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Incidence of social phobia and identification of its risk indicators: a model for prevention

Acarturk C, Smit F, de Graaf R, van Straten A, ten Have M, Cuijpers P. Incidence of social phobia and identification of its risk indicators: a model for prevention.

Objective: This study seeks to examine the incidence of social phobia in the general population and to establish a number of risk indicators.
Method: Data were derived from the Netherlands Mental Health Survey and Incidence Study (NEMESIS) which is a population based prospective study ($n = 7076$). A sample of adults aged 18–64 years ($n = 5618$) were re-interviewed 1 year later using Composite International Diagnostic Interview (CIDI).
Results: The 12-month incidence of DSM-III-R social phobia was 1.0%. Low education, low mastery, low self-esteem, emotional neglect in childhood and ongoing difficulties were found to be risk indicators. After including other mental disorders as risk indicators in the model, the incidence was found to be more common among those with low mastery, major depression, subthreshold social phobia, emotional neglect, negative life events, and low education.
Conclusion: The incidence of social phobia can be predicted relatively well with psychosocial variables and comorbidity.

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Significant outcomes

- Personality characteristics, childhood trauma, current stress, and education level were related to the incidence of social phobia.
- The inclusion of psychiatric history in the risk set did not improve the model overall.

Limitations

- Relatively small number of incident cases.
- The direction of association between the current life events and the incidence of social phobia is not clear.
- Early temperament variables and biological factors which are assumed be related to the incidence of social phobia were not assessed.

Introduction

In recent years, researchers have become increasingly interested in social phobia for several reasons. Population-based studies indicate that social phobia is a highly common disorder with a lifetime prevalence rate between 4% and 13% (1–5). Social phobia is associated with being young (3), being female (1), low education level (1), having a low income (2), never having been married (2) or having been separated (4). Patients with social phobia experience serious functional impairments in education, social and occupational domains (6–8), and seek more help (9–11). However, they often do not apply to the health services for their social phobia symptoms; instead they present problems other than social phobia (9). A better understanding of the risk indicators of the incidence of social phobia and the possibilities for intervention prior to the development of an impairing course of the illness is highly important.

Although prevalence studies provide important information, incidence studies are better suited for detecting high risk groups for mental health disorder. By detecting high risk groups, early intervention and prevention may be possible. To identify target groups for cost-effective prevention at the earliest stage, Smit et al. (12) developed a methodology to obtain indices that indicate how cost-effective a (future) preventive intervention is likely to be given the fact that it will target a specific high-risk group. To that end, risk factors are selected when (i) they are strongly associated with the incidence of the disorder; (ii) they are associated with a substantial decrease in the incidence rate of the disorder if their adverse effect could be completely blocked; and (iii) at the same time the target group can be kept as small as possible. Through this methodology high-risk groups for social phobia can be selected with the largest health benefits for the lowest cost.

To our knowledge, none of the previous studies used this methodology to examine the possibilities for prevention of social phobia in the general population. Only a few population-based studies have examined the incidence rate (13) and the predictors of the incidence of social phobia (14, 15) in adults. A recent incidence study of social phobia reported the cumulative lifetime incidence rate for social phobia in the first three decades of life as 11.0% (13). Among adults, Wells et al. (15) found the annual incidence of social phobia to be 9 new cases per 1000 person-year (pyr) while Neufeld et al. (14) reported 4–5/1000 pyrs. Female gender, low education, never having been married, nervousness, headache, panic attacks, palpitations, other phobias, binge patterns of alcohol consumption, dysthymia, and schizophrenic symptoms were reported as the predictors of social phobia in adults in the above study. On the other hand, Neufeld et al. (14) found only baseline depressive and panic disorders to be significant predictors.

Despite their significant findings, these studies had some limitations. A problem with Neufeld's (14) study is the use of a different diagnostic criterion in wave 1 and in wave 2. This may have caused misclassification error in the incident cases and an upward bias in the incidence rate, as was acknowledged by the authors (14). More importantly, these two incidence studies focused only on demographic, symptomatic, and diagnostic factors as predictors but not on early risk factors (e.g. childhood adversities), personality traits, and current stressors.

Many previous etiological studies have indicated that several different factors could have affected the presence of social phobia. For example, it is stated that factors such as parental psychopathology (16, 17), childhood trauma (e.g. emotional neglect, psychological abuse) (18–20), personality traits (21, 22), and current stressors (23) are associated with social phobia. However, no prospective population studies have examined this broad range of etiological factors in relation to the incidence of social phobia.

Aims of the study

The present paper aims first to examine the incidence of social phobia in adults. Second, to address the question whether predictors from a broad range of etiological factors can explain the incidence of social phobia. The factors studied are sociodemographic factors, childhood trauma, parental psychiatric history, personality traits, current stressors, and psychiatric history.

Material and methods

Sample

The NEMESIS study was based on a multistage, stratified, random sampling procedure (24). Initially, a sample was drawn of 90 Dutch municipalities stratified on the basis of urbanization and adequate dispersion over the 12 provinces in the Netherlands. Second, a sample of private households (addresses) from post office registers was gathered. The number of households selected in each municipality was determined by the size of its population. The third step was to choose which individuals to interview. The residents of the selected households were sent a letter of introduction signed by the Minister of Public Health requesting them to take part. Afterwards, the interviewers contacted the residents by telephone. Households with no telephone or with ex-directory numbers (18%) were visited in person. One respondent with the most recent birthday was randomly selected in each household, on condition that he/she was between 18 and 64 years of age and sufficiently fluent in Dutch to be interviewed. Persons who were not immediately available because of circumstances such as hospitalization, travel or imprisonment were contacted later in the year. If necessary, in order to make a contact, the interviewers made a minimum of ten calls or visits to a given address at different times of the day and week. This study was conducted after the procedures were approved by the ethics committee of the Netherlands Institute of Mental Health and Addiction (Trimbos Institute). First, the aims of the study were explained and then the participants

provided informed consent according to the prevailing Dutch law of 1996. In the first round of the data collection, from February through December 1996, a total of 7076 persons were interviewed (response rate of 69.7%) (24). Refusal was the most common reason for non-response. The sample adequately reflected the Dutch population in terms of gender, civil status and urbanization level (24). The data were collected by 90 experienced interviewers. All of the interviewers underwent a 3-day training course in recruiting respondents and computer-assisted interviewing. After that, a 4-day training course focussing specifically on the content of NEMESIS and the use of CIDI at the WHO-CIDI training center of the Academic Medical Center in Amsterdam was given.

All participants in the first wave (T_0) were approached for the follow-up (T_1). The mean interval between T_0 and T_1 was 379 days (SD = 35). Of the 7076 persons from T_0, 5618 could be re-interviewed at T_1 (response 79.4%). After demographic variables held constant, a 12-month disorder at T_0 only slightly increased the probability of loss to follow-up between T_0 and T_1 (OR = 1.20, CI = 1.04–1.38) (25). Social phobia also somewhat increased the probability of loss to follow-up between T_0 and T_1 (OR = 1.37, CI = 1.07–1.75) (25). To correct the combined effect of initial non-response and drop-out, poststratification weights were used.

Instruments

Diagnoses of mental disorders. The diagnoses were based on DSM-III-R Axis I (26). The Composite International Diagnostic Interview (CIDI) version 1.1 (computerized version) was used that employs the diagnostic criteria of the DSM-III-R (27). Under this version of the DSM, social phobia is defined as a persistent fear of one or more situations which involves possible scrutiny by others and involves a fear of doing something humiliating. This exaggerated fear leads to avoidance of those situations or high levels of anxiety. Two subtypes can be distinguished: (i) generalized social phobia when most social situations are anticipated with fear, and (ii) a form which is restricted to public speaking anxiety. Core questions of the CIDI for social phobia closely follow these formulations with regard to situations such as speaking in public, having to use a toilet when away from home, eating or drinking in public, talking to people when you might have nothing to say or might sound foolish, taking part in a meeting, a class, or going to a party. The CIDI is a structured interview instrument developed by the World

Health Organization (28, 29) on the basis of the Diagnostic Interview Schedule (DIS) and the Present State Examination (PSE). It was designed for use by trained interviewers who are not clinicians. The CIDI is now being used worldwide, and WHO field trials have documented acceptable reliability and validity for nearly all diagnoses (26, 29, 30) with the exception of acute psychotic presentations. Whenever psychotic symptoms were detected, subjects were re-interviewed by trained clinicians with the Structured Clinical Interview for DSM-III-R, an instrument that is reliable and valid for diagnosing schizophrenia (30).

In the current study, we used a lifetime version of the CIDI at T_0. The version at T_1 refers to the period between both interviews, on average 12 months for the prevalence of anxiety disorders (panic disorder, agoraphobia, simple phobia, and generalized anxiety disorder), mood disorders (depression, dysthymia, and bipolar disorder), and substance use disorders (alcohol abuse or dependence). Because of their low prevalence, obsessive compulsive disorder, drug disorders, eating disorders and psychotic disorders were not examined here.

Definition of incident cases

A first-ever incident case of social phobia was defined as someone who developed the disorder between T_0 and T_1 in a cohort of people who had never in their life experienced social phobia before T_0 (persons at risk). The DSM-III-R hierarchical rules were not applied to the incidence data, because it would have incorrectly caused a social phobia case at T_0 to be labeled an incident case at T_1 if the hierarchically higher disorder no longer existed at T_1.

Putative risk indicators

We use the term risk indicator instead of risk factor because we do not make any etiological claims, and the risk indicator could also be a mere marker for, not necessarily a cause of the disorder. Following the stress-vulnerability model (31), we included the following risk indicators:

Sociodemographic variables. Gender, age, level of education (low = 1, high = 0), urbanicity (rural = municipalities with fewer than 500 addresses per square kilometre; urban = larger municipalities) cohabitation status (living alone = 1, else = 0), employment status (unemployment = 1, else = 0), and being a single parent (1 = yes; 0 = no). These stressors were assessed at T_0.

Somatic disorders. Having one or more somatic disorders from a list of 31, treated or monitored by a medical doctor in the previous 12 months prior to T_0 (1 = yes, 0 = no).

Parental psychiatric history. At T_0 we assessed if one or both biological parents exhibited the following problems: depression, anxiety disorders or phobias, problem drinking (1 = presence; 0 = absence).

Childhood trauma. At T_0 we asked about experiences of emotional neglect, psychological or physical abuse, or sexual abuse prior to age 16 on more than one occasion (1 = presence; 0 = absence).

Personality. *Mastery* was assessed by five items that were gathered from the Pearlin Mastery Scale (32) (α = 0.81) with a higher score indicating higher internal control. *Self-esteem* was assessed by the 10 item Rosenberg Self Esteem Scale (33) (α = 0.86), with a higher score indicating a higher degree of self-esteem. These variables were recorded at T_0. We used a cut-off at the median to obtain an indicator for above-average levels of these personality aspects, such that 1 coded for the risk, and 0 for absence of the risk.

Current stressor. *Negative life events*: We asked about the occurrence of at least one of nine negative life events in the 12 months preceding T_1: adverse change in health status; adverse change in health status of significant other; adverse change in important domains (such as job loss, divorce); adverse change in important domains of significant other; adverse change in living conditions; expected adverse change in the future; failure to attain an important goal; other important distressing event (like a physical threat or assault, sexual violence, discrimination); other important distressing event of a significant other.

Ongoing difficulties: We asked about the presence of at least one of three distressing ongoing conflicts or difficulties in the 12 months preceding T_1: relationship problems; conflicts at work or school; private or occupational problems (like noise exposure, financial difficulties). We asked about the respondents' subjective perception of the effect of each event on their own mental health (0 = none; 1 = mild to strong). Only the events which had a mild to strong negative effect on respondents' mental health were included because the impact of each event depends on its specific context, and its meaning can vary for the individual (34).

Psychiatric History. *Subthreshold Social Phobia*: At T_0 we recorded the presence of six social fears based on the DSM-III-R (speaking in public, talking to people when you might have nothing to say or might sound foolish, talking in front of a small group, using public toilets, eating or drinking in public places, and writing while being observed). If the subjects had at least one of those social fears but did not experience intense anxiety or avoidance which are needed for a social phobia diagnosis, it is categorised as subthreshold social phobia. The 12-month prevalence of mood disorders (major depression, dysthymia, and bipolar disorder), anxiety disorders (panic disorder, agoraphobia, simple phobia, and generalised anxiety disorder) was asked about at T_0. The DSM-II-R hierarchical rules were not applied to the psychiatric history data at this point.

Data analysis

The data were weighted to adjust for different response rates in different population groups, including gender, age, marital status (two categories: married, not married) and urbanization (seven categories). After weighting, the sample had exactly the same distribution as the Dutch population according to Statistics Netherlands (CBS). The weighting procedures have been described in detail elsewhere (24). All analyses were conducted with STATA/SE for Windows, version 8.2 (Stata Corp. LP, College Station, TX, USA) (35).

We examined longitudinally whether subjects with the included risk indicators had an increased risk of developing social phobia for the first time in their lives at T_1. For these analyses, we followed a cohort of subjects who had never experienced social phobia. We conducted a Poisson regression analysis with 'having social phobia for the first time at T_1' as the dependent variable. In the analysis, each of the predictors was adjusted for the effects of all other predictors in the model. Then, a more parsimonious multivariate model, based on the smallest subset of statistically significant risk indicators, was obtained by the backward-stepping selection method in the regression equation. Poisson regression models produce incidence rate ratios (IRRs) for each risk indicator. These are the ratios of the incidence rate in the exposed group relative to the incidence rate in the unexposed group. The IRRs were based on person–time data, to account for the small differences in follow-up time between T_0 and T_1 across the subjects.

In the next step the parsimonious model was used to obtain additional indices for the cost-

effectiveness of conducting prevention in the target group. This methodology is described in previous research (36). We calculated the (weighted) exposure rate (ER), the population attributable fraction (AF) and the number-needed-to-treat (NNT) of each risk indicator. The exposure rate (ER) shows the percentage of the population that has been exposed to that particular risk indicator. The attributable fraction (AF) was obtained with the aflogit procedure in STATA for each risk indicator in a Poisson regression analysis, and describes the percentage of cases attributable to the exposure of a risk indicator. In other words, the AF indicates by how many percents the current incidence rate of social phobia in the population would be reduced if the adverse effect of the risk indicator is completely blocked. However, to assume that preventive interventions will be successful in completely blocking the adverse effect of a risk indicator is not realistic. Therefore it is understood that the AF represents the upper limit of the potential health gain in the population. Nevertheless, this method helps to select high-risk groups for which prevention is likely to be associated with the greatest health gain in the population for the lowest cost.

We compared two models of risk indicators, one with and the other without psychiatric history. In doing so, we were able to assess the added value of identifying target groups with the help of more complex (and hence more costly) assessments of psychiatric history.

Results

Incidence and its indicators

Among the subjects who had never had social phobia in their lives at T_0 ($n = 5188$), 1.0% ($n = 52$) had developed social phobia for the first time in their life at T_1 (37). The crude annual incidence of DSM-III-R social phobia was estimated at 9 per 1000 people per annum for all, broken down into 8 per 1000 annually for men, and 11 per 1000 annually for women (38).

Of the 52 persons who developed social phobia, 59.6% were women, 57.7% had a low education level, 75.0% were living in urban settings, 63.5% were not working, 28.8% were living alone and 59.6% had one or more general medical disorders. The mean age of the incident cases was 23.0 (SD = 12.46).

Bivariate model

Table 1, the left hand panel, shows the baseline (T_0) sociodemographic, personality, childhood

Table 1. Incident risk ratios of DSM-III-R social phobia based on the risk indicators, $n = 5020$

		Cases	Non-cases	IRR	Bivariate model 95% CI
Sociodemographic and somatic factors					
Gender	Female	31	2701	1.50	83–2.74
	Male	21	2435		
Age (continuous)				1.01	98–1.03
Educational level	Low	30	2128	2.13**	1.18–3.87
	High	22	3008		
Urbanicity	Urban	39	4268	0.73	38–1.42
	Rural	13	868		
Cohabitation	Alone	15	945	1.65	0.86–3.16
	Not alone	47	4191		
Employment	No	33	3586	0.73	0.40–1.36
	Yes	19	1550		
Presence of somatic disorder	Yes	31	2591	1.56	0.85–2.84
	No	21	2545		
Being a single parent	Yes	3	207	1.43	0.43–4.70
	No	49	4929		
Personality					
Self-esteem	Low	43	2689	4.58***	2.07–10.13
	High	8	2385		
Mastery	Low	49	3282	8.31 **	2.12–31.23
	High	3	1830		
Childhood trauma					
Emotional neglect	Yes	27	1103	4.92***	2.73–8.86
	No	24	4024		
Psychological abuse	Yes	14	556	3.19**	1.64–6.21
	No	38	4576		
Physical abuse	Yes	10	404	3.42**	1.60–7.33
	No	42	4729		
Sexual abuse	Yes	9	343	3.07**	1.42–6.48
	No	42	4790		
Parental psychiatric history					
Family depression	Yes	15	1078	1.75	91–3.35
	No	34	4000		
Family anxiety	Yes	8	521	1.61	71–3.63
	No	42	4560		
Family alcohol problem	Yes	9	405	2.68**	1.22–5.90
	No	42	4703		
Current stress					
Negative life events	Yes	38	2296	3.81***	2.02–7.19
	No	14	2840		
Ongoing difficulties	Yes	23	849	4.05***	2.27–7.25
	No	29	4287		
Psychiatric history					
Subthreshold social phobia	Yes	23	565	6.60***	3.66–11.90
	No	29	4570		
Major depression	Yes	13	224	9.35***	4.71–18.53
	No	39	4912		
Dysthymia	Yes	9	96	14.81***	6.70–32.73
	No	43	5040		
Bipolar disorder	Yes	3	34	9.87***	2.79–34.91
	No	49	5102		
Panic disorder	Yes	6	65	9.99***	4.19–23.85
	No	46	5071		
Agoraphobia	Yes	3	42	7.02**	2.10–23.40
	No	49	5094		
Simple phobia	Yes	9	272	4.20***	1.96–8.98
	No	43	4864		
Generalized anxiety disorder	Yes	8	86	6.67***	2.76–16.11
	No	46	5050		
Alcohol abuse/dependence	Yes	5	319	1.12	43–2.88
	No	47	4817		

*$P < 0.05$, **$P < 0.01$, ***$P < 0.001$.

trauma, parental psychiatric history, psychiatric history and the current stress (between T_0 and T_1) of subjects with and without incident DSM-III-R social phobia. The risk of developing social phobia was significantly higher in subjects who had a low education level, low self-esteem, and low mastery. The incidence of social phobia increased with the experience of emotional neglect, psychological abuse, physical abuse, or sexual abuse in childhood, or having a parent with an alcohol problem. In addition, those with negative life events or ongoing difficulties in the 12 months preceding T_1 have a greater chance of being an incident case. All 12-month mental disorders were significant predictors of the incidence of social phobia except alcohol abuse or dependence; accordingly the predictors were subthreshold social phobia, major depression, dysthymia, bipolar disorder, panic disorder, agoraphobia, simple phobia, and generalized anxiety disorder.

Multivariate models

Models without psychiatric history risk indicators. <u>Complete model.</u> After all the risk indicators had been adjusted for the effects of all other risks in the model, we found that emotional neglect (IRR = 3.29, $P \le 0.001$), ongoing difficulties (IRR = 2.82, $P \le 0.01$), low mastery (IRR = 3.91, $P \le 0.05$), low self-esteem (IRR = 2.17, $P \le 0.05$) and low education (IRR = 1.98, $P \le 0.05$) were significantly associated with developing social phobia (not in table).
<u>Parsimonious model.</u> Again, to obtain a parsimonious multivariate model with the smallest set of significant risk indicators, the backward-stepping selection method was used. Table 2 shows the ER, the IRR, and the population AF for the smallest subset of risk indicators. With all risk indicators, the total attributable fraction was 95.4%; in the parsimonious model this is 94.7% – which seems not much lower.

It can be seen that low mastery had the highest AF for incident social phobia, showing that if the

adverse effects of low mastery were completely blocked, the incidence of social phobia would be reduced by 70.6%. This health gain could be increased if in addition the adverse effects of low self-esteem (AF = 47.5%), emotional neglect in childhood (AF = 44.1%), and low education (AF = 30.3%) could be completely blocked. In terms of current stress, the elimination of ongoing difficulties would help to reduce the incidence of social phobia by 30.4%.

Models with psychiatric history risk indicators. <u>Complete model.</u> The risk indicators from Table 1 were entered into the regression equation, but now we also entered psychiatric risk indicators. The risk of developing social phobia was significantly higher in subjects who had major depression (IRR = 3.50, $P \le 0.01$), subthreshold social phobia (IRR = 3.31, $P \le 0.001$) and simple phobia (IRR = 2.20, $P \le 0.05$) at T_0 after controlling for other risk indicators. We also found that negative life events (IRR = 2.63, $P \le 0.01$), emotional neglect (IRR = 2.58, $P \le 0.01$), low mastery (IRR = 4.34, $P \le 0.05$), and low education (IRR = 1.93, $P \le 0.05$) were associated with the incidence of social phobia (not in Table).
<u>Parsimonious model.</u> We selected the smallest subset of risk indicators with a Poisson regression analysis (backward method) (Table 3). Although simple phobia was a significant predictor of social phobia in the complete multivariate model, it was no longer significant in the parsimonious model. Thus, our parsimonious model had only six risk indicators: low mastery (IRR = 4.45, $P \le 0.05$), subthreshold social phobia (IRR = 4.34, $P \le 0.001$), major depression (IRR = 4.34, $P \le 0.01$), emotional neglect (IRR = 2.70, $P \le 0.01$), negative life events (IRR = 4.34, $P \le 0.01$), and low education (IRR = 2.04, $P \le 0.05$).

As can be seen in Table 2, low mastery was again associated with the highest AF (74.0%) for developing social phobia. If the adverse effects of negative life events (AF = 49.2%), emotional

Table 2. Parsimonious model, $n = 5102$

Risk indicator	ER%	IRR (95% CI)	AF%
Low self-esteem	53.8	2.25 (1.06–4.80)	47.5
Ongoing difficulties	17.8	2.68 (1.43–5.03)	30.4
Low education	40.2	2.01 (1.08–3.74)	30.7
Low mastery	65.1	4.01 (1.13–14.24)	70.6
Emotional neglect	23.1	3.48 (1.81–6.69)	44.1
Total			94.7

ER, exposed rate; IRR, incidence rate ratio; AF, attributable fraction.
*All parameters are statistically significant at $P < 0.05$.

Table 3. Parsimonious model with psychiatric history*, $n = 5153$

Risk indicator	ER%	IRR (95% CI)	AF%
Major depression	5.6	3.57 (1.61–7.91)	28.7
Low education	40.2	2.04 (1.10–3.75)	32.7
Low mastery	65.1	4.45 (1.11–17.84)	74.0
Emotional neglect	23.1	2.70 (1.43–5.09)	40.6
Negative life events	45.8	2.67 (1.38–5.17)	49.2
Subthreshold social phobia	17.8	3.66 (1.89–7.09)	47.4
Total			96.8

ER, exposed rate; IRR, incidence rate ratio; AF, attributable fraction.
*All parameters are statistically significant at $P < 0.05$.

neglect (AF = 40.6%), and low education (AF = 32.7%) could be completely blocked, the health gain would be increased. Of the psychiatric history variables, subthreshold social phobia had the highest AF (47.4%) while major depression had a lower AF (28.7%).

The total attributable fraction of the complete model was 97.3%. If the adverse effects of all the risk factors in the parsimonious model could be completely blocked, almost the same decrease (96.8%) in the incidence rate of social phobia would be achieved.

As one of our aims is to target the high-risk group with the greatest health benefits for the lowest cost, we compared the two parsimonious models (with or without psychiatric history) of the risk indicators. Results indicated that adding 12-month mental disorders (AF = 96.8%) as risk indicators did not substantially improve the attributable fraction of the other risk indicators (94.7%).

Discussion

Main findings

Social phobia is associated with decreased quality of life (6, 8), more comorbidity (11, 39), and high service utilization (1, 9, 11, 40). The disabling consequences of social phobia make the prevention of the incidence of social phobia important. Therefore, the aim of the present study was to identify the risk group with the highest probability of developing social phobia. We compared two different sets of risk factors: one which included psychiatric history (subsyndromal social phobia and mental health disorders) and the other that did not. The results of our study indicated that including psychiatric history in the risk set did not improve the prediction of incident social phobia overall and a shorter list of risk indicators worked just as well. The reason for this might be that most of the other risk indicators like self-esteem or mastery are highly associated with mental disorders (41–43).

The incidence of DSM-III-R social phobia (nine new cases per 1000 population-years) was in line with previous studies among adults (14, 15). For the reason that the mean age of the incidence cases was 23.0 in the current study, we could better describe the new cases of social phobia in our cohort study as late onset social phobia. With the exception of low education level, the sociodemographic variables were found to be less strong predictors of the incidence of social phobia, which is also consistent with previous research (14, 15).

Low mastery (e.g. a person believes he has little control over the things relevant to his own life) is associated with the largest relative risk of developing social phobia. Low self-esteem was also helpful in identifying the high risk group. As stated above, the previous research clearly established that personality traits such as low mastery and low self-esteem were related to mental health (41–43). These two vulnerability indicators could be used as a suitable starting point in preventive interventions because it is not possible to change some risk indicators such as emotional neglect in childhood. Timely intervention by practitioners with regard to these vulnerability factors might reduce the incidence of social phobia considerably.

The association between childhood trauma and social phobia has been studied in previous prevalence studies (20). When we control the risk indicators for other risks, emotional neglect was significantly associated with the onset of social phobia. Even though emotional neglect had a fairly large attributable fraction (44.1%), it is perhaps not a suitable starting point for the prevention of social phobia. Nonetheless, screening for this variable could be valuable to identify the group at highest risk.

Studying exposure to current stressors may also be helpful in targeting the risk groups. Although there is a lack of research about the relationship between social phobia and life events, in a recent study, it was found that life events were significantly related to the onset of social phobia (23). We found support for this finding: ongoing difficulties such as relationship problems, conflicts at work or school, or private or occupational problems in the previous 12 months or longer were significant indicators of incident social phobia. This indicates that teaching coping skills for those problems could also be an effective strategy in the prevention of social phobia.

In the model in which psychiatric history was included, we found that major depression and subthreshold social phobia appear as important risk indicators for the incidence of social phobia. Thus, treating major depression and subthreshold social phobia might be helpful in the prevention of comorbid or primary social phobia.

Strengths and limitations

The results of this study must be considered in the context of the study's strengths and limitations. NEMESIS (from which our data are derived) is a population-based, prospective, and longitudinal study in which social phobia is measured with a reliable instrument. To our knowledge this study is

the first on the incidence of social phobia to include a large range of risk indicators and clinical factors. Moreover, our study is the first to apply a recently developed statistical technique to identify target groups for the prevention of social phobia.

The study has several limitations. First, the number of incident cases was small ($n = 52$). Second, life events were recorded at T_1. Therefore, the direction of the association is not clear: onset of social phobia may have preceded stressful life events or the other way round (44). Third, the etiology studies of social phobia indicated that early temperament styles such as behavioural inhibition and biological factors are related to the onset of social phobia (45). However, in the present study we did not assess those variables. Although it is difficult to infer how their inclusion might have affected the results of the study, it would probably have provided a more comprehensive explanation about the risk indicators for the incidence of social phobia.

Our study has shown that a very sizable fraction of the incident cases of social phobia which is an important mental health problem can be detected with a small group of risk indicators. From a public health point of view, it is important for the prevention of social phobia to continue the efforts to develop treatments which improve the mastery and self-esteem of individuals, while increasing problem solving skills especially for ongoing difficulties.

Conflict of interest

None.

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