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Consequences of anxiety in older persons: its effect on disability, well-being and use of health services

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ABSTRACT

Background. Although anxiety is quite prevalent in late life, its impact on disability, well-being, and health care utilization of older persons has not been studied. Older persons are a highly relevant age group for studying the consequences of anxiety, since their increasing numbers put an extra strain on already limited health care resources.

Methods. Data of a large community-based random probability sample ($N = 659$) of older subjects (55–85 year) in the Netherlands were used to select three groups: subjects with a diagnosed anxiety disorder, subjects with merely anxiety symptoms and a reference group without anxiety. These groups were compared with regard to their functioning, subjective well-being, and use of health care services, while controlling for potentially confounding variables.

Results. Anxiety was associated with increased disability and diminished well-being. Older persons with a diagnosed anxiety disorder were equally affected in their functioning as those with merely anxiety symptoms. Although use of health services was increased in anxiety sufferers, their use of appropriate care was generally low.

Conclusions. Anxiety has a clear negative impact on the functioning and well-being of older subjects. The similarity of participants with an anxiety disorder and those having merely anxiety symptoms regarding quality of life variables and health care use was quite striking. Finally, in spite of its grave consequences for the quality of life, appropriate care for anxiety is seldom received. Efforts to improve recognition, disseminate effective treatments in primary care, and referring to specialized care may have positive effects on the management of anxiety in late life.

INTRODUCTION

Anxiety disorders appear to be quite prevalent in later life, affecting about 10% of the population (Flint, 1994). The impact of anxiety on the quality of life for older persons is unknown. Community-based studies in samples of mixed age have shown that common mental disorders such as depression and anxiety have grave consequences for everyday functioning, comparable to or even exceeding those of major chronic medical conditions such as diabetes and arthritis (Ormel *et al.* 1994; Hays *et al.* 1995; Sherbourne *et al.* 1996). Furthermore, a body of research on the effects of depression in late life is growing, indicating a significant association between mood disorders and decreased quality of life (Wells *et al.* 1989; Alexpoulos *et al.* 1996; Beekman *et al.* 1997). Furthermore, it has been shown in community samples that anxiety disorders are associated with excess use of health services (e.g. Shapiro *et al.* 1984), but appropriate care is often not provided (Goldberg & Bridges, 1988). Various explanations for this finding have been put forward. First, recognition of anxiety in primary care patients is rather poor

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(Goldberg & Bridges, 1988; Ormel & van den Brink, 1994). Under-recognition may lead to excess use of health services for allegedly somatic problems. This state of affairs may even be exacerbated in older persons, who tend to present their problems as somatic complaints, rather than as a psychiatric problem (Small, 1997). Furthermore, patients' fear of stigmatization may cause under-reporting, and bias of clinicians (ageism or age-related prejudice) causes under-recognition of mental disorders in late life (Small, 1997). Until now, data regarding the consequences of anxiety on the functioning and use of health care of older persons were not available.

Investigation of the impact of anxiety on health care use is only valid if other determinants of health care utilization are controlled for. Andersen & Newman (1973) have proposed a model for determinants of service utilization, which proved useful in previous community-based studies (e.g. Kempen & Stuurmeyer, 1991). They distinguish predisposing, enabling and need-for-care factors. Predisposing factors are background characteristics such as age, sex, level of education, and social functioning; enabling factors refer to resources that facilitate or hinder health care use, such as financial status, medical insurance, and availability of health care; need-for-care factors are the signs and symptoms of disease and disability that can trigger the decision to seek health care. Anxiety is such a factor, but concomitant (medical) problems have to be taken into account as well. In later life the prevalence, severity, and complications of physical illness increases. This in turn may lead to an increase of anxiety in older persons. Furthermore, the increased co-morbidity with physical illness may modify the quality and the consequences of anxiety and may lead to more frequent health service utilization. Therefore, when investigating the consequences of anxiety in later life, physical diseases and the limitations they imply for functioning are highly relevant factors and have to be taken into account as potential confounders.

The present study investigates the impact of anxiety by comparing older persons with either a diagnosed anxiety disorder or merely anxiety symptoms, to a psychologically healthy control group with no anxiety. Our hypothesis was that having an anxiety disorder or anxiety symptoms would be associated with increased disability, diminished well-being and excess use of health care services, even after controlling for co-morbid medical problems and functional limitations.

METHOD

Sample

Data were collected as part of a larger study, the Longitudinal Aging Study Amsterdam (LASA). LASA is a 10 year longitudinal research effort on predictors and consequences of changes in well-being and autonomy in the older population (Deeg *et al.* 1993). A random sample of older persons (aged 55–85) were drawn from population registers in 11 municipalities in three regions of the Netherlands. The sample was stratified on age and sex, number of males and females in different age groups were weighted using projected survival rates to ensure sufficient respondents in the higher age groups at the end of the study. Ten months prior to LASA, the respondents had participated in another study: NESTOR-Living arrangements and Social Networks (NESTOR-LSN). In NESTOR a response rate of 62·3% had been attained. All participants of NESTOR were approached for the LASA baseline, 3107 (81·7%) of them took part in LASA. However, 394 (10·4%) subjects refused to participate, due to lack of interest; 134 (3·5%) were unable to participate due to illness or cognitive impairment; 126 (3·3%) had died, and 44 (1·2%) subjects could not be contacted. Attrition appeared to be related to age, but not to sex (Smith & de Vries, 1994). Due to item non-response on the screening instrument a further 51 subjects were lost, leaving a baseline sample of $N = 3056$.

Subjects with anxiety disorders were identified using a two-stage screening design (cf. Wilkinson *et al.* 1988). At the time of designing the study no screening instrument for anxiety was available with demonstrated validity for use in a community-based study. Therefore, the Center for Epidemiological Studies Depression scale (CES-D, Radloff, 1977) was used as screening instrument, utilizing the generally recommended cut-off score of $\geqslant 16$. The CES-D was found to be a good screener for anxiety by Breslau (1985).

Thus, 386 screen positive subjects and a non-selective subsample of 380 screen negative subjects were selected for the second stage, which involved a diagnostic interview, held 2 to 8 weeks after the first LASA assessment. Response here was 86·0% and attrition was again related to age, but not to sex, leaving 332 screen positives and 327 screen negatives, who were interviewed.

Informed consent was obtained from all subjects who participated in the study. Subjects were interviewed in their homes by well trained and intensively supervised interviewers. Different group of interviewers were trained for the baseline and diagnostic interviews, respectively, ensuring that screening and diagnosis of anxiety was not conducted by the same interviewer. Interviewers worked with laptop computers, programmed to streamline the interview. All interviews were tape-recorded for supervision and quality control purposes.

Measures

Anxiety

Anxiety disorders were defined according to DSM-III criteria and assessed by means of the Diagnostic Interview Schedule (DIS; Robins *et al.* 1981). In this study four anxiety disorders were assessed: phobic disorders, panic disorder, generalized anxiety disorder and obsessive–compulsive disorder. Due to non-response in the recency section of the DIS, 19 subjects with an anxiety disorder were lost to the analysis. The group with an anxiety diagnosis consisted of 82 respondents.

Subsyndromal anxiety was defined as clinically relevant anxiety symptoms but not fulfilling diagnostic criteria for anxiety disorder according to the DIS. The anxiety subscale of the Hospital Anxiety and Depression Scale (HADS-A, Zigmond & Snaith, 1983) was used to measure anxiety symptoms. Since no threshold score for the Dutch version of the HADS-A was available to delineate clinical anxiety, we chose as cut-off a score halfway between the mean score for the entire sample ($N = 3056$) and the mean score of subjects with an anxiety disorder (adjusted for variance in scores of both groups). The cut-off point was a score between 3 and 4. This resulted in 189 subjects with anxiety symptoms but no anxiety disorder. Finally, the reference group of healthy controls consisted of 325 respondents who did not meet the above criteria.

As was noted before, depression is clearly associated with decreased well-being and increased health care use (Beekman *et al.* 1997). Anxiety and depression are also likely to co-occur in the sample. To avoid a confounding effect of co-morbid depression on the outcome variables, subjects meeting diagnostic criteria for major depression in the past 6 months were excluded from the three groups.

Potentially confounding variables

Physical problems were assessed in an interview using a detailed questionnaire on chronic physical diseases (Kriegsman *et al.* 1996). The questionnaire asks for specific information regarding presence, duration, principal symptoms, complications and treatment of: lung diseases (asthma, bronchitis and pulmonary emphysema), cardiac diseases, artherosclerotic diseases of the abdominal aorta and the arteries of the lower limbs, stroke (excluding transient ischaemic attacks), diabetes mellitus, malignant neoplasms, osteoarthritis and rheumatoid arthritis. Other chronic diseases were assessed in less detail. The validity of the instrument was supported in a previous study by cross-checking responses with respondents' general practitioners (Kriegsman *et al.* 1996).

Functional limitations (restrictions in performing basic physical and mental actions used in daily life) are to be distinguished from disability, in that they refer to personal capabilities, whereas disability refers to actual behaviour, evaluated relative to environmental demands. Disability can also be described as the gap between personal capabilities on the one hand and personal standards or environmental demands on the other (Verbrugge & Jette, 1994). Therefore, functional limitations were considered to be a potential confounder, to be distinguished from disability, one of the outcome variables. Functional limitations were measured using a previously validated instrument (OECD Questionnaire; van Sonsbeek, 1988).

Social resources were assessed by estimating the size of the social network. Respondents were asked to name people they socialized with regularly and who they deemed important to them in various domains (neighbours, work, church, etc.) The validity of the network size

index was supported in a previous study (van Tilburg *et al*. 1992). Finally, cognitive functioning was assessed by the Mini-Mental State Exam (Folstein *et al*. 1975).

Disability and well-being

Disability was assessed by various indices. Regarding general functioning, disability was operationalised by the number of bed-days and by the number of days when activities were limited due to health problems (Anderson *et al*. 1990). The impact of mental disorders in younger patients is usually measured by its interference with working ability. However, for retired persons this is an unsuitable variable and the adequacy of functioning was assessed in two other areas: physical activities (light and heavy household work, going for walks, cycling, and sports) and social activities (being involved in an association, recreational outings, visits to pubs, restaurants, museums, etc.). For all activities it was assessed whether the subject had engaged in the activity or not and scores were summed and recorded, a higher score indicating more disability regarding specific activities.

Measures of well-being included a rating of self-reported loneliness on an 11-point scale (1 = not lonely to 11 = very lonely; (de Jong-Gierveld & Kamphuis, 1985); a rating of self-perceived health on a 5-point scale (1 = excellent to 5 = poor; CBS, 1989) and a rating of general satisfaction with life on a 5-point scale (1 = very dissatisfied to 5 = very satisfied; CBS, 1989). The last rating was obtained from a set of self-report questionnaires that were completed after the interview and were mailed in by the respondent. Due to non-response the number of subjects for this variable was smaller ($N = 475$).

Health care service utilization

Subjects were interviewed about recent visits to physicians (general practitioner, medical specialist, psychiatrist), to community health services, to paramedical services (social work, home nursing), to formal social support (home help) and hospital admissions. Furthermore, subjects were interviewed about medication use, and their report was ascertained (the interviewer inspected bottles of currently used prescriptions at the home visit). Finally, subjects' evaluation of services provided was included as a subjective measure of satisfaction with health services.

Statistical analysis

Disability, well-being and the use of health care were compared in the three groups with analysis of variance or non-parametric alternatives. The impact of anxiety (subsyndromal or a diagnosed disorder) on quality of life variables and health care use was expressed in odds ratios. Therefore, disability and well-being variables were dichotomized. To control for the influence of demographic variables, and other potentially confounding variables on the outcome variables, a series of logistic regression analyses were performed in which the demographic variables were entered first as predictors, followed by the covariates and finally anxiety. Adjusted odds ratios provide an index of strength of the association between anxiety and outcome variables reflecting disability, well-being and use of health care, while controlling for differences in demographic variables and covariates.

Due to the imperfect sensitivity of the CES-D for anxiety, the two-stage sampling design implies that screen negative subjects had a lower chance of being included in the diagnostic sample. In the baseline sample 14·9% was screen positive, whereas the diagnostic sample was deliberately composed to include 50% screen positives. To correct for this sampling bias, one can assign different weights to cases. However, this has negative consequences for the accuracy of statistical tests and confidence intervals for odds ratios. Therefore, the following procedure was chosen. First, analysis were performed without weighting cases and these results are presented in the tables. Next, all analyses were repeated while weighting cases (a weight of 1·71 to screen negative cases and 0·30 to screen positive cases).

To investigate the influence of co-morbid depression, the analyses were repeated once again, now including in the two anxiety groups the subjects with a co-morbid major depression, who had been excluded in all previous analyses. Twenty-four subjects were added to the anxiety disorder group and 30 subjects to the anxiety symptoms group. Whenever the various analyses lead to disparate conclusions, this is reported.

Generally, the statistical significance of tests is expressed by their exact P levels. When results are presented merely as statistically significant, $P < 0{\cdot}05$ was used.

RESULTS

Based on the prevalence in the study sample, the 6-month prevalence of anxiety disorders in the entire baseline sample was estimated as 10·2% (Beekman *et al*. 1998) and a major depressive episode was present in 2·0% of the baseline sample (Beekman *et al*. 1995). Anxiety and depression were associated in the sample, both at the syndromal level ($\chi^2(1) = 44{\cdot}98$; $P < 0{\cdot}001$), and according to a significant correlation between self-reported symptom scores on the CES-D and HADS-A (Pearson's $r = 0{\cdot}75$; $P < 0{\cdot}001$). Furthermore, 26% of subjects with an anxiety disorder also met criteria for major depression and 25% of depressed subjects also had an anxiety disorder (Beekman *et al*. 1998).

The three study groups were compared on demographic and descriptive variables (see Table 1). There was no difference in age between the groups. Women are somewhat over-represented in the anxiety groups, as are inhabitants of Amsterdam. Finally, the anxiety disorder group is less educated and less frequently married. Not surprisingly, the reference group appears to be the most healthy of the three groups. In comparison to both the anxiety disorder group and the anxiety symptom group, the reference group reported fewer functional limitations and fewer chronic physical diseases, which suggests a possible association of anxiety with chronic diseases and functional limitations, but also underlines the relevance of controlling for the effect of these variables on the outcome variables of the study.

Consequences of anxiety on disability and well-being

The impact of anxiety on functioning in various areas was first investigated by comparing the three study groups with analysis of variance. On all variables significant differences between groups were found, except for social activities. As can be seen in Table 2, *post hoc* pairwise comparisons revealed that usually both anxiety groups differed from the reference group, an effect most pronounced on well-being variables. There was one exception: subjects with an anxiety disorder did not report more bed-days than controls. There was no significant difference

Table 1. *Demographic characteristics and other descriptive variables for subjects with an anxiety disorder* (N = 82), *subjects with anxiety symptoms* (N = 189) *and a reference group of normal controls* (N = 325)

	Anxiety					
	Disorder Mean (S.D.)	Symptoms Mean (S.D.)	Normal controls Mean (S.D.)	$F(2, 592)$	P	*Post hoc* analyses*
Age	72·4 (9·0)	70·7 (9·2)	71·1 (8·6)	1·15	NS	
Hads-A	7·1 (4·6)	7·3 (3·2)	1·0 (1·1)	396·04	0·0001	3 < 1, 3 < 2
Ces-D†	19·7 (9·1)	18·9 (7·9)	7·7 (7·6)	155·24	0·0001	3 < 1, 3 < 2
Functional limit.	2·8 (2·8)	2·0 (2·5)	1·6 (2·6)	7·59	0·001	1 > 2, 1 > 3
Chronic diseases	1·7 (1·4)	1·4 (1·1)	1·1 (1·1)	10·47	0·0001	3 < 1, 3 < 2
	%	%	%	$\chi^2(2)$	P	
Sex						
Male	35	39	49	7·88	0·02	
Female	65	61	51			
Urbanization						
Amsterdam	40	40	26	13·95	0·001	
Elsewhere	60	60	74			
Education						
Low	63	44	39	15·74	0·001	
Middle/High	37	56	61			
Partner						
Yes	42	53	57	6·04	0·05	
No	58	47	43			

* Pairwise comparisons; difference significant at $P < 0{\cdot}05$; 1 = anxiety disorder, 2 = anxiety symptoms, 3 = normal controls.
† Patients meeting criteria for major depression are removed from the sample.

Table 2. *Results of analysis of variance comparing subjects with an anxiety disorder, subjects with anxiety symptoms, and normal controls*

	Anxiety		Normal controls			
	Disorder Mean (S.D.)	Symptoms Mean (S.D.)	Mean (S.D.)	$F(2, 592)$	P	*Post hoc* analyses*
General functioning						
Bed-days	1·2 (0·7)	1·4 (0·9)	1·1 (0·6)	8·38	0·0001	3 < 2
Activities limited due to health	1·7 (1·3)	1·7 (1·3)	1·2 (0·7)	16·90	0·0001	3 < 1, 3 < 2
Specific activities						
Physical activities	2·1 (1·4)	1·9 (1·3)	1·5 (1·3)	11·30	0·0001	3 < 1, 3 < 2
Social activities	3·1 (1·9)	3·2 (1·6)	2·8 (1·6)	2·54	NS	
Well-being						
Loneliness	4·3 (3·4)	4·1 (3·3)	1·9 (2·3)	47·30	0·0001	3 < 1, 3 < 2
Satisfied†	3·6 (0·8)	3·6 (0·7)	4·0 (0·6)	23·28	0·0001	3 > 1, 3 > 2
Perceived health	3·1 (1·1)	2·9 (1·0)	2·4 (0·9)	27·23	0·0001	3 < 1, 3 < 2

* Pairwise comparisons; difference significant at $P < 0·05$; 1 = anxiety disorder, 2 = anxiety symptoms, 3 = normal controls.

† Questionnaire data on satisfaction with life were only available for a subset of respondents $N = 66$, $N = 150$, $N = 259$ for anxiety disorder, anxiety symptoms, and the reference group, respectively. Non-responders were equally distributed among the three groups (19%, 21% and 20% for the three groups).

Table 3. *Disability and well-being: odds ratios for bivariate associations with anxiety disorders and anxiety symptoms*

	Unadjusted				Adjusted†			
	Disorder		Symptoms		Disorder		Symptoms	
	OR*	Conf.	OR*	Conf.	OR*	Conf.	OR*	Conf.
General functioning								
Bed-days	1·8	0·8–4·1	**3·6**	1·7–6·3	1·2	0·8–2·0	**3·2**	1·7–6·0
Activities limited due to health	**3·0**	1·7–5·5	**3·4**	2·1–5·5	**1·6**	1·2–2·3	**3·2**	1·9–5·3
Limited in specific activities								
Physical activities	**3·2**	1·9–5·5	**2·0**	1·4–2·7	**1·7**	1·2–2·4	**1·7**	1·1–2·6
Social activities	1·5	0·9–2·5	1·4	1·0–2·0	1·2	0·9–1·7	1·2	0·8–1·9
Well-being								
Loneliness	**2·7**	1·6–4·5	**3·2**	2·1–4·7	**1·7**	1·3–2·4	**3·9**	2·4–6·1
Satisfied with life	**3·6**	1·9–6·8	**3·5**	2·1–5·8	**1·9**	1·3–2·7	**4·3**	2·3–8·0
Perceived health	**3·8**	2·3–6·4	**2·6**	1·8–3·8	**1·7**	1·2–2·4	**2·1**	1·3–3·4

* An odds ratio with a confidence interval that does not include 1·00 is statistically significant ($P < 0·05$).

† Adjusted for age, sex, marital status, education, urbanisation, chronic diseases, functional limitations, social network size, and cognitive functioning.

Significant odds ratios are displayed in bold typeface.

Variables were dichotomized as follows: Bed-days (0 *v.* 1 or more); Days when activities were limited due to health (0 *v.* 1 or more); Physical activities (1 *v.* more); Social activities (1 or 2 *v.* more); Loneliness (0–1 *v.* 2–11); Satisfied with life (dissatisfied) *v.* satisfied or very satisfied); Perceived health (excellent or good *v.* fair or poor).

between the two anxiety groups on any variable (all $P > 0·12$) and the mean scores for both anxiety groups also suggest that they did not differ among each other. Apparently, anxiety disorders and anxiety symptoms have an equal impact on functioning and well-being.

Table 3 presents the data in a different way by providing odds ratios for the association between group membership (anxiety disorders *v.* normals and anxiety symptoms *v.* normals) and variables for disability and well-being. The unadjusted associations suggest that having an anxiety disorder is associated with a increased chance for disability (ORs = 1·5–3·2) and a decreased chance of well-being (ORs = 2·7–3·8). The impact of anxiety symptoms was equally adverse.

Table 4. *Percentage of subjects using health care services*

	Anxiety		Normal controls	$\chi^2(2)$	*P*
	Disorder	Symptoms			
Contacts					
General practitioner	88·5	82·0	74·2	9·38	0·009
Medical specialist	63·6	62·0	47·8	12·59	0·002
Psychiatrist	2·6	2·7	1·0	*	
Social worker	2·5	3·3	1·3	*	
Community MH Center	3·8	1·7	2·2	*	
Home nursing	10·1	5·5	2·8	7·59	0·019
Home help	15·2	9·9	8·2	3·54	NS
Hospital admission	11·8	14·5	9·8	2·46	NS
Current use of medication					
Any medication	87·3	81·0	70·1	14·15	0·001
Benzodiazepines	25·3	21·2	10·3	16·80	0·0001
Antidepressants	3·8	3·3	0·9	*	
Subjective evaluation					
Insufficient help	20·5	14·1	4·3	24·22	0·0001

* Cells with $N < 5$ preclude statistical testing.
'Insufficient help' was dichotomized as follows: (very) sufficient *v*. insufficient.

When looking at specific activities, it appears that activities requiring physical exercise (going for walks, engaging in sports) are affected by anxiety, but not social activities (recreational outings, being involved in associations).

Next, it was investigated whether the association between anxiety and diminished well-being and disability still holds after controlling for covariates. As a first step, the association between covariates and anxiety was investigated using anxiety as dependent variable in a logistic regression analysis. Demographic variables appeared unrelated to anxiety with the exception of sex and urbanization: female subjects and subjects living in Amsterdam had higher chance for anxiety symptoms (OR = 1·5 and 2·0, respectively). Furthermore, chronic diseases were significantly associated with diagnosed anxiety disorders (OR = 1·4) and with anxiety symptoms (OR = 1·3). Secondly, the data were analysed with multiple logistic regression analyses, each time using a variable reflecting disability and well-being as the dependent variable and entering demographic variables, cognitive functioning, number of chronic diseases, functional limitations, social network size and, finally, anxiety as predictors. The variables most consistently associated with disability were chronic diseases and functional limitations. The adjusted odds ratios from the multivariate analyses are given in Table 4. They show that, after controlling for potentially confounding variables, the associations between anxiety and most indices of disability were still significant. The same holds for the associations between anxiety and well-being. Apparently, the impact of anxiety on disability and well-being is not to be explained through the effect of the covariates.

Health care service utilization

Table 4 and Table 5 present results from the analysis pertaining to health-care service utilization by older persons with and without anxiety. The low rate of specialized psychological/psychiatric care depicted in Table 4 is striking (and precludes statistical testing for differences between groups). Also, use of antidepressant medication, the modern alternative for benzodiazepines in the treatment of anxiety, is low. In contrast, benzodiazepine use is high and significantly elevated in the groups with anxiety: one out of every four subjects with an anxiety disorder and one out of every five with anxiety symptoms uses a benzodiazepine, *v*. one out of 10 in the control group. After weighting cases still 21·8% of anxiety disordered subjects and 18·2% of subjects with anxiety symptoms are benzodiazepine users. Overall, as Table 5 shows, health care use of anxiety sufferers is substantially elevated in comparison to healthy controls. Demographic variables were also related to health care use. A significant relation was found for age with psychological or psychiatric care and for age with benzodiazepine

Table 5. *Odds ratios for service utilization during the past 6 months*

		Unadjusted				Adjusted†			
		Disorder		Symptoms		Disorder		Symptoms	
	%	OR*	Conf.	OR*	Conf.	OR*	Conf.	OR*	Conf.
Contacts									
General practitioner	78·6	**2·7**	1·3–5·6	**1·5**	1·1–2·5	**1·5**	1·1–2·4	1·3	0·8–2·2
Medical specialist	54·5	**1·9**	1·1–3·2	**1·8**	1·2–2·6	1·3	1·0–1·7	**1·6**	1·1–2·4
Psychol/psychiat help‡	5·4	2·4	0·9–6·4	1·9	0·9–4·3	1·8	1·0–3·3	1·7	0·7–4·2
Home nursing	4·7	**3·9**	1·4–10·3	2·0	0·8–5·0	**2·2**	1·1–4·3	3·1	0·9–11·0
Home help	9·7	2·0	1·0–4·2	1·2	0·7–2·3	1·2	0·7–1·9	1·3	0·6–2·8
Hospital admission	11·6	1·2	0·6–2·7	1·6	0·9–2·7	0·9	0·6–1·4	1·4	0·8–2·6
Current use of medication									
Any medication	75·9	**2·9**	1·5–6·0	**1·8**	1·2–2·8	1·3	0·9–1·9	1·3	0·8–2·2
Benzodiazepines	15·8	**3·0**	1·6–5·5	**2·4**	1·4–3·9	**1·5**	1·1–2·1	**2·3**	1·3–4·0
Antidepressants	2·1	4·2	0·8–21·1	3·6	0·9–14·5	2·1	0·9–5·2	2·3	0·5–10·2
Subjective evaluation									
Insufficient help	9·6	**5·7**	2·6–12·6	**3·6**	1·8–7·3	**2·2**	1·3–3·6	**3·0**	1·4–6·7

* An odds ratio with a confidence interval that does not include 1·00 is statistically significant ($P < 0·05$).

† Adjusted for age, sex, marital status, education, urbanization, chronic diseases, functional limitations, social network size, and cognitive functioning.

‡ Includes visits to a psychiatrist (1·8%), social worker (2·6%), and community mental health centre (2·0%).

Significant odds ratios are displayed in bold typeface.

use (younger subjects using psychological/psychiatric care more frequently and using less benzodiazepines). However, according to a additional series of hierarchical logit analyses, there was no significant interaction between age, anxiety and health care use, indicating that the elevating effect of anxiety on health care use was similar in all three age groups.

Of course, health care use was also associated with chronic diseases and functional limitations. After controlling for these variables the association between health care use and anxiety disorder diagnosis was no longer significant for most variables. Benzodiazepine use of the groups with anxiety, however, was still significantly elevated after controlling for covariates.

Additional analyses

All previous analyses were repeated while differentially weighting cases, to correct for sampling bias due to the imperfect sensitivity of the CES-D for anxiety. Overall, the analyses yield the same pattern of results: a substantial increase of disability, diminished well-being and increased use of health care facilities among subjects with an anxiety disorder and subjects with anxiety symptoms.

Subjects with a co-morbid major depression were excluded in the previous analyses, since our main was to assess the impact of pure anxiety. However, since co-morbidity between anxiety and depression is quite high and, according to some, elevated in later life (cf. Salzman & Lebowitz, 1991), one might argue that the sample is no longer representative for all older subjects with anxiety. To accommodate such criticism we included subjects with co-morbid depression and reanalysed the data. As expected, this had a worsening impact on consequences resulting in bivariate odds ratios for 'bed-days' of OR = 2·0 (adjusted 1·4) (was 1·8 and 1·2), for 'activities limited due to health' OR = 3·3 (adjusted 1·8) (was 3·0 and 1·6), for satisfaction with life OR = 4·0 (adjusted 2·0) (was 3·6 and 1·9), for benzodiazepine use OR = 3·5 (adjusted 1·8) (was 3·0 and 1·5). All these ORs are significant at $P < 0·05$. Inclusion of depressed subjects in the anxiety symptoms groups had an even larger effect on the odds ratios for disability, well-being and health care utilization.

DISCUSSION

The present results replicate findings from studies with younger subjects, demonstrating increased disability and impaired well-being for older individuals who suffer from anxiety. Since we were interested in the impact of anxiety, subjects with co-morbid depression were excluded from the initial analyses. In the present

sample 25% of the subjects with an anxiety disorder also suffered from major depression. Additional analyses revealed a more severe impact of the psychopathology on disability, well-being and health care utilization, when comorbid cases were included. The selection of only pure anxiety disorders or symptoms has apparently resulted in conservative estimates of the impact of anxiety on our outcome variables.

Disability and well-being

Bivariate analyses showed that anxiety was negatively associated with various indices of functioning and subjective well-being. Logistic regression analyses revealed that chronic diseases and functional limitations were also associated with disability and well-being. Controlling for these covariates had only a minor diminishing effect on the associations between anxiety and disability and well-being. Inclusion of depressed subjects led to a further decrease in well-being and increased disability. This implies that older persons who suffer from anxiety and depression, who have one or more chronic diseases, and experience functional limitations, are in the worst state regarding disability and well-being.

Service utilization

Regarding health care utilization, the bivariate analyses revealed that anxiety is associated with a significant increase in health care use. Controlling for demographic variables such as age, sex, education, or urbanization did not alter these results. Not surprisingly, health care use is associated with chronic diseases and functional limitations as well. Controlling for these variables diminishes the effect of anxiety somewhat, but the use of medication by anxious subjects is still increased. The odds ratios for many services utilization variables indicate increased use, but fail to reach statistical significance, due to the overall low rate of usage (e.g. psychological of psychiatric help or use of antidepressants).

The results show that subjects with an anxiety disorder or with anxiety symptoms had an increased chance of visiting their GP and actually most were seen by their GP in the 6 months prior to the interview. Nevertheless, specific care for anxiety (as apparent from contact with a mental health care provider or antidepressant medication) is relatively rare. Most subjects are using benzodiazepines instead. This is unfortunate, as benzodiazepines may cause additional problems, especially in later life, such as dizziness and cognitive impairment (Solomon *et al*. 1993). Furthermore, older subjects appear to be at greater risk for abuse of benzodiazepines compared with younger adults (Miller *et al*. 1991).

Notably few anxiety sufferers find the way to specialized care. From the 82 subjects with an anxiety disorder, only 7 (9%) had contact with a psychiatrist, clinical psychologist, or social worker in the 6 months preceding the interview. For subjects with anxiety symptoms this figure was 13 (7%). For a proper interpretation of the findings regarding health care utilization, some peculiarities of the health care system in the Netherlands should be explained. In the Netherlands, there are few financial constraints limiting the use of health services. Neither is specialized care limited to urban centres: the services under study are generally available throughout the country. This may explain why demographic variables (predisposing and enabling factors in the model of Anderson & Newman, 1973) had little influence on health care use in our sample. Furthermore, a referral from a GP is required for most of the services listed in Table 4 and 5. The findings suggest that GPs do not diagnose a substantial number of cases. Indeed, under-recognition of anxiety and depression by GPs was demonstrated in a study in the Netherlands (Ormel & van den Brink, 1994). A highly relevant issue for further study is which factors contribute to recognition by GPs (e.g. severity, kind of anxiety disorder, comorbidity). Also, GPs may tend to treat anxious patients themselves, predominantly with benzodiazepines. This may not be to the satisfaction of their patients, since the data show that dissatisfied respondents come mainly from the ranks of anxiety sufferers.

Limitations of the study

Some limitations of the present findings should be mentioned. First, conclusions regarding the findings are somewhat limited due to the cross-sectional character of the data. Only associations can be reported on and definite conclusions regarding causal relationships among the variables are precluded. Generalization of the findings is further limited by non-response.

Attrition was substantial in the present study, largely due to oversampling of the older old. Our sampling procedure led to the intended good representation of this age group, but has also resulted in considerable non-response, which was related to age but not sex of the respondents. Older old were more likely to drop out due to health problems, cognitive problems and mortality. Thus, the sample may underrepresent the most frail subjects and generalization of our findings to this section of the population is limited. However, for the purpose of the present study, aimed at investigating the associations between variables, good representation on all variables is far more important than the absolute attrition rate. Finally, it should be noted that, regarding our hypothesis, an overly healthy sample would have likely resulted in too conservative an estimate, rather than an exaggeration of the impact of anxiety on quality of life and use of health care services.

Anxiety disorders *v.* anxiety symptoms

Overall, in terms of the consequences of anxiety on disability and well-being, no difference was found between the group with anxiety symptoms and the group with one or more formally diagnosed anxiety disorders. Apparently, it does not seem to matter whether or not the anxiety level warrants a diagnosis of anxiety for its adverse consequences on quality of life. Similarity of the two groups is also apparent from the demographic and other descriptive variables: on measures for anxiety and depression both groups scored quite similarly, but they differed from the reference group. Finally, the medical consumption of both anxiety groups was quite similar. It is somewhat surprising that having merely anxiety symptoms, as opposed to a diagnosed anxiety disorder, has equally grave consequences. Two possible explanations for this result come to mind. First, anxiety disorders were diagnosed by lay interviewers, using the DIS. Although the DIS is a reliable and valid instrument, especially designed for use by assessors with limited experience in making psychiatric diagnoses, it may still be overinclusive, assigning diagnoses to cases who actually suffer from subsyndromal anxiety. This would have caused our anxiety disorder group to be impure. Alternatively, the lack of a difference between the two anxiety groups raises the question where the DSM criteria are appropriate for older subjects (see also Salzman & Lebowitz, 1991). The diagnostic criteria may be too strict, singling out a group of patients who do not differ from subjects with anxiety symptoms in terms of suffering and health care utilization. Put differently, the diagnostic conventions of the DSM may not reflect very well the distinction between syndromal and subsyndromal anxiety in older persons. For depression, similar findings have been reported with the distinction between minor (subsyndromal) and major depression. Both in mixed age samples (Judd *et al.* 1996) as well as in older persons (Beekman *et al.* 1997), the consequences of minor and major depression are quite similar, raising doubt on the boundaries for the diagnosis of major depression. The present data cannot reveal which explanation is correct, thus the issue warrants further study.

Conclusion

The present findings suggest that better management of anxiety in later life is called for, even if rigorous criteria for an anxiety disorder have not been met. Apparently, even in the absence of a formal diagnosis, anxiety causes considerable suffering and has a diminishing effect on the quality of life. The provision of appropriate treatment will improve psychological adjustment for those involved, but may serve an economic objective as well, in particular for older persons. Mumford and colleagues (1984) found that adults over 55 years of age had a greater reduction in medical service utilization after mental health treatment than younger adults. Thus, delivering appropriate treatment can be highly cost-effective, as it may lead to a significant reduction of medical consumption, especially among older persons.

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