

## Generalised anxiety disorder symptoms and utilisation of health care services. A cross-sectional study from the “Northern Finland 1966 Birth Cohort”

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### ABSTRACT

**Objective:** To analyse the utilization of health care services of people who tested positive for GAD compared to those who tested negative. **Setting:** A cross-sectional study from the Northern Finland 1966 Birth Cohort. **Subjects:** A total of 10,282 members followed from birth in a longitudinal study were asked to participate in a follow-up survey at the age of 46. As part of this survey they filled in questionnaires concerning health care utilization and their illness history as well as the GAD-7 screening tool. Altogether 5,480 cohort members responded to the questionnaires. **Main outcome measures:** Number of visits in different health care services among people who tested positive for GAD with the GAD-7 screening tool compared to those who tested negative. **Results:** People who tested positive for GAD had 112% more total health care visits, 74% more total physician visits, 115% more visits to health centres, 133% more health centre physician visits, 160% more visits to secondary care, and 775% more mental health care visits than those who tested negative. **Conclusion:** People with GAD symptoms utilize health care services more than other people.

### KEY POINTS

- Generalised anxiety disorder (GAD) is a common but poorly identified mental health problem in primary care.
- People who tested positive for GAD utilise more health care services than those who tested negative.
- About 58% of people who tested positive for GAD had visited their primary care physician during the past year.
- Only 29% of people who tested positive for GAD had used mental health services during the past year.

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## Introduction

Generalised anxiety disorder (GAD) is the most common anxiety disorder in primary care.[1] It is characterised by excessive anxiety and worry accompanied by physical symptoms from the activation of the sympathetic nervous system.[2] However, patients with GAD only rarely complain about anxiety symptoms directly, which makes detecting these patients challenging.[1,2] Studies in primary care show that general practitioners correctly recognise only about one-third of them.[1,3] Still, GAD significantly impairs the quality of life and functioning of sufferers and entails considerable economic costs to the society.[4]

GAD is fairly common in the society with a current prevalence of 2–3% and lifetime prevalence of 5%.[2] In the Finnish general population, the 12-month prevalence of GAD was 1.3%, according to the Health 2000 study.[5] However, in primary care attenders the prevalence rate is higher than in the general population. In Finland, the prevalence of GAD in general practice has been reported to be 4.1% in men and 7.1% in women.[3] Similarly, an international study in 15 countries showed a one month prevalence of 7.9% in primary care.[6] Moreover, the highest prevalence rates for GAD have been reported among health care high utilisers, the prevalence of GAD rising to 21.8% among distressed health care high utilisers in an American

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study.[7] Similarly, those patients who had five or more primary care physician consultations over the course of a year were 3.95 times more likely to have positive results for GAD in a screening questionnaire in a Canadian study.[8] In a recent study among Finnish health care high utilisers, the prevalence of GAD was 4%.[9]

Earlier studies in a primary care setting have shown that patients with GAD are frequently health care high utilisers.[1,7,8,10–15] In fact, patients with GAD have had approximately double the number of visits to primary care.[10,13,14] Still, there is paucity of studies at population level. The aim of this study was to study different patterns of health care utilisation associated with GAD at population level by using the Northern Finland 1966 Birth Cohort.

## Material and methods

### Study sample

The Northern Finland Birth Cohort 1966 (NFBC 1966) is a longitudinal research programme that was started in 1965 and is still ongoing (<http://www.oulu.fi/nfbc>). The population initially consisted of pregnant women living in the two northernmost provinces of Finland (Oulu and Lapland) with expected dates of delivery between 1 January and 31 December 1966 ( $N = 12,068$  mothers,  $N = 12,231$  children, 96.3% of all births during 1966 in the area). The mothers and their children have been subsequently followed. When the subjects born in 1966 reached the age of 46 years, a large health study, which included questionnaires and clinical examinations, was conducted in 2012–2013. The questionnaires included items about occupational class, smoking, alcohol use, diseases, anxiety, and use of health care services. Body weight and height were measured in the clinical examination and self-reported in the questionnaire. The questionnaires were sent to all cohort members who were alive and whose postal addresses were known at the age of 46 years ( $n = 10,282$ ). In all, 5515 (54%) subjects responded to the used questionnaires and 5480 (53%) of them also gave their permission to link their data to the Finnish Hospital Discharge Register (FHDR). This study was conducted cross-sectionally by using the material from the follow-up survey at the age of 46 years.

The data from NFBC 1966 was also linked to the FHDR for performing a missing value analysis. The FHDR contains diagnosis information from all treatment episodes in Finnish general, mental, military, prison, and private hospitals as well as inpatient wards at health centres. Those NFBC 1966 cohort members

who participated in 46-year follow-up survey had a lifetime hospital-treated mental disorder (ICD-10 codes F10–F34, F40–F42; ICD-9 codes 291–292, 295–298, 300, 303–305) in 7.9% of the cases. Meanwhile, 14.4% ( $p < 0.001$ ) of the cohort members who did not participate in the survey had a hospital-treated mental disorder.

The seven-item generalised anxiety disorder scale (GAD-7) is a brief self-questionnaire developed on the basis of the Diagnostic and Statistical Manual of Mental Disorders, fourth edition (DSM-IV) symptom criteria for GAD.[16] It contains questions on how often a person has been affected by seven different symptoms of anxiety during the past two weeks.[16] The response options are: “not at all”, “several days”, “more than half the days”, and “nearly every day”; and they are scored 0, 1, 2, and 3, respectively.[16] With a cut-off point of 10 or more, it has been shown to be a valid instrument with a sensitivity of 89% and a specificity of 82% for GAD.[16] The Finnish translation of GAD-7 has been validated among a small sample of health care high utilisers obtaining the highest sum of sensitivity (100%) and specificity (83%) by using the cut-off point at  $\geq 7$  points.[9] However, by using the originally recommended cut-off point at  $\geq 10$  points [16] better specificity (95%) was obtained; meanwhile, sensitivity was lower 67%.[9] An international study with a larger sample in the general population also supports the use of the cut-off point  $\geq 10$ .[17] We defined people who had 10 or more points in the GAD-7 questionnaire as screening positive for GAD and in this article we refer to them as test positive.

### Utilisation of health care services

The frequency of visits in the past year to different health care services was assessed by a self-questionnaire. The participants were asked separately about visits to health centres, occupational health care, private health care, dental health care, ambulatory secondary care, mental health clinics (in the Finnish health care system these can be organised either in primary or in secondary care), and psychiatric outpatient clinics (secondary care). They were also asked whether they had visited a physician, nurse, dentist, dental hygienist, psychologist, or physiotherapist. The total use of health services was calculated as a sum of visits to all these services. The use of mental health care services was calculated as a sum of visits to a mental health clinic, a psychiatric outpatient clinic, a psychologist in a health centre and a psychologist in occupational health care.

## Confounders

Smoking status, body mass index (BMI), alcohol consumption, occupational class, self-reported somatic diseases, and hospital-treated mental disorders were used as confounding factors in the analysis, given that in earlier literature all of these have been shown to be associated both with GAD [18,19] and with utilisation of health care services.[20,21]

The subjects were asked about their smoking status at the age of 46 years. Three categories were formed depending on smoking habits: (1) non-smoker, (2) occasional smoker, and (3) current smoker. Height and weight were inquired and measured at the age of 46 years. The values the subjects were requested to provide were used if measurement was not performed. BMI was calculated ( $\text{kg/m}^2$ ) and categorised according to the WHO definition (underweight: BMI <18.5; normal weight: BMI 18.5–25; overweight: BMI 25–30, and obese: BMI >30). Alcohol consumption (wine, cider, beer, and spirits – frequency and amount of consumption) were inquired, mean alcohol grams per day were calculated and categorised in four categories: (1) non-users, (2) light users (men <230 g/week, women <150 g/week), (3) moderate users (men 230–350 g/week, women 150–210 g/week), and (4) heavy users (men >350 g/week, women >210 g/week).[22] Occupational class was inquired and categorised in respect of four classes: (1) higher/lower professionals and entrepreneurs, (2) manual workers, (3) students, pensioners, others, and (4) farmers. Somatic diseases were self-reported in the questionnaire. Lifetime hospital-treated mental disorders were obtained from the FHDR by using the following ICD-10 codes: F10–F34, F40–F42 (except F41.1), and ICD-9 codes: 291–292, 295–298, 300 (except 300.02), 303–305.

## Statistical methods

Continuous variables are presented as means and standard deviations (SDs) and categorical variables are presented as the number and percentage of subjects in each category. For categorical variables, Pearson's Chi-Square test or Fisher's exact test were used to identify any differences in proportions between GAD-7 categories. Wilcoxon rank sum tests (due to lack of normality in many continuous variables) were used to compare continuous variables, i.e. health care utilisation between GAD-7 groups.

To assess the impact of GAD-7, the zero-inflated negative binomial model was applied for health care utilisation as outcome. The zero-inflated negative model is recommended, when modelling data that contain an excessive number of zeros.[23] The

potentially confounding variables – occupational class, BMI, smoking status, alcohol consumptions, number of somatic diseases, and hospital-treated psychiatric disorders were used as adjusting variables in these models. The results were presented as adjusted risk ratios (RRs) and their 95% confidence intervals (CIs).

All analyses were performed using the R software environment, version 3.1.2 (Vienna, Austria), and were conducted separately for men and women. A  $p$  value of <0.05 was considered statistically significant.

## Results

Table 1 presents the demographic characteristics of the study population, which consisted of 5480 people. Forty-three percent of them were men and 57% women.

Of the study population, 198 people (3.6%) had 10 points or more in the GAD-7-questionnaire. Sixty-five (2.8%) men and 133 (4.3%) women had positive test results for GAD. People who tested positive for GAD had statistically significantly ( $p < 0.001$ ) more co-morbid physical conditions (mean 3.9) than people who tested negative (mean 3.0). Also, lifetime hospital-treated mental disorders were more common among people who tested positive for GAD (29%) than among those who tested negative (6%).

Table 2 presents the utilisation of different health care services according to the results of GAD-7. People who tested positive for GAD had a specifically high number of visits to mental health services, with 775% more visits when compared with those who tested negative. However, a statistically significant difference emerged only among women. Only 29% of people who tested positive for GAD had used mental health services, though. Still, this is more than among people who tested negative for GAD (6.9%). The number of people with positive test result for GAD who had utilised mental health services was low, 13 and 41 among men and women, respectively. In addition, the number of visits to any professional at a health centre was 115% higher and in respect of health centre physician visits 133% higher in people who tested positive for GAD. Moreover, 76% of people who tested positive for GAD had visited their health centre and 58% their health centre physician during the past year. Similarly, people who tested positive for GAD had 160% more visits to secondary care than people who tested negative.

Figure 1 presents the risk ratios for utilisation of different health care services after controlling for confounding factors separately for men and women comparing people who tested positive for GAD to people who tested negative. In respect of both men and women, people who tested positive for GAD had a

**Table 1.** Demographic characteristics of the study population.

Variable	All N (% of variable)	GAD-7 < 10 N (% of all)	GAD-7 ≥ 10 N (% of all)	p Value
Gender				0.004
Men	2353 (42.9)	2288 (43.3)	65 (32.8)	
Women	3127 (57.1)	2994 (56.7)	133 (67.2)	
Occupational class				<0.001
Professionals, entrepreneurs	2486 (48.5)	2411 (48.8)	75 (39.3)	
Manual workers	2258 (44.0)	2176 (44.1)	82 (42.9)	
Farmers	100 (2.0)	96 (1.9)	4 (2.1)	
Students, pensioners, others	283 (5.5)	253 (5.1)	30 (15.7)	
BMI <sup>a</sup>				<0.001
Underweight	36 (0.7)	32 (0.6)	4 (2.0)	
Normal	2154 (39.4)	2094 (39.8)	60 (30.5)	
Overweight	2143 (39.2)	2072 (39.3)	71 (36.0)	
Obese	1131 (20.7)	1069 (20.3)	62 (31.5)	
Current smoking status				<0.001
No	4094 (77.0)	3974 (77.6)	120 (61.9)	
Occasional	304 (5.7)	293 (5.7)	11 (5.7)	
Yes	920 (17.3)	857 (16.7)	63 (32.5)	
Alcohol consumption <sup>b</sup>				<0.001
Non-use	527 (9.9)	504 (9.9)	23 (12.0)	
Light use	4293 (80.9)	4169 (81.5)	124 (64.9)	
Moderate use	236 (4.4)	220 (4.3)	16 (8.4)	
Heavy use	251 (4.7)	223 (4.4)	28 (14.7)	
Number of somatic diseases, mean (SD)	3.0 (2.5)	3.0 (2.5)	3.9 (2.6)	<0.001
Hospital-treated mental disorder <sup>c</sup>				<0.001
No	5105 (93.2)	4965 (94.0)	140 (70.7)	
Yes	375 (6.8)	317 (6.0)	58 (29.3)	

<sup>a</sup>underweight: BMI <18.5 kg/m<sup>2</sup>; normal weight: BMI 18.5–25 kg/m<sup>2</sup>; overweight: BMI 25–30 kg/m<sup>2</sup>; and obese: BMI >30 kg/m<sup>2</sup>.

<sup>b</sup>light use: men <230 g/week and women <150 g/week; moderate use: men 230–350 g/week and women 150–210 g/week; heavy use: men >350 g/week and women >210 g/week.

<sup>c</sup>A lifetime treatment episode with recorded ICD-10 or ICD-9 classified diagnosis of a mental disorder (ICD-10:F10–F34, F40–F42, not F41.1; ICD-9: 291–292, 295–298, 300 (not 300.02), 303–305) in a Finnish general, mental, prison, or private hospital or inpatient ward of a local health centre.

**Table 2.** Health care utilisation according to results in GAD-7 questionnaire.

Type of health care utilisation	All mean (SD)	GAD-7 < 10 mean (SD)	GAD-7 ≥ 10 mean (SD)	p Value
Health care visits in total	6.0 (6.8)	5.7 (6.2)	12.1 (14.7)	<0.001
Physician visits in total	3.2 (3.7)	3.1 (3.6)	5.4 (4.7)	<0.001
Health centre visits in total	2.8 (4.6)	2.7 (4.3)	5.8 (9.4)	<0.001
Health centre physician visits	1.0 (1.8)	0.9 (1.7)	2.1 (3.0)	<0.001
Ambulatory secondary care visits	0.5 (1.5)	0.5 (1.5)	1.3 (2.5)	<0.001
Mental health visits	0.5 (3.1)	0.4 (2.3)	3.5 (10.8)	<0.001
Private physician visits	0.5 (1.3)	0.5 (1.2)	0.8 (1.7)	0.046
Dental care visits	1.6 (2.0)	1.6 (2.0)	1.7 (2.1)	0.469

statistically significantly ( $p < 0.05$ ) higher total number of visits to health services, total number of physician visits, total number of health centre visits, and number of health centre physician visits than those who tested negative for GAD. Moreover, women who tested positive for GAD had statistically significantly more ambulatory secondary care visits, mental health visits, and private physician visits than women who tested negative for GAD. On the other hand, there was no statistically significant difference in the utilisation of dental care services in women, or in ambulatory secondary care visits, private physician visits, mental health visits, or dental care visits in men when controlled for confounders.

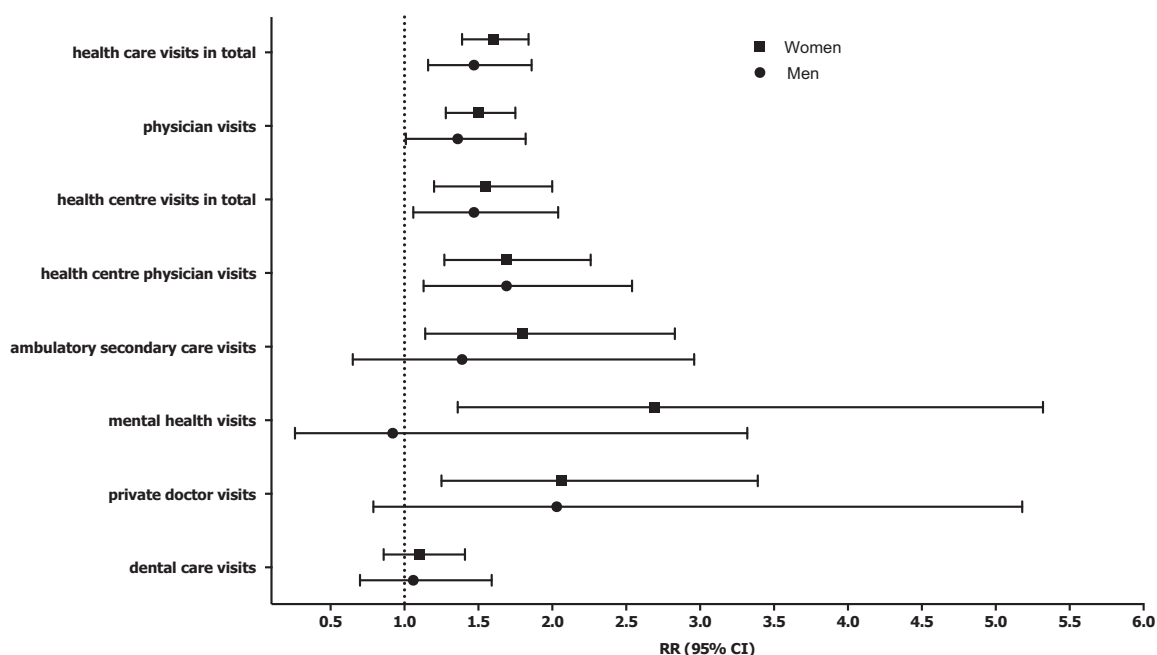
## Discussion

### Statement of principal findings

Our results in the Northern Finland 1966 Birth Cohort approximated by using GAD-7 scale that the prevalence

of GAD symptoms among Finnish middle-aged people was 3.6% in the whole study population, 2.8% among men and 4.3% among women. In general, people who tested positive for GAD had more health care visits during the past year than those who tested negative. This difference was evident as well in total use of health services as in use of primary care services, and among women also in ambulatory secondary care visits, mental health visits, and private physician visits.

When all visits to primary care, secondary care, mental health services, and private services were calculated, people who had tested positive for GAD had 112% more visits than those who tested negative. However, only 29% of people who tested positive for GAD had used mental health services. There was a statistically significant difference in the utilisation of mental health services depending on the results in GAD-7 only among women, though. Correspondingly,



**Figure 1.** Risk ratios for health care utilisation of men and women who tested positive for GAD compared with those who tested negative controlled for possible confounders.

in men only 21% ( $n = 13$ ) had used mental health services. In contrast, 76% of people who tested positive for GAD had used primary health care services, and 58% had visited a physician in primary care during the past year. Furthermore, 45% of people who tested positive for GAD had secondary care visits during the past year.

### **Strengths and weaknesses of the study**

A strength of this study is the large population-based data. Moreover, we used a validated screening tool GAD-7 to determine people with GAD.[9,16,17,24–29] However, the Finnish translation of GAD-7 has been validated only among a selected population of health care high utilisers with a relatively small sample achieving the highest sum of sensitivity and specificity with a cut-off point of  $\geq 7$ . [9] Nevertheless, an international study with a larger sample in the general population supports the use of a cut-off point of  $\geq 10$ , [17] which we used in this study. Moreover, the scale of different utilisation of health care services requested from our study population was large.

A limitation to our study is that the data regarding health care utilisation are based on self-reported data from one year, which makes it prone to recall bias and periodical changes in health care utilisation. Moreover, GAD-7 as a self-report rating scale on one time point provides only a limited approximation of the presence of GAD, but not a definitive clinical diagnosis. The questions in GAD-7 also concern the last two weeks before completing the questionnaire. Meanwhile, enquiries

regarding healthcare utilisation have been made in respect of the past year. Therefore, all who screened positive for GAD have not probably been affected with GAD symptoms the whole time from which health care utilisation was recorded. Also, causal deductions in the association between GAD and health care utilisation cannot be made. Although this study was conducted as part of a longitudinal cohort study, the variables used in the analysis were collected cross-sectionally in the 46-year follow-up survey. The cohort members who participated the follow-up survey were selected regarding psychiatric morbidity as lower share of participants had hospital-treated mental disorders than those who did not participate. Despite the fact that this might have influenced the prevalence of GAD, in our opinion our results concerning health care utilisation are valuable.

### **Comparison with existing literature**

The detected prevalence of GAD symptoms among Finnish middle-aged people was 3.6%, which is higher than that reported in earlier studies. According to the Health-2000 study, the 12-month prevalence of GAD in the Finnish general population was 1.3%. [5] The participants in the Health-2000 Study, however, differed from our study population, who were older than 30 years and covered different age groups. Our study population consisted of people aged between 46 and 47 years at the follow-up study. In the Health-2000 study, the highest prevalence of any anxiety disorder was found in the age group 45–54 years, with an odds ratio of 5.16

compared with people over the age of 65 years.[5] Similarly, in the National Comorbidity Survey Replication in the USA, the lifetime prevalence of GAD was highest in the age group 45–59 years, with a 7.7% prevalence compared with a prevalence of 5.7% in all age groups aged over 18 years.[30] The age group studied explains the detected high prevalence for GAD symptoms.

Our results are in line with earlier findings in primary care settings showing that GAD is associated with higher health care utilisation than people on average.[1,7,8,31] Earlier studies in primary care settings indicated a two-fold number of primary care physician visits [10,13,14] and our results in a general population setting are quite similar.

The use of health services for mental problems has been studied at population level also in the Health 2000 study in Finland.[32] The results on health care utilisation were based on self-report data and showed that 37% of people with GAD had used specialist level services for mental health reasons and 19% only general level services for mental health reasons, whereas 44% did not use health services for mental health problems.[32] Thus, our results based on 29% of people with GAD using mental health services, which corresponds to specialist level services in Health 2000 study, are somewhat lower. Differences in the age of population studied and in diagnostic methods partly explain the difference.[32] Moreover, differences in the availability of psychiatric services in different geographical areas may influence the results. However, earlier results from a German primary care study showed that only 19.8% of patients with GAD and 20.8% of those with co-morbid GAD and major depressive disorder (MDD) were currently receiving treatment.[1] These findings may reflect the poor detection of GAD, as earlier studies indicate that primary care physicians detect only about one-third of cases.[1,3]

An earlier study suggested that higher utilisation of non-mental health care services among patients with an anxiety disorder is explained by greater co-morbid illness but not anxiety symptoms.[33] However, the results in this study showed that people who tested positive for GAD had higher health care utilisation also when controlled for somatic co-morbidities.

### **Implications for clinical practice and future research**

The results of this study highlight the influence of GAD in health care utilisation and, thus the importance of detecting GAD. Especially primary health care has an important role in detection and treatment of GAD in collaboration with secondary health care when

appropriate, as people with GAD had 133% more visits to their primary care physician than other people, and 58% had visited their primary care physician at least once during the past year. Relative differences in health care utilisation were great between people with positive and negative test result for GAD, but differences in figures were rather small. Still, high relative difference at population level has relevance. Of note is also that not all the people with GAD are health care high utilisers (please see review as regarding health care high utilisers [34]). However, it is an issue for further studies to investigate what determines health care utilisation among people with GAD. Also, future research is needed to examine the physical and mental co-morbidities of GAD and how GAD influences their manifestation and prognosis. Future research is also needed to examine how appropriate treatment of GAD affects healthcare utilisation.

### **Conclusions**

People with GAD symptoms used more health care services than other people both in primary and secondary care. The majority of the subjects with GAD symptoms used primary health care services during the past year, but only a small minority used mental health services.

### **Acknowledgements**

The study complied with the principles of the Declaration of Helsinki. The participants took part on a voluntary basis and signed their informed consent. The data were handled on a group level only, the personal information being replaced by identification codes. The Ethics Committee of the Northern Ostrobothnia Hospital District approved the research.

### **Disclosure statement**

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the article.

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