted in a final sample of 4,174 (weighted N = 4,179). The presented results can be regarded as representative for the German non-institutionalized adult population from 18 to 65 years of age.

### ■ Assessment

Psychopathological and diagnostic assessments were based on the computer-assisted version of the Munich Composite International Diagnostic Interview (M-CIDI) [49], a modified version of the World Health Organization CIDI (version 2.1) [41] for a wider range of mental disorders according to the criteria of DSM-IV than in previous studies. Psychometric properties of the CIDI were found to be acceptable to very good [33, 45, 46]. Unlike previous versions of the M-CIDI, the study version focuses strictly on the assessment of 12-month symptoms and disorders. The standard M-CIDI lifetime assessment was only performed when lifetime information was necessary for evaluating current diagnoses (e.g., mood disorders).

The M-CIDI SAD section begins with a stem question to assess the presence of strong fears regarding seven social and performance situations (DSM-IV criterion A-1). After at least one fear situation was elicited, a subsequent series of nine questions asked about cognitive elements of anxiety such as fear of humiliating or embarrassing occurrences, fear of blushing, fear of panic, fear of showing symptoms of anxiety, etc. (criterion A-2). Criterion B was assessed by a list of anxiety symptoms (e.g., sweating, heart racing, etc.) of which at least two were required to occur when thinking about, or when being exposed to such situations. Respondents further indicated whether they considered either the anxiety or the avoidance to be excessive or unreasonable (criterion C), and whether they frequently avoided the situations or, if not, endured the situations with distress (criterion D). Criterion E was assessed by determining whether the respondent reported that the social fears or avoidance interfered a lot with normal routines, or whether they sought professional help for the fears.

Besides threshold SAD (all DSM-IV criteria are met) we included two conditions characterized by social anxiety, but not fulfilling all DSM-IV criteria: Individuals in the *subthreshold* group met criterion A, but had one other criterion missing. Consistent with operationalizations of other studies [50], individuals in the *symptomatic* group reported strong social fears, but did not complete two or more of the DSM-IV criteria. Table 1 gives an overview of the nature of the missing criteria.

With regard to onset and course of the social fears, participants were asked to retrospectively remember their age at the first episode of the condition. Duration of social anxiety was calculated as the age at interview minus age of onset.

Comorbidity with other mental disorders was determined with regard to the following (threshold) 12-month diagnoses: other anxiety disorders (panic disorder with and without agoraphobia, agoraphobia without panic attacks, specific phobias, generalized anxiety disorder, obsessive-compulsive disorder, phobias not otherwise specified), mood disorders (major depressive disorder), dysthymia, bipolar disorders, dependence from nicotine or alcohol, eating disorders (anorexia nervosa, bulimia nervosa and eating disorder not otherwise specified), and an aggregate group of somatoform disorders (somatization disorder, hypochondriasis, undifferentiated somatoform disorder, somatic symptom index 4.6 [14], pain disorder).

Impairment in different life domains was assessed in four ways: reduced health related quality of life (physical and mental health sum scores of the SF-36, [7]; clinical complaints (sum score of a list of psycho-vegetative symptoms mostly related to depression and anxiety (“Beschwerdeliste”) [40]; satisfaction in several life domains (rated on 7-point-Likert scales), and self reported disability days within the past 12 months (“How many days within last 12 months have you been too sick to carry out usual activities?”). Health care utilization is presented in form of the variable “at least minimal intervention”, a combination of items asking about having ever sought treatment due to psychological, mental, addictive, or psychosomatic problems, or the recommendation by a doctor to do so.

■ **Statistical analyses**

Prevalence estimates for threshold, subthreshold and symptomatic SAD [N, %; 95% confidence intervals (CI) available on request] were calculated with the data weighted for age, gender, region and

screening status in order to address different sampling probabilities and systematic non-response [19]. In the following, we only report weighted Ns and percentages. Logistic regression [odds ratios (OR) and 95% CI] were used to quantify the associations between SAD conditions and other mental disorders. Mean differences for the impairment measures over different groups were calculated with mean ratios (MR) (from gamma regression, with 95% CI).

**Results**

■ **Prevalence of SAD, gender and age group differences**

The total 12-month prevalence rate for DSM-IV SAD was 2.0% (Table 2, upper part). Women had an about twofold risk to develop the disorder as compared to men (OR = 2.1).

There seemed to be a decrease in prevalence rates in older age groups, however, this decline did not reach statistical significance.

The 12-month prevalence rates for subthreshold and symptomatic SAD were 3.0 and 7.5%, respectively. Women were significantly more frequently affected by subthreshold SAD (total sample: OR = 1.8; age 18–29: OR = 4.4; age 50–65: OR = 2.6) compared

**Table 2** Twelve-month prevalence rates of DSM-IV SAD and its subthreshold expressions (N = 4,179; men: n = 2,101; women: n = 2,078)

Age group	Threshold SAD (DSM-IV)							
	Total		Men		Women		Ref. group: men	
	n	%	n	%	n	%	OR	95% CI
18–65	83	2.0	28	1.3	55	2.7	<b>2.1</b>	1.3–3.5
18–29	23	2.6	9	2.1	14	3.2	1.6	0.6–4.1
30–39	18	1.7	4	0.8	14	2.6	3.5	1.0–12.5
40–49	19	2.1	5	1.2	13	3.0	2.6	0.9–7.5
50–65	23	1.8	9	1.4	14	2.2	1.7	0.7–4.0
Age group	Subthreshold SAD							
	Total		Men		Women		Ref. group: men	
	n	%	n	%	n	%	OR	95% CI
18–65	127	3.0	47	2.2	80	3.9	<b>1.8</b>	1.2–2.7
18–29	36	4.1	7	1.6	29	6.6	<b>4.4</b>	1.9–10.4
30–39	36	3.3	17	3.1	19	3.5	1.2	0.6–2.4
40–49	30	3.4	15	3.3	15	3.4	1.0	0.5–2.2
50–65	25	1.9	7	1.1	18	2.7	<b>2.6</b>	1.1–6.2
Age group	Symptomatic SAD							
	Total		Men		Women		Ref. group: men	
	n	%	n	%	n	%	OR	95% CI
18–65	314	7.5	149	7.1	165	7.9	1.2	0.9–1.5
18–29	115	13.1	60	13.5	55	12.7	1.0	0.6–1.6
30–39	82	7.6	39	6.9	43	8.3	1.2	0.8–1.9
40–49	61	6.8	32	7.1	29	6.4	0.9	0.5–1.6
50–65	56	4.2	18	2.8	38	5.6	<b>2.1</b>	1.2–3.6

Threshold: all DSM-IV criteria are met; subthreshold: criterion A and all but one DSM-IV criteria are met; symptomatic: individuals report strong social fears, but have at least two DSM-IV criteria missing. n numbers (weighted); % percentages (weighted), OR odds ratio from multinomial logistic regression

to men. For symptomatic social anxiety, this gender difference only occurred in the oldest age group (age 50–65: OR = 2.1).

In the subthreshold as well as in the symptomatic condition, the decline of prevalence with higher age reached statistical significance (subthreshold SAD: age 50–65 vs. 18–29: OR = 0.4; 95% CI: 0.2–0.7; age 50–65 vs. 30–39: OR = 0.6; 95% CI: 0.3–0.9; age 50–65 vs. 40–49: OR = 0.5; 95% CI: 0.3–0.97; symptomatic SAD: age 18–29 vs. age 30–39: OR = 1.9, 95% CI: 1.3–2.6; age 50–65 vs. 30–39: OR = 0.5; 95% CI: 0.4–0.7; age 50–65 vs. 40–49: OR = 0.6; 95% CI: 0.4–0.9).

### ■ Comorbidity with other mental disorders

The vast majority of individuals with DSM-IV SAD ( $N = 73/83$ , 87.8%) had a diagnosis of at least one other mental disorder during the past 12-month period. Among those, 20% had one, 20% two, and 60% three or more comorbid conditions. Pure cases were younger than comorbid cases (33.5 vs. 40.5 years), but this difference failed to reach statistical significance ( $P = 0.065$ ). In the majority of comorbid cases, SAD preceded the comorbid disorders (total: 66%; men: 57.5%, women: 70.7%).

To investigate the comorbidity patterns of the different diagnostic expressions of SAD, Tables 3 and 4 show the proportions of other anxiety disorders and other mental disorders among individuals with symptomatic, subthreshold, threshold SAD and no SAD. In addition, associations were not only calculated for each of these diagnostic categories with no

SAD as the reference group, but also with symptomatic and subthreshold SAD serving as the reference.

Using no SAD as the reference group, not only DSM-IV SAD (OR = 22.2), but also subthreshold (OR = 10.3) and even symptomatic (OR = 3.4) expressions of this condition were associated with other anxiety disorders, in particular with panic disorder, agoraphobia, generalized anxiety disorder, and obsessive–compulsive disorder (see Table 3). A dose–response relationship could be observed for each of the comorbid anxiety conditions under study as indicated by increasing ORs from symptomatic SAD towards the DSM-IV diagnosis. This observation was supported by analyses using symptomatic and subthreshold SAD as the reference group, respectively: DSM-IV SAD was not only associated with other anxiety disorders compared to individuals with no SAD (OR = 22.2), but also in comparison to individuals with symptomatic (OR = 6.6) or subthreshold (OR = 2.2) expressions of this condition. Similarly, subthreshold SAD was associated with other anxiety disorders even when using symptomatic SAD as the reference group (OR = 3.1).

Any mood disorder (including major depression, dysthymia, bipolar disorders) was strongly associated with SAD as well (OR range 3.3–19.7) (see Table 4). Likewise, there were significant risk elevations for somatoform disorders (OR ranging between 1.9 and 4.4) in all three levels of SAD that are again most pronounced for threshold SAD. Furthermore, a range of differences in proportions of comorbid conditions was significant between the three SAD groups, again indicating a dose–response relation-

**Table 3** Comorbid anxiety disorders conditional on SAD status ( $N = 4,179$ )

Comorbid anxiety disorders	Reference group	No SAD ( $n = 3,655$ )		Symptomatic SAD ( $n = 314$ )		Subthreshold SAD ( $n = 127$ )			Threshold SAD ( $n = 83$ )			
		%		%	OR	95% CI	%	OR	95% CI	%	OR	95% CI
Any other anxiety disorder	No SAD	10.1		27.3	<b>3.4</b>	2.6–4.1	53.4	<b>10.3</b>	7.1–15.0	71.2	<b>22.2</b>	13.0–37.9
	Symptomatic SAD							<b>3.1</b>	1.9–4.7		<b>6.6</b>	3.7–11.8
	Subthreshold SAD										<b>2.2</b>	1.1–4.1
Panic disorder	No SAD	1.3		2.9	2.3	1.1–4.7	16.4	<b>15.1</b>	8.6–26.2	25.6	<b>26.4</b>	15.1–46.3
	Symptomatic SAD							<b>6.5</b>	2.9–14.7		<b>11.5</b>	5.1–26.0
	Subthreshold SAD										1.7	0.9–2.3
Agoraphobia without panic	No SAD	0.9		4.8	<b>5.1</b>	2.8–9.2	14.6	<b>17.3</b>	9.6–31.3	17.0	<b>20.7</b>	11.0–38.7
	Symptomatic SAD							<b>3.4</b>	1.7–6.9		<b>4.1</b>	1.9–8.6
	Subthreshold SAD										1.2	0.6–2.5
Any specific phobia	No SAD	5.9		14.3	<b>2.6</b>	1.9–3.7	24.5	<b>5.1</b>	3.3–7.8	29.5	<b>6.6</b>	4.1–10.7
	Symptomatic SAD							<b>1.9</b>	1.2–3.2		<b>2.5</b>	1.4–4.4
	Subthreshold SAD										1.4	0.7–2.4
GAD	No SAD	0.8		2.7	<b>3.5</b>	1.6–7.3	5.9	<b>7.9</b>	3.5–17.5	22.2	<b>35.4</b>	18.5–67.9
	Symptomatic SAD							2.3	0.9–5.9		<b>10.3</b>	4.5–23.4
	Subthreshold SAD										<b>4.5</b>	1.9–10.9
OCD	No SAD	0.3		0.9	3.1	1.0–9.9	4.8	<b>15.9</b>	5.9–42.4	11.5	<b>41.5</b>	17.7–97.2
	Symptomatic SAD							<b>5.1</b>	1.4–18.3		<b>13.2</b>	4.0–43.9
	Subthreshold SAD										2.6	0.9–7.2
Phobia NOS	No SAD	2.6		8.8	<b>3.7</b>	2.4–5.6	9.9	<b>4.2</b>	2.3–7.7	10.7	<b>4.6</b>	2.2–9.1
	Symptomatic SAD							1.1	0.6–2.2		1.2	0.6–2.6
	Subthreshold SAD										1.1	0.5–2.6

GAD generalized anxiety disorder, OCD obsessive–compulsive disorder, NOS not otherwise specified.  $n$  numbers (weighted); % percentages (weighted); OR odds ratio from multinomial logistic regressions

**Table 4** Comorbid other mental disorders conditional on SAD status ( $N = 4,179$ )

Comorbid disorders	Reference group	No SAD ( $n = 3655$ )	Symptomatic SAD ( $n = 314$ )			Subthreshold SAD ( $n = 127$ )			Threshold SAD ( $n = 83$ )		
		%	%	OR	95% CI	%	OR	95% CI	%	OR	95% CI
Any mood disorder	No SAD	8.7	24.1	<b>3.3</b>	2.5–4.5	39.4	<b>6.8</b>	4.6–9.9	65.3	<b>19.7</b>	12.0–32.1
	Symptomatic SAD						<b>2.0</b>	1.3–3.2		<b>5.9</b>	3.4–10.2
	Subthreshold SAD									<b>2.9</b>	1.6–5.3
MDD	No SAD	6.0	18.6	<b>3.6</b>	2.5–5.0	21.3	<b>4.2</b>	2.7–6.5	50.5	<b>15.9</b>	10.0–25.4
	Symptomatic SAD						1.2	0.7–1.9		<b>4.5</b>	2.6–7.7
	Subthreshold SAD									<b>3.8</b>	2.1–7.1
Dysthymia	No SAD	3.0	6.9	<b>2.5</b>	1.5–3.9	20.9	<b>8.7</b>	5.4–13.9	38.1	<b>20.2</b>	12.4–32.9
	Symptomatic SAD						<b>3.5</b>	1.9–6.5		<b>8.2</b>	4.4–15.3
	Subthreshold SAD									<b>2.3</b>	1.2–4.3
Any bipolar disorder <sup>a</sup>	No SAD	0.5	1.2	2.4	0.9–6.1	5.8	<b>11.9</b>	4.9–29.1	5.7	<b>12.6</b>	4.1–33.6
	Symptomatic SAD						<b>4.9</b>	1.6–14.8		<b>4.8</b>	1.4–16.6
	Subthreshold SAD									0.9	0.3–3.3
Any somatoform disorder <sup>b</sup>	No SAD	9.3	18.7	<b>2.2</b>	1.6–3.1	28.0	<b>3.8</b>	2.5–5.7	31.3	<b>4.4</b>	2.7–7.2
	Symptomatic SAD						1.7	1.04–2.7		<b>1.9</b>	1.1–3.4
	Subthreshold SAD									1.2	0.6–2.1
Any eating disorder <sup>c</sup>	No SAD	0.3	0.8	3.2	1.1–9.7	2.1	<b>8.4</b>	1.8–39.2	0.0	–	–
	Symptomatic SAD						2.6	0.5–13.9			
	Subthreshold SAD										
Nicotine dependence	No SAD	9.1	15.8	<b>1.9</b>	1.3–2.6	21.9	<b>2.8</b>	1.8–4.4	24.0	<b>3.2</b>	1.8–5.4
	Symptomatic SAD						1.5	0.9–2.6		1.7	0.9–3.1
	Subthreshold SAD									1.1	0.5–2.1
Alcohol dependence	No SAD	2.8	4.6	1.7	0.9–3.0	9.8	<b>3.7</b>	1.9–7.1	10.3	<b>3.9</b>	1.8–8.5
	Symptomatic SAD						2.2	1.0–5.0		2.4	0.9–5.8
	Subthreshold SAD									1.1	0.4–2.7

MDD major depressive disorder

$n$  numbers (weighted), % percentages (weighted); OR odds ratio from multinomial logistic regressions

<sup>a</sup>Bipolar-I-disorder, bipolar-II-disorder

<sup>b</sup>Somatization disorder, hypochondriasis, undifferentiated somatoform disorder, somatoform pain disorder

<sup>c</sup>Anorexia nervosa, bulimia nervosa, eating disorder not otherwise specified

ship for at least affective disorders and somatoform disorders. For eating disorders, nicotine dependence and alcohol dependence, the associations with sub-threshold expressions of SAD were weaker or not significant.

### ■ Age of onset and course

As a retrospective self-report measure, a mean duration of 16.1 years ( $SD = 14.5$ ) was found for threshold and 18.6 years ( $SD = 13.7$ ) for subthreshold SAD (for symptomatic SAD, this information was not available, as this part of the interview was skipped due to the interviews' rules). Men and women did not differ with regard to duration (threshold: men  $M = 16.1$ ,  $SD = 16.3$ , women  $M = 15.8$ ,  $SD = 13.0$ ; subthreshold: men  $M = 21.3$ ,  $SD = 13.5$ , women  $M = 17.1$ ,  $SD = 13.7$ ).

Among individuals with threshold SAD, most participants reported an age of onset during adolescence and early adulthood, however, 17.8% ( $n = 15/83$ ) reported an onset after their 40th year of life.

### ■ Impairments and disabilities

As SAD is known to affect more than only social domains of life, we examined different facets of quality of life. Social anxiety disorder was found to be

associated with a significantly reduced quality of life in various domains, e.g., reduced mental health (measured by the SF-36 mental health sum scale), clinical complaints ("Beschwerdeliste"), and satisfaction in different life domains, e.g., family, social relations, work situation and financial situation, but not with self-perceived physical health (SF-36, physical health sum scale) (see Table 5). The self-reported number of disability days during the past year was threefold among individuals with SAD compared to those without SAD (35 vs. 12 days; MR: 2.9). Interestingly, the differences in impairments and disabilities did not only occur in threshold SAD, but also in subthreshold and even symptomatic expressions of this condition with no SAD as the comparison group.

In a further analysis we explored whether different periods of onset of SAD are associated with different degrees of impairment and disability by comparing three groups of individuals with threshold SAD: those with an age of onset of SAD before the 25th year of life ("early onset"; serving as the reference group), those with an onset between ages 25 and 40, and those with an onset during or after the fifth decade of life ("late onset"). Among the different indicators of quality of life (see Table 5) only two significant comparisons emerged: the "late onset" group had significantly lower scores for physical health compared to the reference group (MR = 0.9; 95% CI 0.7–0.97), and



**Table 5** Impairment in different life domains, differentiated by diagnostic level of SAD ( $N = 4,175$ )

	No SAD ( $n = 3655$ ) (ref. group)		Symptomatic SAD ( $n = 314$ )				Subthreshold SAD ( $n = 127$ )				Threshold SAD ( $n = 83$ )			
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>MR</i>	95% CI	<i>M</i>	<i>SD</i>	<i>MR</i>	95% CI	<i>M</i>	<i>SD</i>	<i>MR</i>	95% CI
SF-36: mental health <sup>a</sup>	51.5	8.1	46.3	9.3	<b>0.89</b>	0.88–0.92	42.2	11.1	<b>0.82</b>	0.78–0.86	36.9	13.0	<b>0.72</b>	0.66–0.78
SF-36: physical health <sup>a</sup>	49.3	8.8	49.5	8.5	1.00	0.98–1.03	47.5	10.2	0.97	0.93–1.00	47.4	9.8	0.96	0.92–1.00
Clinical complaints (Zerssen score) <sup>b,c</sup>	15.9	10.5	20.4	10.8	<b>1.28</b>	1.20–1.37	24.5	13.8	<b>1.54</b>	1.38–1.71	29.5	12.6	<b>1.85</b>	1.66–2.06
Satisfaction in several life domains <sup>a</sup>														
Overall	5.6	1.1	5.3	1.2	<b>0.94</b>	0.91–0.97	4.7	1.4	<b>0.83</b>	0.78–0.87	4.5	1.6	<b>0.79</b>	0.73–0.86
Family	5.8	1.4	5.5	1.6	<b>0.95</b>	0.92–0.98	5.1	1.7	<b>0.87</b>	0.82–0.92	4.8	2.0	<b>0.82</b>	0.75–0.90
Social relations	5.9	1.1	5.7	1.3	<b>0.97</b>	0.94–1.00	5.2	1.5	<b>0.89</b>	0.84–0.93	5.1	1.5	<b>0.87</b>	0.81–0.93
Work situations	5.2	1.6	4.8	1.7	<b>0.93</b>	0.89–0.97	4.6	1.7	<b>0.86</b>	0.80–0.92	4.1	1.8	<b>0.79</b>	0.71–0.87
Financial situation	4.9	1.6	4.4	1.7	<b>0.94</b>	0.89–0.98	4.1	1.9	<b>0.86</b>	0.79–0.94	4.1	2.1	<b>0.77</b>	0.69–0.86
Disability days (last 12 month, self report)	12.1	37.0	10.7	22.5	0.88	0.69–1.11	25.9	62.8	<b>2.13</b>	1.39–3.23	34.9	74.6	<b>2.88</b>	1.86–4.44

*MR* mean ratios from negative binominal regression and 95% confidence intervals (CI); reference group: no social phobia; bold:  $P < 0.05$

<sup>a</sup>Higher scores indicate better health/higher satisfaction

<sup>b</sup>"Beschwerdeliste"

<sup>c</sup>Higher scores indicate more complaints

they were more satisfied with their social relations ( $MR = 1.2$ ; 95% CI 1.02–1.4).

### ■ Help-seeking behavior

Sixty-five percent of all individuals with threshold DSM-IV SAD ( $N = 54/83$ ) indicated to have accessed professional mental health services at least once. For other mental disorders apart from SAD this rate was 36.3% ( $N = 435/1,301$ ). Individuals with comorbid SAD had a more than threefold risk of seeking services compared to those cases without other mental disorders ( $OR = 3.26$ , 95% CI 1.99–5.36). However, as health care use was not assessed with regard to specific symptoms or disorders, no statements about disorder-related treatment rates or the adequacy of the treatment were available.

## Discussion

Our study addressed SAD in a large unselected sample not only on the full DSM-IV diagnostic level, but also on a syndrome level including symptomatic and sub-threshold expressions of this condition with regard to patterns of 12-month prevalence, comorbidity and quality of life.

The prevalence of threshold SAD in our sample was 2.0%, which corresponds to the median prevalence in a recently published review for the European countries [16]. Subthreshold and symptomatic expressions of SAD were found in 3.0 and 7.5% of the participants, respectively. One would have expected social anxiety to be more prevalent on a broad syndrome level, as social anxiety is usually regarded as being normally distributed in the general population. Our results might be explained by the wording of the respective questions in the interview that intended to

assess social anxiety of a significant degree only ("Did you feel *strong* anxiety in the following situations, or did you avoid these situations...?", "Do you think you experience this fear or avoid these situations *much stronger* than other people?").

While the majority of SAD cases expectedly reported an onset of social anxiety in adolescence or early adulthood, there seems to be a small portion of cases with threshold SAD with a later onset after the fourth decade of life. As the results have not been adjusted for individuals having not yet reached the age of 40, our findings might underestimate the actual number of late-onset cases. On the other hand, due to the restriction on 12-month prevalence it may be that individuals experienced previous episodes of SAD which were inaccurately recalled and therefore possibly resulted in shifts of dating the first age of onset towards later ages. Among the questions determining age of onset, participants were asked to indicate their very first episode in life, but we cannot rule out completely whether there were episodes that were not reported—either voluntarily or involuntarily. Another reason for a possible misdating of onsets might be the broad age range of the sample that should be kept in mind when interpreting retrospective age-of-onset reports. However, due to lack of basic epidemiological data on SAD according to DSM-IV criteria we still felt that it would be important to report age-of-onset findings among our 12-month SAD cases despite the methodological limitations and the need for replication of findings in more appropriate samples (studies beginning in childhood or adolescence) and study designs (prospective-longitudinal studies).

Regarding comorbidity, our results are consistent with findings of other studies [23, 30] in that SAD is a highly comorbid disorder. Even within the 12-month time frame that we used in our study, we

found a very low portion of only 12.2% pure cases. However, our findings expand former knowledge on comorbidity patterns in SAD by showing that comorbidity is lower, but still significant among subjects with subthreshold and symptomatic expressions of this condition.

Moreover, SAD seems to precede comorbid disorders in the majority of cases. It thus may function as a potential causal risk factor for the development of comorbid disorders and/or their more malignant course as suggested by recent analyses of a prospective-longitudinal community study among adolescence and young adults on the example of depression [4, 37]. The temporal relation between comorbid conditions and SAD has to be more closely investigated in future research in order to further investigate whether an increased risk for the secondary onset of comorbid conditions can be found irrespective of age or rather in specific age or time frames, whether SAD can be considered a causal risk factor for other conditions, and if so, what the causal determinants of such risk associations might be. The answer to these questions would have considerable clinical impact with regard to targeting and timing early screening and early intervention as well as on prevention. This is especially of relevance as we could show that social anxiety is associated with reduced health related quality of life, reduced satisfaction in several life domains, more clinical complaints and more disability days. Also, help seeking (lifetime contact with mental health professionals) is increased compared with other mental disorders. However, other studies suggest that individuals with SAD usually consult mental health services not until many years after the onset of their disorder. For example Wang et al. [42] reported that only 3.4% of individuals of SAD make treatment contact during the first year after onset of this condition. The discrepancies between the findings might be explained by the fact that our help-seeking assessment was not specifically targeted on SAD but rather on mental health in general. Therefore, it is likely that the help seeking is influenced by the presence of comorbid conditions revealing overall higher rates.

Lastly, special attention should be given to the strong impairments reported by subthreshold and symptomatic SAD cases. At first glance this seems to contradict the fact that in many subthreshold cases the DSM-criterion of subjective impairment was missing. It has to be differentiated in future analyses, whether the impairment among these cases can be traced back to comorbid disorders or if indeed the impairment criterion in the DSM classification has to be challenged critically (for a discussion see [3, 22]). Either way, syndromes of SAD below the diagnostic threshold seem to be sensitive indicators of psychopathology, impairment and disability—a fact with important clinical implications in regard to diagnostics, intervention and prevention.

## ■ Strengths and limitations

A major strength of the study lies in the unselected representative population sample. This is important, because clinical samples are subject to diverse selection biases (e.g., due to symptom severity, varying inclusion/exclusion of patients in treatment facilities) and represent only a small portion of all individuals affected by the condition. In contrast, unselected, representative samples allow broader inferences on a general population level and are of special interest for the determination of the prevalence and the actual burden of the disorder. It could be speculated that only more impaired cases seek treatment and that clinical samples represent the upper end of a continuum of impairment by SAD. A direct comparison of indicators of impairment and disability in non-clinical and clinical samples would allow for testing this assumption.

The use of a well-established diagnostic interview is a further strength of the study but since the SAD assessment focused on the previous 12 months, analyses covering longer periods of time are limited (e.g., with regard to the temporal patterns of comorbid disorders, or the course of social anxiety over time). It is possible that some of the symptomatic and subthreshold cases have met criteria for threshold diagnosis in the past (>1 year), but due to the restricted diagnostic time frame this cannot be further investigated (as well as comparisons with completely remitted cases).

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## Conclusion

Taken together our results point to an enormous burden posed on the many individuals suffering from SAD as well as its subthreshold expressions. As SAD is likely to precede other disorders, the early detection and treatment of SAD is of utmost importance.

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## Note

Data of this study are available as Public Use File from Dr. Frank Jacobi (manual and variable description in German language): Dr. Frank Jacobi, Institute of Clinical Psychology and Psychotherapy, Chemnitzer Str. 46, 01187 Dresden, Germany; e-mail: jacobi@psychologie.tu-dresden.de

For further information about the Core Survey (GHS-CS) and its Public Use File contact the Robert Koch-Institute, Dr. Heribert Stolzenberg, Nordufer 20, D-13353 Berlin, Germany; e-mail: stolzenberg@rki.de

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