RESEARCH REPORT

Is perceived nervousness and anxiety a predictor of premature mortality and severe morbidity? A longitudinal follow up of the Swedish survey of living conditions

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Study objective: To find out if people perceiving nervousness, uneasiness, and anxiety have excess risks of premature death and severe morbidity.

Design, setting, participants: Random samples of the Swedish population aged 16–74 years in 1980–81, 1988–89, and 1995–96 were followed up for 5 and 10 years with regard to deaths and hospital admissions for different causes. Relative risks were estimated by Poisson regression, comparing those who reported perceived nervousness, uneasiness, and anxiety with those who did not and adjustments were made for baseline characteristics as age, education, smoking, and longstanding illness.

Main results: Perceived nervousness, uneasiness, and anxiety was strongly related to subsequent risks of suicide attempt and psychiatric disease. Those perceiving severe complaints of anxiety had a relative risk (fully adjusted) for suicide attempt of 9.2 (95% CI 3.0 to 28.8) for men and 3.1 (1.4 to 7.1) for women. Even for less severe complaints, there was a significant, but less pronounced excess risk. These negative feelings were also associated with later risks for all cause mortality, hospital care, and ischaemic heart disease, although to a lesser extent and more strongly among men. Unchanged relative risks over time shows no trend in response attitude and perceived anxiety seems to be a better predictor of a negative health outcome than self reported longstanding illness.

Conclusions: Positive responses to self report survey questions about anxiety/nervousness are associated with adverse health outcomes, particularly hospital admission for deliberate self harm. This is an alarming signal bearing in mind the rapid increase in prevalence of perceived anxiety in the Swedish society.

T here is a rapid increase of people reporting feelings of nervousness, uneasiness, and anxiety in the Swedish society. From 1988/89 to 2001/02 the percentage in the population increased from 12% to 22% according to the Swedish survey of living conditions (ULF). One question is whether this trend is an indicator of future severe health problems or merely a change in attitude or a tendency to more frequent reporting.

Self reported conditions about health and psychological state have enjoyed interest as predictors of future mortality and ill health. In general, self reported global health status has been found to be a strong indicator of mortality risk, even after accounting for known demographic, social, and medical risk factors.[1–3] Larsson *et al*[4] found that poor self reported health reported in late adolescence among male conscripts was associated with an increased risk of mortality during 27 years of follow up. However, the association almost disappeared after adjustments for psychological factors measured at baseline. Among elderly persons, self rated health was found to be an even better predictor of future mortality than clinically assessed health.[5] Negative dose-response associations have also been found between different emotions as self reported happiness, and suicide,[6] as well as between feelings of hopelessness (defined as negative expectations about oneself and the future), and subsequent risk of mortality from coronary heart disease (CHD), external and internal deaths as well as incident cancer and myocardial infarction.[7] Self reported hopelessness[8] and life satisfaction[9] have also been linked to suicidality.

Epidemiological research has also increasingly focused on the relation between worry, anxiety, and depression and risk of CHD and findings suggest that these negative emotions may be risk factors for CHD.[10–16] Much of this work has been done in the context of psychopathology, but questions have been raised about possible consequences of the presence of even ''normal'' (non-pathological) levels of negative emotion. It has been suggested that anxiety symptoms may identify groups in the general population who are at increased risk of sudden cardiac death.[11]

The purpose of this study was to evaluate the prediction of premature mortality and severe morbidity with a self reported single item about nervousness and anxiety. The effects of baseline health status, health behaviour, and socioeconomic factors on this association were also investigated. We studied possible changes over time of the relation, as indications of whether changes in responses are attributable to changes in attitudes and language use, rather than genuine experiences of nervousness and anxiety. We made use of unique datasets that link survey response data to subsequent mortality records and records about hospitalisation.

METHODS

We used series of data from the Swedish survey of living conditions (ULF) for three different cohorts, 1980–81, 1988–89, and 1995–96, as we wanted to elucidate whether the relation changed over time, in this case a 15 year period. The choice of cohorts was motivated by the fact that the question about nervousness and anxiety was used only during the years 1980–81, 1988–89, and 1994 and onwards. We had cause of death and hospital data only until 2001, and to make five year follow ups, 1995–96 was the latest possible cohort. This survey is based on annual face to face interviews with a random sample representative of the Swedish population. We investigated people in the age range 16–74 years at the time of the interview. The non-response rate in these surveys has

Table 1 Nervousness, uneasiness, and anxiety among men and women in three different cohorts over time

		Cohort 1980–1981		Cohort 1988–1989		Cohort 1995–96		All cohorts	
		Number	(%)	Number		Number	(%)	Number	(%)
No reported problems	Men	5598	(91.0)	5189	(92.9)	4700	(87.9)	15 487	(90.7)
	Women	5135	(81.4)	4846	(85.5)	4400	(80.8)	14 381	(82.5)
Light problems	Men	440	(7.2)	298	(5.3)	518	(9.7)	1256	(7.4)
	Women	938	(14.9)	642	(11.3)	830	(15.2)	2410	(13.8)
Severe problems	Men	111	(1.8)	99	(1.8)	131	(2.5)	341	(2.0)
	Women	235	(3.7)	183	(3.2)	218	(4.0)	636	(3.6)

increased over time from 13.7% in 1980 to 21.3% in 1996 (the non-response rates were 13.5% 1981, 20.4% 1988, 20.7% 1989, and 19.6% 1995).[17]

We studied mortality and severe morbidity generally over five year follow up periods starting the year after interview, using data from the National Cause of Death Register and the Swedish Hospital Patient Register, respectively—that is, conditions requiring either hospital care or causing death. Ten year follow ups were also performed. The Hospital Patient Register contains data about all discharges from Swedish hospitals (overnight patients). Diagnoses from the hospital records are mainly based on the judgement of the doctor—standard diagnostic assessments are rarely used. Death was followed up for all the three cohorts (1980–81, 1988–89, 1995–96) while inpatient data were available only from 1987 and hence possible to follow up only for the two latter cohorts. We studied total mortality; all inpatient care (all causes except for maternity care ICD9 630-679, ICD10 O00-O99); psychiatric diseases (ICD9 290-319), except for diagnoses indicating addiction (291, 292, 303–305.0) or (ICD10 F00-F99) except for (F10-F16), and suicide attempt (ICD9 E950-E959, E980-E989) or (ICD10 X60-X84, Y10-Y34). Ischaemic heart disease (IHD) (ICD9 410-414) or (ICD10 I20-I25) incorporated either death or hospital admission or both.

Mortality and morbidity rates during the follow up periods were analysed in relation to self rated nervousness, uneasiness, and anxiety at the time of the interview. Self perceived anxiety was assessed from answers to the question; "Do you possibly have any of these; inconvenience with nervousness, uneasiness and anxiety? The wording of the question remained identical in all the surveys. The response options were: "Yes, severe problems; yes, light problems; no". Respondents answering no problems made up the reference group.

Mortality and morbidity risks, indicated by records of hospital discharges, were analysed with person months at risk used as a basis for assessment. For assessment of mortality we calculated the number of months that participants were alive during follow up; and, for other outcomes based on hospital data, the months until the first relevant admission or death during the five year follow up period respectively. We used the primary diagnosis at first discharge and underlying cause of deaths as outcomes. Relative risks (RRs) with 95% confidence intervals (CIs) were used as estimates of effects. Multivariate analyses were done with Poisson regression (SAS, version 8).

In the multivariate analyses we tried to estimate the independent effect of nervousness and anxiety by adjusting for possible confounders obtained from the survey at baseline. The following variables, presumed to be important for the relations, were associated with anxiety at baseline and classified as stated in parentheses: age (a continuous variable), smoking (yes/no), limiting longstanding illness (different classification for different outcomes: yes/no alternatives in analyses of total mortality and any inpatient care; IHD/diabetes/other diagnoses/no disease in analyses of IHD;

psychiatric diagnosis/other diagnoses/no disease in analyses of psychiatric disease and suicide/suicide attempt), education (compulsory school or less/high school less than three years/high school three years/post-high school education), and cohort belongings (1980–81/1988–89/1995–96). Health status variables at baseline were used to control for reverse causation—to avoid that we are measuring effects of impaired health status on worry, rather than the opposite. However, when investigating associations with suicide attempt psychiatric illness may lie on the causal pathway rather than acting as a confounder and adjustments may thus lead to underestimation of the relation.

We also assessed the association within different subgroups classified according to education, longstanding illness, and smoking.

RESULTS

We studied 34 511 men and women (17 084 men and 17 427 women) aged 16–74 years at the time of the interview (12 457 for the years 1980–81, 11 257 1988–89, and 10 797 1995–96).

Mean age was 42.3 for men and 43.0 for women (not shown in table). Almost twice as many women as men reported problems with nervousness, uneasiness, and anxiety. Some 3.6% among the women reported severe problems, compared with 2.0% among the men. It was found that 13.8% among the women reported light problems, while the corresponding percentage among men was 7.4 (table 1, all cohorts taken together). Both light and severe problems seem to be most common during the last period studied (1995–96), and generally least common during the second period (1988–89) (table 1).

A total of 1025 persons died during the five year follow up period (all cohorts taken together). People who reported severe problems of nervousness, uneasiness, and anxiety suffered from about twofold to threefold increased risks of death during the three time periods after adjustments for age and sex (table 2). Those reporting lighter problems had less increased risks. Adjusting for smoking, longstanding limiting illness, and education resulted in attenuation of the increased risks. Judging from the point estimates for severe problems (fully adjusted RRs for cohort 1980–81 = 1.7, 1988–89 = 2.3, and 1995–96 = 1.8) a slight increase of the relative risks occurred over time, at least between period one and period two. However, we could not exclude that the effect modification of time was random (p values for comparisons between the first and second cohort = 0.2711, the first and third = 0.8028, and the second and third = 0.4923, p values are not shown in table). Fully adjusted RRs for inpatient care were also significantly increased during both periods studied (1988–89 and 1995–96), with a higher point estimate for severe problems during the last period (RR = 1.3 and 1.6 respectively, p value for comparison between cohorts = 0.0472). More pronounced increased risks were found for hospital care for psychiatric disease—almost 11-fold (1988–89) and eightfold increased risks (1995–96)

Table 2 Multivariate models for mortality and inpatient care: five year follow ups of people reporting light or severe problems of nervousness, uneasiness and anxiety 1980–81, 1988–89, and 1995–96

| | | 1980–81 | | | 1988–89 | | | 1995–96 | | |
| | Reported problem worry, anxiety | | RR (95% CI) | | | RR (95% CI) | | | RR (95% CI) | |
Outcome		Number of cases	Model 1	Model 2	Number of cases	Model 1	Model 2	Number of cases	Model 1	Model 2
All cause mortality	No	327	(Ref)	(Ref)	271	(Ref)	(Ref)	188	(Ref)	(Ref)
	Yes, light	79	1.6 (1.2 to 2.0)	1.4 (1.1 to 2.8)	41	1.5 (1.1 to 2.1)	1.2 (0.9 to 1.7)	49	1.9 (1.4 to 2.6)	1.6 (1.2 to 2.3)
	Yes, severe	25	2.2 (1.5 to 3.4)	1.7 (1.1 to 2.5)	30	3.1 (2.1 to 4.6)	2.3 (1.6 to 3.3)	15	2.4 (1.4 to 4.1)	1.8 (1.1 to 1.3)
Inpatient care:* All—except for maternity care	No	–		–	2928	(Ref)	(Ref)	2301	(Ref)	(Ref)
	Yes, light	–		–	357	1.2 (1.1 to 1.3)	1.0 (0.9 to 1.2)	449	1.4 (1.2 to 1.5)	1.2 (1.1 to 1.3)
	Yes, severe	–		–	140	1.8 (1.5 to 2.1)	1.3 (1.1 to 1.6)	154	2.0 (1.7 to 2.4)	1.6 (1.4 to 1.9)
Psychiatric disease	No	–		–	102	(Ref)	(Ref)	96	(Ref)	(Ref.)
	Yes, light	–		–	44	4.6 (3.2 to 6.5)	3.3 (2.3 to 4.8)	36	2.6 (1.8 to 3.8)	2.0 (1.4 to 3.0)
	Yes, severe	–		–	29	10.8 (7.1 to 16.4)	4.1 (2.5 to 6.6)	27	7.6 (5.0 to 11.7)	3.3 (2.1 to 5.4)

Model 1 Adjusted for age and sex. Model 2 Adjusted for age, sex, longstanding limiting illness, and education. For total mortality and all inpatient care adjustments are made also for smoking. Longstanding illness is classified as a yes/no variable. For psychiatric disease longstanding illness is classified as; psychiatric disease/other diagnoses/no disease. *Inpatient data were not available for the first period.

among those with severe problems, after adjustments for age and sex (table 2). After further adjustments for longstanding limiting illness and education, the increased risks for psychiatric disease were attenuated substantially. Light problems implied considerable less pronounced risk increases. There was no significant difference in risk increase between the cohorts—neither among those with light problems (0 = 0.627) nor among those with severe problems (p = 0.4926, fully adjusted model).

Age adjusted RRs for hospital care for suicide attempt were strongly increased, especially for men (RR for men 12.7 (95% CI 5.1 to 31.3)). Women had a ninefold increased risk (9.1 (4.7 to 17.5)) (table 3). For both men and women lighter problems implied a threefold risk increase. Adjustments for limiting longstanding illness greatly attenuated the risk increase among women (RR = 3.4 (1.5 to 7.7)), and less for men (RR = 9.2 (3.0 to 28.6)). Educational level, though, only had a minor impact on the relation between reported nervousness/anxiety and suicide attempt, among both men and women.

Men who reported light or severe problems with nervousness and anxiety had, by contrast with women, increased risk for IHD (table 3). Age adjusted RR for men was 1.8 (1.4 to 2.3) and for women 1.3 (0.9 to 1.7) (light and severe problems taken together). Smoking and education did hardly seem to attenuate the risk increase among men, however longstanding illness did. After adjustments for all background variables taken together a significant risk increase remained unaccounted for among men (RR = 1.5 (1.1 to 1.9)).

Five and 10 year follow ups respectively showed generally minor attenuation of risk increases over time for total mortality and all inpatient care taken together (table 4). However, with regard to suicide attempt the relation seemed to become even stronger over time, both for men and women and among those with light as well as severe problems. In addition to age, relative risks were adjusted for smoking, education, and longstanding illness and the relation between these variables and the different outcomes are also shown in the table, expressed as relative risks, and adjusted for all the other variables in the table. Thus, we get a hint of the relative ''predictive power'' of different risk factors. For men, severe problems with nervousness/anxiety, seemed to be a stronger risk factor for all cause mortality risk in a five or 10 year perspective than smoking and longstanding illness. With regard to suicide attempt among men, nervousness and anxiety seemed to be the utmost strongest risk factor, and increasing with time of follow up, with a 15-fold risk increase during the 10 year follow up.

Table 3 Five year follow up of suicide attempt and death or care for ischaemic heart disease (IHD) among men and women reporting light or severe problems of nervousness, uneasiness, and anxiety 1980–81, 1988–89 and 1995–96 (the cohorts taken together) in multivariate models

| | | | | | RR | RR | RR | RR | RR |
| | Reported problem with worries, anxiety | Person years | Number of cases | Model adjustments:* | | | | | |
Hospital care or death				Age	Age, smoking	Age, longstanding illness†	Age, education	All factors
Suicide attempt	Men No	48624	24	(Ref)	Not relevant	(Ref)	(Ref)	(Ref)
	Yes, light	3953	6	3.3 (1.3 to 8.1)		3.0 (1.2 to 7.6)	3.3 (1.3 to 8.1)	3.1 (1.2 to 7.7)
	Yes, severe	1065	6	12.7 (5.1 to 31.3)		9.2 (3.0 to 28.6)	12.4 (5.0 to 30.7)	9.2 (3.0 to 28.8)
	Women No	45826	37	(Ref)	Not relevant	(Ref)	(Ref)	(Ref)
	Yes, light	7209	16	3.1 (1.7 to 5.6)		2.2 (1.2 to 4.2)	2.9 (1.6 to 5.3)	2.1 (1.1 to 4.0)
	Yes, severe	1927	12	9.1 (4.7 to 17.5)		3.4 (1.5 to 7.7)	8.2 (4.2 to 15.9)	3.1 (1.3 to 7.1)
IHD	Men No	48029	355	(Ref)	(Ref)	(Ref)	(Ref)	(Ref)
	Yes, light or severe	4906	62	1.8 (1.4 to 2.5)	1.7 (1.3 to 2.3)	1.5 (1.2 to 2.0)	1.8 (1.3 to 2.3)	1.5 (1.1 to 1.9)
	Women No	45624	152	(Ref)	(Ref)	(Ref)	(Ref)	(Ref)
	Yes, light or severe	9128	52	1.3 (0.9 to 1.7)	1.2 (0.9 to 1.7)	1.0 (0.8 to 1.4)	1.3 (0.9 to 1.7)	1.1 (0.7 to 1.4)

*All models are adjusted for cohort belongings. †In analyses of suicide attempt the adjustment variable longstanding illness is classified as; psychiatric diagnosis/other diagnoses/no disease and in analyses of IHD-IHD/diabetes/IHD and diabetes/other diagnoses/no disease.

Table 4 Influence of different risk factors: multivariate models with 5 and 10 year follow ups of death and hospital care for men and women reporting nervousness, uneasiness, anxiety, and other risk factors

Adjustments for age, cohort, and all other variables		Total mortality		All inpatient care		Suicide attempt	
		5 year follow up*	10 year follow up†	5 year follow up‡	10 year follow up§	5 year follow up‡	10 year follow up§
Men	Nervousness, uneasiness, anxiety						
	light	1.6 (1.2 to 2.0)	1.4 (1.2 to 1.7)	1.2 (1.1 to 1.4)	1.1 (0.9 to 1.3)	3.1 (1.2 to 7.7)	3.8 (1.3 to 11.5)
	severe	2.4 (1.7 to 3.3)	2.0 (1.5 to 2.7)	1.8 (1.5 to 2.2)	2.0 (1.6 to 2.5)	9.2 (3.0 to 28.8)	15.3 (4.2 to 55.5)
	Current smoker	1.9 (1.6 to 2.2)	1.7 (1.5 to 2.0)	1.2 (1.1 to 1.3)	1.2 (1.1 to 1.3)	Not relevant	Not relevant
	Education	1.2 (1.0 to 1.6)	1.2 (1.0 to 1.4)	1.3 (1.2 to 1.4)	1.2 (1.1 to 1.4)	2.4 (0.9 to 6.6)	1.3 (0.5 to 3.4)
	Longstanding illness**	1.9 (1.6 to 2.3)	1.7 (1.5 to 2.0)	1.8 (1.6 to 1.9)	1.6 (1.5 to 1.8)	2.0 (0.5 to 7.8)	1.3 (0.2 to 6.5)
Women	Worry, anxiety						
	light	1.2 (1.0 to 1.6)	1.1 (0.9 to 1.3)	1.1 (1.0 to 1.2)	1.0 (0.9 to 1.2)	2.1 (1.1 to 4.0)	3.4 (1.6 to 7.2)
	severe	1.5 (1.0 to 2.2)	1.5 (1.1 to 1.9)	1.4 (1.2 to 1.6)	1.1 (0.9 to 1.3)	3.1 (1.3 to 7.1)	4.3 (1.5 to 12.2)
	Current smoker	1.9 (1.5 to 2.4)	1.7 (1.4 to 2.0)	1.2 (1.1 to 1.3)	1.3 (1.2 to 1.4)	Not relevant	Not relevant
	Education¶	1.5 (1.0 to 2.3)	1.5 (1.1 to 2.1)	1.2 (1.1 to 1.3)	1.2 (1.1 to 1.3)	2.4 (1.1 to 5.3)	1.9 (0.8 to 4.7)
	Longstanding illness**	2.0 (1.6 to 2.6)	1.7 (1.5 to 2.1)	1.8 (1.7 to 2.0)	1.7 (1.6 to 1.9)	8.4 (3.6 to 19.6)	5.8 (2.0 to 16.5)

The reference groups consist of unexposed to a risk factor. *Follow up of cohorts 1980–81, 1988–89, 1995–96. †Follow up of cohorts 1980–81, 1988–89. ‡Follow up of cohorts 1988–89, 1995–96. §Follow up of cohort 1988–89. ¶Relative risk for compulsory school or less compared with post-high school education. **In analyses of suicide and suicide attempt longstanding illness refers only to those with a psychiatric illness compared with those with no disease.

For women, on the other hand, longstanding limiting illness (note: different definitions for different outcomes) seemed to be a more important risk factor for suicide attempt, all cause mortality, and inpatient care than self reported negative emotions. Among women, smoking also showed a generally stronger relation to all cause mortality and inpatient care than did nervousness/anxiety (table 4).

Analyses were also done to assess whether the relation between self reported nervousness, uneasiness, anxiety, and all inpatient care as well as suicide attempt varied by educational level, longstanding limiting illness, and smoking habits (not shown in table). The effects were similar among both high and low educated, as well as among those with and without longstanding limiting illness. We found a significantly stronger relation between anxiety and inpatient care among non-smoking women, than among smoking women.

DISCUSSION

In this study, a simple question about feelings of nervousness, uneasiness, and anxiety was strongly related to subsequent risks of suicide attempt and psychiatric disease during the following five or 10 years. These negative feelings also seemed to be associated with later risks for all cause mortality, inpatient care, and IHD, although to a lesser extent. The presence of nervous symptoms seemed to be a stronger risk indicator for all cause mortality, hospital care, and suicide attempt than prevalence of longstanding illness, smoking, and low educational achievement.

There seems to be an explicit sex difference—the associations were much stronger among men. For instance, while relative risk for IHD was significantly increased among men, we found no association among women, and much weaker relations among women for outcomes such as total mortality, suicide, and inpatient care. The results from our follow up

study may provide a community based perspective of nervousness/anxiety as distal and vulnerability risk factors in suicide behaviour and with regard to mortality and severe morbidity.

Overall, self reported conditions about health and psychological state have been found to be strong predictors of risk of mortality and ill health (physical as well as mental). Different emotions as self reported hopelessness and life dissatisfaction were found to have long term effects on the risk of suicide.[8] [9] It was maintained by the authors that life dissatisfaction might be an early sign on future mental problems and the assessment of life satisfaction could, in part promote the early identification of depressive persons who have not necessarily been in reach of psychiatric evaluation.

Self reported phobic anxiety (both pathological and not) has been found to be predictive of subsequent cardiovascular disease mortality in men[10] [12] and a number of prospective studies have linked depression with coronary heart disease.[14] People with diagnosed major depression, and even those with depressive symptoms were found to be at greater risk of a heart attack independent of other cardiovascular risk factors.[14] [18]

Several mechanisms might explain the association between nervousness/anxiety and ill health. Emotions can affect health through many pathways. They may occur indirectly, through health behaviours or medical regimens or directly, through changes in the functioning of the central nervous system, immune endocrine, and cardiovascular system. Distress related immune dysregulation may be one core mechanism behind a large and diverse set of health risks associated with negative emotions. In addition to the direct influences of psychological states on physiological function, distressed people are more likely to have health habits that put them at greater risk, including poorer sleep, a greater propensity for alcohol, drug misuse and smoking, poorer nutrition, and less exercise. However, health habits do not seem to be sufficient to explain the relation between emotions and disease.[19]

Gunnell at al[20] found that the association between self reported minor mental disorder and suicide risk was stronger among men (RR = 6.70) than among women (RR = 1.66). van Hout[21] found that for men, but not for women, there was an increased mortality risk among those with anxiety disorders. Both findings are in line with ours. It has been shown that sex differences in the link between negative emotions and CHD remains under-researched—most of the

Policy implications

- Health personnel should pay attention to patient anxiety in their diagnostic procedures, especially among men.
- The rapid increase in prevalence of perceived anxiety in Sweden may be an alarm signal that society should take seriously.

What this paper adds

A simple question about feelings of nervousness, uneasiness, and anxiety seems to be an indicator of premature mortality and severe morbidity, especially psychiatric morbidity.

longitudinal prospective cohorts studies have been carried out among men. This is considered as a serious defect in our knowledge because anxiety and depressive disorders are more common among women.[15] Several other studies have found that the association between self rated health and mortality risk is stronger or only exists among men, and it has been proposed that subjective health reflects serious health problems differently for men and women.[1 3 22] A well known paradox is that women live longer, but experience higher morbidity and disability rates. Differences in health reporting behaviours are usually assumed to be one explanation.[20 23] Thus, the men who do report symptoms, in comparison with women, may have more severe disorder—as suggested by their comparatively more heightened risks for mortality and severe morbidity outcomes. Yet, these assumptions have been questioned by among others Macintyre and coauthors.[24] Further research is required to elucidate whether sex differences found in our analyses are attributable to women's relative proneness to report anxiety and nervousness or whether these negative feelings have different implications among men and women. Men may for instance be less capable of dealing with feelings of anxiety.

Limitations of the study lies foremost in the studied predictor—which is based on the respondents' reports on one single item about prevalence of nervousness, uneasiness, and anxiety, instead of psychiatric screening instruments with reported reliability or other clinical methods. The non-response rate in the survey increased over time and this may underlie apparent changes in the prevalence of anxiety. However, the second (1988–89) and third (1995–96) cohorts had very similar response rates, still, the existence of anxiety was considerably larger during the last period. Hence, it is difficult to interpret in what way changing response rates may influence the prevalence of anxiety, and furthermore, in what way the strengths of the relations to later negative health outcomes are influenced. The main strengths lie in the complete coverage of the outcomes by using deaths and hospital discharge records of the entire country. This also implies that our health measure is not biased by self reporting, and can be expected to cover most serious morbidity outcomes.

In conclusion, the strength of our observed associations, especially with regard to men and for outcomes as suicide attempt, underscores the need to try to understand the individual, social, and environmental conditions that lead to the development of nervousness, uneasiness, and anxiety. This single measure of anxiety seems to be an indicator of premature mortality and severe morbidity, and was in this study an even stronger indicator than longstanding illness and smoking. Unchanged relative risks over time indicates no trend in response attitude and the indicator predicts excess mortality and morbidity up to 10 years of follow up. Health personnel should pay attention to patient anxiety in their diagnostic procedures. The rapid increase in prevalence of perceived anxiety may be an alarm signal that society should take seriously.

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REFERENCES
1 **Idler EL**, Benyamini Y. Self-rated health and mortality: a review of twenty-seven community studies. *J Epidemiol Community Health* 1997;**38**:21–37.
2 **Burström B**, Fredlund P. Self rated health: Is it a good predictor of subsequent mortality among adults in lower as well in higher social classes? *J Epidemiol Community Health* 2001;**55**:836–40.
3 **Benjamins MR**, Hummer RA, Eberstein IW, *et al.* Self-reported health and adult mortality risk: an analysis of cause-specific mortality. *Soc Sci Med* 2004;**59**:1297–306.
4 **Larsson D**, Hemmingsson T, Allebeck P, *et al.* Self-rated health and mortality among young men: what is the relation and how may it be explained? *Scand J Public Health* 2002;**30**:259–66.
5 **Mossey JM**, Shapiro E. Self-rated health: a predictor of mortality among the elderly. *Am J Public Health* 1982;**72**:800–8.
6 **Koivumaa-Honkanen H**, Honkanen R, Koskenvuo M, *et al.* Self-reported happiness in life and suicide in ensuing 20 years. *Soc Psychiatry Psychiatr Epidemiol* 2003;**38**:244–8.
7 **Everson SA**, Goldberg DE, Kaplan GA, *et al.* Hopelessness and risk of mortality and incidence of myocardial infarction and cancer. *Psychosom Med* 1996;**58**:113–21.
8 **Kuo W-H**, Gallo JJ, Eaton WW. Hopelessness, depression, substance disorder, and suicidality. A 13-year community-based study. *Soc Psychiatry Psychiatr Epidemiol* 2004;**39**:497–501.
9 **Koivumaa-Honkanen H**, Honkanen R, Viinamäki H, *et al.* Life satisfaction and suicide: a 20-year follow-up study. *Am J Psychiatry* 2001;**158**:433–9.
10 **Haines AP**, Imeson JD, Meade TW. Phobic anxiety and ischaemic heart disease. *BMJ* 1987;**295**:297–9.
11 **Kubzansky LD**, Weiss ST, Sparrow D. Anxiety and coronary heart disease: a synthesis of epidemiological, psychological, and experimental evidence. *Ann Behav Med* 1998;**20**:47–58.
12 **Kawachi I**, Sparrow D, Vokonas PS, *et al.* Symptoms of anxiety and risk of coronary heart disease. *Circulation* 1994;**90**:2225–9.
13 **Hayward C**. Psychiatric illness and cardiovascular disease risk. *Epidemiol Rev* 1995;**17**:129–38.
14 **Glassman AH**, Shapiro PA. Depression and the course of coronary artery disease. *Am J Psychiatry* 1998;**155**:4–11.
15 **Kubzansky LD**, Kawachi I. Going to the heart of matter: do negative emotions cause coronary heart disease? *J Psychosom Res* 2000;**48**:323–37.
16 **Kubzansky LD**, Kawachi I, Spiro A, *et al.* Is worrying bad for your heart? *Circulation* 1997;**95**:818–24.
17 **Statistics Sweden**. *Supplement to appendix 15: technical report regarding 1990–91 and 1992–93 Swedish survey of living conditions.* Stockholm: Statistics Sweden, 1995.
18 **Pratt LA**, Ford DE, Crum RM, *et al.* Depression, psychotropic medication, and risk of myocardial infarction. *Circulation* 1996;**94**:3123–9.
19 **Kiecolt-Glaser JK**, McGuire L, Robles TF, *et al.* Emotions, morbidity, and mortality: new perspectives from psychoneuroimmunology. *Annu Rev Psychol* 2002;**53**:87–107.
20 **Gunnell D**, Rasul F, Stansfeld SA, *et al.* Gender differences in self-reported minor mental disorder and its association with suicide. *Soc Psychiatry Psychiatr Epidemiol* 2002;**37**:457–52.
21 **van Hout HPJ**, Beekman AATF, de Beurs E, *et al.* Anxiety and the risk of death in older men and women. *Br J Psychiatry* 2004;**185**:399–404.
22 **Jylhä M**, Guralnik JM, Ferrucci L, *et al.* Is self-rated health comparable across cultures and genders? *J Gerontol* 1998;**53B**:144–52.
23 **Verbrugge LM**. The twain meet: empirical explanations of sex differences in health and mortality. *J Health Soc Behav* 1989;**30**:282–304.
24 **Macintyre S**, Ford G, Hunt K. Do women 'over-report' morbidity? Men's and women's responses to structured prompting on a standard question on long standing illness. *Soc Sci Med* 1999;**48**:89–98.