Published in final edited form as:
Am J Geriatr Psychiatry. 2009 June ; 17(6): 473–482.

The Burden of Late-Life Generalized Anxiety Disorder: Effects on Disability, Health-Related Quality of Life, and Healthcare Utilization

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Abstract

Objective—To describe the burden of Generalized Anxiety Disorder (GAD), a common anxiety disorder in older adults.

Design—Cross-sectional.

Setting—Late-life depression and anxiety research clinic in Pittsburgh, PA.

Participants—One hundred sixty-four older adults with GAD and 42 healthy comparison participants with no lifetime history of psychiatric disorder were recruited from primary care and mental health settings as well as advertisements.

Measurements—Participants were evaluated with the Late Life Function and Disability Index to assess disability, the MOS 36-Item Short Form Survey Instrument to assess health-related quality of life (HRQOL), and the Cornell Service Index to assess healthcare utilization.

Results—Older adults with GAD were more disabled, had worse HRQOL, and had greater healthcare utilization, than nonanxious comparison participants, even in the absence of psychiatric comorbidity. After controlling for medical burden and depressive symptoms, higher severity of anxiety symptoms was associated with greater disability and poorer HRQOL in several domains. The greatest decrements in HRQOL and function were observed in measures assessing role functioning, including social function.

Conclusion—This study, the largest ever of GAD in older adults, provides evidence of the significant burden of this disorder in late life. Given the high prevalence and chronicity of GAD in the elderly, these data provide a public health imperative for finding and implementing effective management strategies for this typically undiagnosed and untreated disorder.

Keywords

Generalized anxiety disorder; older adults; health-related quality of life; disability; burden

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Generalized anxiety disorder (GAD) is the most common anxiety disorder in late life, with point prevalence rates in the community as high as 7.3%.[1] Late-life GAD is also common in primary care and other medical settings,[2] where older adults with anxiety disorders are more likely to present than in specialty mental health settings.[3] For instance, one study found the prevalence of GAD to be 11.2% in a sample of older primary care patients.[4] GAD is a chronic disorder that is unlikely to remit without treatment[5]; treatment-seeking older adults with GAD report symptom duration of 20 years or more before presenting for treatment.[6–8] Regardless of setting, late-life GAD is typically undiagnosed and inadequately treated.[9,10]

Data in younger adults suggest that individuals with GAD have greater disability, experience poorer quality of life, and use more healthcare services compared with individuals without psychiatric disorder.[11,12] However, many individuals with GAD have at least one comorbid psychiatric diagnosis, most commonly major depressive disorder (MDD),[13–15] which has led researchers to debate whether the impairment in individuals with GAD is attributable primarily to comorbid psychiatric disorders.[16,17,13] Studies with younger adults suggest that that individuals with GAD only (i.e., without current comorbid psychiatric disorders) do suffer greater functional and economic burden compared with individuals without psychiatric disorder.[18] However, some controversy remains about the unique impact of GAD on these outcomes, particularly in older adults, in whom comorbid MDD is highly prevalent.[1] Older adults also have comorbid medical illness and changes in socioemotional functioning in late life, which make it more difficult to disentangle the relationship between GAD and its functional consequences.[19,20]

Several studies to date have investigated quality of life in late-life GAD.[7,20–23] All found that GAD participants had significantly lower quality of life than healthy comparison samples. However, only one study compared older adults with and without current psychiatric comorbidity.[20] That investigation, which was described by the authors as “preliminary” due to the limitations of its small sample size, found no difference in health-related quality of life (HRQOL) between participants with “comorbid” GAD (which was defined as having at least one other comorbid psychiatric disorder) and GAD alone (defined as having GAD with no other comorbid psychiatric disorders). Furthermore, little research with older adults has addressed the effect of GAD on disability or healthcare utilization. Anxiety symptoms have been reported to be associated with more disability and healthcare usage among older adults,[24] yet only one small study of primary care patients has examined the specific effect of GAD on healthcare utilization, and found no difference between individuals with GAD and those without, excluding differences in psychotropic medication use.[22] No prior research with older adults has addressed the effect of GAD on disability.

Given the high prevalence and public health significance of late-life GAD, it is important to replicate previous findings on the burden of this disorder in a larger sample. Further, a larger sample size will permit better examination of comorbidity issues, which have been explored only minimally in samples of older adults in the past. The purpose of the current study was to examine the burden of late-life GAD, in terms of disability, HRQOL and health service utilization, in a large treatment-seeking sample. We hypothesized that older adults with GAD without comorbid psychiatric diagnoses would report lower HRQOL, greater disability and increased heath service use compared with a healthy older adult comparison group. In addition, we expected that individuals with GAD and comorbid psychiatric illnesses would have lower HRQOL, more severe disability, and greater health service utilization compared with GAD without psychiatric comorbidity. For all older adults with GAD, we hypothesized that anxiety severity would be associated with HRQOL and disability.

METHODS

Participants

The Institutional Review Board at the University of Pittsburgh School of Medicine approved this study, and all participants provided written informed consent. Participants were older adults taking part in a randomized, placebo-controlled medication study for the treatment of GAD. Baseline (prestudy treatment) data are analyzed here.

Among 550 adults aged 60 and older who were initially screened, 167 were excluded due to negative GAD screening, and 126 screened positive for GAD but refused an in-person baseline assessment. Two hundred fifty-seven individuals screened positive for GAD and consented to an in-person assessment, which included current and past medical history and medication use, the Mini-Mental State Exam (MMSE),[25] the Structured Clinical Interview for DSM-IV Axis I Disorders (SCID),[26] and measures of anxiety severity, depression severity, and medical burden. In addition to meeting Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) criteria for GAD, participants were required to have a Hamilton Rating Scale for Anxiety (HRSA) score of ≥17. Except for low-dose benzodiazepines (i.e., lorazepam ≤2 mg/day), all participants were required to taper off of antidepressant or antianxiety medications and be medication free for at least 2 weeks before study entry. Those who remained on low-dose lorazepam (N = 27 participants) still met criteria for current GAD with anxiety symptoms of at least moderate intensity, suggesting inadequate anxiolytic effect.

Of the 257 who took part in this baseline evaluation, 35 were ineligible for randomization for the medication study, 43 were eligible but refused randomization, and two consented to randomization but did not take any pills (and therefore were not counted as randomized). The remaining 177 participants were enrolled and randomized for the purposes of the treatment study. At the time of data analysis for the current study, two additional participants were excluded due to missing data on all of the primary study outcomes (disability, HRQOL, and healthcare utilization) at baseline, and 11 were removed due to low MMSE scores (24 or below). Of the 164 cases included in this study's analysis, participants were recruited through screening and referrals from primary care (50%; N = 82) and specialty mental health practices (8%; N = 13) in the Pittsburgh, PA, region, as well as community advertisements and word of mouth (42%; N = 69).

For comparison purposes, 42 volunteers aged 60 and older who did not meet DSM-IV criteria for any current or lifetime psychiatric disorder were enrolled from the same recruitment sources and during the same time period as the GAD participants (i.e., primary care, community advertisements, and word of mouth). Exclusion criteria for all participants included dementia, unstable medical illness, alcohol or drug abuse within the past 6 months, or lifetime SCID-IV diagnoses of schizophrenia, schizoaffective disorder, delusional disorder, or bipolar disorder. GAD participants with other current or lifetime comorbid diagnoses, such as unipolar depression or other anxiety disorders, were included as long as GAD was the principal diagnosis. Principal diagnosis was assigned based on the SCID severity criteria and other clinical data regarding diagnostic severity.

Measures

Disability—Disability was assessed using the disability scale of the Late Life Function and Disability Index (LLFDI).[27] This scale contains 16 items (e.g., social activities, preparing meals, management of finances) that measure disability on two dimensions: activity limitation assesses the level of difficulty that an individual has with a particular activity, whereas participation restriction assesses how frequently an individual engages in that

activity. Items in the activity limitation dimension are rated on a 5-point Likert-scale ranging from 1 (completely limited) to 5 (not at all limited). Items in the participation restriction dimension range from 1 (never restricted) to 5 (very often restricted). Raw scores for both dimensions are converted to scales ranging from 0 to 100, with higher scores indicating better functioning. This scale has good internal consistency, with Cronbach's alpha for the current sample 0.92 and 0.79, respectively.

Health-Related Quality of Life—The MOS 36-Item Short Form Survey Instrument (SF-36) was used to assess health-related quality of life (HRQOL).[28] This self-report scale is composed of eight subscales: general health, physical functioning, mental health, vitality, pain, social functioning, role limitations due to physical health, and role limitations due to emotional health. Scores on each subscale range from 0 to 100, with higher scores indicating better functioning. In the current sample, all eight subscales had adequate to good internal consistency, with Cronbach's alpha values ranging from 0.78 (general health) to 0.91 (physical functioning).[29] For completeness, the mental health subscale was included; however, given the redundancy of the mental health subscale with anxiety and depression symptoms, the results for this scale should be interpreted with caution.

Healthcare Utilization—The Cornell Service Index was used to calculate use of healthcare services.[30] This measure, based on interview of subjects plus medical record review, quantifies frequency of primary care, mental health, emergency room, and in-patient visits in the previous 6 months. Visits were summed to create an index of healthcare utilization.

Anxiety—The HRSA is a 14-item clinician-administered rating scale that assesses anxiety severity.[31] Inter-rater reliability for this study was 0.91 (intra-class correlation coefficient). The intensity of pathological worry was measured using the Penn State Worry Questionnaire (PSWQ).[32] This 16-item self-report scale had an internal consistency alpha for the current sample of 0.93. The Generalized Anxiety Disorder Severity Scale (GADSS)[33] is a clinician rating scale that was used to measure of the severity of GAD-specific symptoms. Inter-rater reliability, measured by an intraclass correlation coefficient, was 0.99.

Depression—The Hamilton Rating Scale for Depression is a standard clinician-rating measure of severity of depressive symptoms.[34] Inter-rater reliability was 0.94.

Medical Burden—The Cumulative Illness Rating Scale for Geriatrics was used to assess medical burden.[35] One clinician-investigator (EJL) rated the number and severity of subjects' medical problems using the Cumulative Illness Rating Scale for Geriatrics guidelines. Total scores range from 0 to 52, with higher scores indicating greater medical burden. This scale has been shown to have good inter-rater reliability and face validity.[35]

Cognition—Participants were screened for cognitive impairment using the Mini Mental State Exam (MMSE).[25] As noted above, participants were required to be nondemented to participate in this study (MMSE ≥18). At the time of data analysis, to lessen the possibility that incipient dementia in anxious individuals was the cause of disability and quality of life impairment, we excluded those participants with MMSE scores of 24 or below (11 cases).

Data Analysis

Primary analyses focused on the comparison of three groups: 1) GAD participants with current psychiatric comorbidity (referred to as "GAD plus comorbidity") 2) GAD participants without current psychiatric comorbidity ("GAD without comorbidity"), and 3) healthy comparison participants ("comparisons"). Mean scores for these three groups were

first compared on baseline demographic measures using analyses of variance for continuous variables and χ^2 tests for categorical variables; Fisher's least significant difference post-hoc comparisons were computed for variables on which there significant group differences. Then, because the data for the dependent variables did not meet homogeneity of variance assumptions necessary for parametric tests, nonparametric Kruskal-Wallis tests followed by post-hoc Mann-Whitney U tests were conducted to determine whether there were significant differences in disability, HRQOL, and healthcare utilization between the three groups. For all Kruskal-Wallis tests, the Benjamini-Hochberg (B-H) procedure was used to control the potential for Type I error due to multiple comparisons.[36] The B-H procedure is a more recent approach to managing the false-discovery rate; each observed p value from the 10 Kruskal-Wallis tests was compared in sequential order, from smallest to largest, to a series of calculated B-H critical values, such that the smallest p value was compared with the Bonferroni critical value ($\alpha/10 = 0.0025$), whereas each of the subsequent p values were compared with successively larger critical values.[37] In the current study, the B-H adjusted alphas ranged from 0.0025 to 0.025 for the 10 Kruskal-Wallis tests; all p values reported in Table 2 were statistically significant using the adjusted critical values. Effect sizes for the nonparametric statistics were calculated using the probabilistic index.[38] A value of 0.50 indicates a 50:50 likelihood of a score coming from one group compared with the other (i.e., no difference between the two groups). Values closer to 0 indicate less likelihood of good scores coming from the GAD group (e.g., 0.20) versus the healthy control group (0.80). Finally, we examined the relationship between anxiety severity and the HRQOL and disability variables within the GAD group using hierarchical regression analyses.

RESULTS

Descriptive Statistics

Demographic characteristics for the sample are presented in Table 1. There were significant age differences between the healthy comparison group and the two GAD groups. However, age was not correlated with any dependent variable, and results from analyses that included age as a covariate did not differ from those analyses that excluded age; hence, the results presented below did not include age as a covariate. There were no other significant demographic differences between the three groups.

In the GAD plus comorbidity group, current comorbid diagnoses included specific phobia (38.6%, N = 32), MDD (28.9%, N = 24), social phobia (22.9%, N = 19), dysthymia (19.3%, N = 16), panic disorder (18.1%, N = 15), posttraumatic stress disorder (6.0%, N = 5), depression not otherwise specified (not otherwise specified; 4.8%, N = 4), agoraphobia (2.4%, N = 2), and obsessive-compulsive disorder (1.2%, N = 1). Thirty-three percent of individuals in the without comorbidity group and 51% of individuals with plus comorbidity group met criteria for additional lifetime (i.e., past) diagnoses, although these past diagnoses were not considered in the designation of participants to the GAD plus versus without comorbidity groups, and did not affect the study's findings (results not shown).

Disability

Group Differences in Disability—Results from Kruskal-Wallis tests comparing the GAD plus comorbidity, GAD without comorbidity, and comparison groups are presented in Table 2. There were significant differences across the three groups for both LLFDI frequency, $H(2) = 19.5$, $p < 0.001$, and limitation, $H(2) = 38.1$, $p < 0.001$, subscale scores. Post-hoc Mann-Whitney U tests indicated the GAD plus comorbidity and GAD without comorbidity groups reported significantly less frequent engagement (participation restriction) and more difficulty (activity limitation) in everyday activities than healthy comparisons. When both GAD groups were compared with the healthy comparison group,

greater effects were seen for activity limitation (GAD plus comorbidity versus comparisons P_{est} = 0.17 and GAD without comorbidity versus comparisons P_{est} = 0.21) than for participation restriction (GAD plus comorbidity versus comparisons P_{est} = 0.26 and GAD without comorbidity versus comparisons P_{est} = 0.30). There were no significant differences between GAD plus comorbidity and GAD without comorbidity for either activity limitation or participation restriction.

Anxiety Severity and Disability—We examined the relationship between anxiety severity and disability for individuals with GAD in multiple regression analyses. Two items on the GADSS were omitted in these analyses, because they assess the effect of GAD symptoms on function and would have led to inflated correlations between the GADSS and disability measures.

Zero-order correlations between the three measures of anxiety and the measures of disability are presented in the first two lines of Table 3. The correlations of the HRSA and GADSS with the disability measures were small to moderate, ranging from −0.22 to −0.39; the correlations between the PSWQ and disability were negligible and nonsignificant.

To examine the unique effect of anxiety symptoms on disability, we conducted hierarchical regression analyses for *activity limitation* and *participation restriction*, controlling for the effect of medical burden and depressive symptoms (i.e., HAM-D items of depressed mood, guilt, suicidality, and energy/interests) in Step 1.[39] These covariates together accounted for 15% of the variance in activity limitation, $F_{[2,160]} = 14.6$, p <0.001. The three anxiety measures explained an additional 11% of the variance in activity limitation, $F_{[3,157]} = 14.60$, p <0.001). Patients with greater anxiety had more severe disability. Inspection of the partial regression coefficients in Step 2 revealed that all three measures of anxiety severity made unique contributions to the prediction of activity limitation. Although the PSWQ had a negligible zero-order correlation with activity limitation, a series of hierarchical regression analyses (results not shown) revealed that it acted as a suppressor variable through its substantial correlation with the GADSS, thereby enhancing the prediction of activity limitation.

In contrast, the effect of anxiety severity on participation restriction was not statistically significant after controlling for depressive symptoms and medical burden, $\Delta R^2 = 0.02$, $F_{[2,158]} = 2.08$, p = 0.13. In this model, the covariates together explained 18% of the variance in participation restriction, $F_{[2,160]} = 17.31$, p <0.001, but the anxiety measures did not explain any additional variance in participation restriction.

As expected, zero-order correlations revealed some multicollinearity among the three anxiety measures. HRSA was correlated 0.42 with GADSS and 0.27 with PSWQ; the r between the GADSS and PSWQ was 0.42 (all p values <0.001). The variance inflation factor (VIF) statistics, however, for both activity limitation and participation restriction regression models were substantially below 10 (average VIF = 1.4 for both models) and the tolerance statistics were well above 0.2, indicating that collinearity was not of concern in the regression models.[40,41]

Health-Related Quality of Life

Group Differences in Health-Related Quality of Life—Results from Kruskal-Wallis tests comparing the three groups on the eight SF-36 subscales are presented in Table 2. Participants with GAD plus comorbidity reported lower HRQOL than comparisons across all eight SF-36 subscales examined in this study. Similarly, participants with GAD without comorbidity reported significantly lower HRQOL compared with healthy comparisons on every SF-36 subscale. When comparing the GAD groups (plus and without comorbidity) to

the healthy comparison group, effect sizes were largest for the domains of mental health, social functioning, vitality, and role limitations due to emotional health (see Table 2 for effect sizes). There were no significant differences between the GAD plus comorbidity and GAD without comorbidity groups on any SF-36 domain except for vitality, $U = 2710.0$, p = 0.04, $P_{est} = 0.41$, and this difference was small.

Anxiety Severity and Health-Related Quality of Life—Similar to analysis of anxiety severity and disability, regression analyses were used to examine the association between anxiety severity and HRQOL. Again two items that assess function on the GADSS were omitted from these analyses.

Zero-order correlations between the HRSA and GADSS and the eight HRQOL subscales were moderate, ranging from −0.23 to −0.48. The correlations between the PSWQ and the HRQOL subscales were negligible and largely nonsignificant, ranging from 0.05 to 0.23, with the exception of mental health ($r = -0.56$; Table 3).

After controlling for depressive symptoms and medical burden in hierarchical regression analyses, six of the eight regression analyses yielded significant ΔR^2 values (Table 3) when the anxiety measures were added at the second step. Anxiety severity accounted for additional unique variance in mental health (22%), physical functioning (11%), vitality (10%), role limitations due to physical health (6%), general health (5%), and bodily pain (5%). As expected, greater anxiety severity was associated with lower HRQOL for these domains. In contrast, the three anxiety measures did not have a unique effect on social functioning or role limitations due to emotional health after controlling for covariates.

Inspection of the beta weights indicated that the HRSA alone made unique contributions to the prediction of two of the eight HRQOL domains (physical functioning and role-limitations due to physical health). Both the HRSA and the GADSS made unique contributions to the explanation of variance in vitality, and the GADSS and PSWQ made unique contributions to the prediction of mental health. Finally, although the addition of the three anxiety measures produced a significant ΔR for both general health and bodily pain, the partial regression coefficients for the three anxiety measures were all nonsignificant, indicating that there is considerable overlap of the three measures in predicting bodily pain and general health. Again, the VIF statistics for the three anxiety measures in all eight HRQOL regression models were substantially below 10 (average VIF = 1.3 for all models) and the tolerance statistics were well above 0.2, indicating that collinearity is not of concern in these regression models.[40,41]

Health Service Utilization

Group Differences in Health Service Utilization—Results of the Kruskal-Wallis test comparing healthcare utilization between the three groups are presented in Table 2. This analysis yielded a statistically significant difference between groups, $H(2) = 7.9$, p = 0.02; post-hoc Mann-Whitney U tests revealed a significant difference between the GAD plus comorbidity and healthy comparison groups, $U = 933.0$, p = 0.02, $P_{est} = 0.36$, and between the GAD without comorbidity and comparison groups, $U = 841.0$, p = 0.007, $P_{est} = 0.34$. The difference between GAD plus comorbidity and GAD without comorbidity was not statistically significant, $U = 3102.0$, p = 0.39.

Anxiety Severity and Health Service Utilization—Zero-order correlations were computed to examine the relationship between anxiety severity and health service utilization. As shown in Table 3, all three correlations between anxiety severity and health resource use were negligible and did not reach statistical significance. This indicates that

greater severity of anxiety was not associated with increased usage of health resources. Consequently, we did not proceed with regression analyses for this variable.

DISCUSSION

This is the largest study to date of the burden of GAD in late life.[18] Our results reveal marked levels of disability and HRQOL impairment in older adults with GAD, which seem comparable with the disability and impairment reported in MDD.[42] Notably, this impairment cannot be attributed exclusively to the presence of complicating psychiatric disorders, as evidenced by the differences found in these domains even between older adults with GAD only and healthy comparisons, nor to comorbid medical illness. In addition to the impairment seen in HRQOL and disability— collectively referred to as "human burden" in a recent review[18]—this study found evidence to suggest that late-life GAD confers further "economic burden" on patients, as evidenced by the increased usage of healthcare resources in older adults with GAD.[18]

Consistent with previous mixed-age studies,[13,42–44] the current investigation found that older adults with GAD alone (i.e., without current psychiatric comorbidity) reported lower quality of life than older adults without GAD. We also found that GAD complicated by other psychiatric diagnoses was not associated with lower HRQOL than GAD alone. Although contrary to our hypothesis, the latter finding is consistent with another smaller study in older adults with GAD.[8] Also consistent with this prior research, worse functioning was found to be associated with GAD in all eight HRQOL domains tested. The greatest impairments in this sample were found for the dimensions of social functioning, vitality, and role limitations due to emotional health. This indicates that older adults with GAD perceive a reduction in their ability to spend time with friends and family and to carry out their regular daily activities. The association with lower vitality is expected, as fatigue is a symptom of GAD.

The pattern of results for disability was nearly identical to the findings for HRQOL. Even in the absence of current psychiatric comorbidity, older adults with GAD had more difficulty in carrying out daily activities than individuals without GAD, and they also engaged less frequently in such activities. The levels of disability reported by older adults with GAD alone were comparable with levels reported by older adults with depression, as well as older adults with GAD and comorbid psychiatric diagnoses.[45] In comparing these two domains of disability (limitation and frequency, respectively), older adults with GAD seem to perceive a slightly greater reduction in their ability to carry out activities than in the frequency with which they do so. Hence, the activity limitation subscale of the LLFDI-disability, taken together with the role limitations due to emotional health and social functioning scales of the SF-36, seem to best capture the burden of GAD experienced in late life, which can be described broadly as "role impairment."

Anxiety severity in late-life GAD was found to be associated with disability and HRQOL impairments, above and beyond the impairment accounted for by depression and medical burden. As hypothesized, older adults with more severe anxiety reported greater disability and lower HRQOL in several domains. For five of the eight HRQOL domains, the best single predictor of disability and HRQOL was the full GADSS (results not shown), which assesses the frequency and severity of GAD-specific symptoms (i.e., worrying and associated symptoms such as restlessness, irritability, muscle tension, and fatigue), as well as the extent to which GAD symptoms interfere with everyday responsibilities. This finding suggests that interventions that reduce GAD symptom severity would also produce HRQOL improvement. Notably, the predictive ability of the GADSS seems to be due largely to the items that assess the effect of GAD symptoms on functioning in work and social domains;

when those items were excluded, the superiority of the GADSS as a predictive measure was eliminated. Instead, the HRSA, which measures more general symptoms of anxiety, emotional distress, and somatic symptoms, was predictive of the physical functioning and role-limitations due to physical illness components of HRQOL. Other measures, such as vitality and mental health, as well as general health and bodily pain, were best predicted by a combination of the GADSS and one or both other measures of anxiety. The PSWQ alone, which specifically measures self-reported worry severity, was not uniquely predictive of HRQOL, and in general contributed less to the prediction of disability than did the other measures.

With respect to the economic costs of GAD, older adults with this disorder were found to have greater use of healthcare resources, such as primary care and specialty medical care doctor visits, compared with healthy comparisons. As in disability and HRQOL, psychiatric comorbidity did not confer added burden for individuals with GAD in this domain. Future research should further explore this association and determine whether appropriate long-term management of anxiety reduces health service utilization as it does in late-life depression.[46]

The study's main limitation is that the sample was composed of older adults who consented to a treatment study for GAD, which may reduce the generalizability of these results to nontreatment seeking samples. Another limitation is that the study is cross-sectional; an experimental design (i.e., intervention study) is needed to demonstrate causality in the association between GAD and the reported burden.

In sum, the results of the present investigation add to the body of evidence showing that late-life GAD is associated with significant disability and marked impairment in HRQOL, which is not attributable to the common medical and psychiatric comorbidity with this condition. Greater anxiety severity was associated with greater severity of disability and impairment in late-life GAD. Together with prior reports demonstrating the high prevalence of this disorder in elderly persons, and its potential for chronicity in the absence of effective treatment, our findings support previous authors' calls for development and implementation of GAD treatment strategies in elderly persons, to reduce the considerable human and economic burden of this disorder.[20]

Acknowledgments

The authors thank Martha Storandt for her help with the data analysis and interpretation for this manuscript.

This research was supported by National Institutes of Health grant numbers R01 MH070547 and the Advanced Center for Interventions and Services Research in Late-life Mood Disorders (P30 MH71944; principal investigator: Charles F. Reynolds III, M.D.).

Dr. Eric J. Lenze has received research support from Forest Laboratories, Novartis, and OrthoMcNeill Neurologics. He has also served as a consultant for the Veterans Medical Research Foundation and Fox Learning Systems. Dr. M. Katherine Shear served on an advisory board for Forest Laboratories. Dr. Jordan F. Karp has served on an advisory board for and has received medication supplies for an IIT from Eli Lilly. He has received honoraria from Novartis and is a stockholder in Corcept.

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Am J Geriatr Psychiatry. Author manuscript; available in PMC 2012 July 30.

TABLE 1

Baseline Characteristics of the Sample

	Healthy Comparisons (n = 42)	GAD Without Comorbidity (n = 81)	GAD Plus Comorbidity (n = 83)	*F* or χ^2(*df*)	p
Age, years, mean ± SD	75.1 (6.3)	72.6 (7.6)	70.1 (7.8)	6.73 (2, 202)	0.001
Female, %	66.7% (28)	66.9% (55)	69.9% (58)	0.15 (2)	0.93
White, %	92.8% (39)	86.4% (70)	77.1% (64)	6.53 (4)	0.16
Education, years, mean ± SD	14.5 (2.9)	13.7 (2.7)	14.5 (2.7)	1.80 (2, 203)	0.17
Mini-Mental State Exam score, mean ± SD	28.9 (1.3)	28.4 (1.4)	28.3 (1.3)	2.32 (2, 203)	0.10
CIRSG, mean ± SD	8.0 (3.0)	8.4 (3.5)	9.3 (4.4)	1.9 (2, 199)	0.15
HRSA, mean ± SD	4.8 (3.7)	21.9 (3.8)	23.8 (5.0)	293.3 (2, 202)	<0.001
HRSD, mean ± SD	1.8 (2.1)	11.1 (3.1)	12.8 (4.2)	147.9 (2, 203)	<0.001
GADSS, mean ± SD	1.5 (2.0)	11.7 (2.6)	12.6 (3.5)	215.9 (2, 200)	<0.001
PSWQ, mean ± SD	27.9 (7.0)	54.6 (12.5)	58.2 (12.5)	86.9 (2, 196)	<0.001

Note: GAD: Generalized Anxiety Disorder; MMSE: Mini-Mental Status Exam; CIRSG: Cumulative Illness Rating Scale for Geriatrics; HRSA: Hamilton Rating Scale for Anxiety; HRSD: Hamilton Rating Scale for Depression—17-item version; GADSS: GAD Severity Scale; PSWQ: Penn State Worry Questionnaire; SD: standard deviation.

TABLE 2

Functional Limitations and Healthcare Utilization in Healthy and Anxious Older Adults

	M (SD)					
	Healthy Comparisons (n = 42)	**GAD Without Comorbidity (n = 81)**	**GAD Plus Comorbidity (n = 83)**	***H*[a]**	**Effect Size[b] Healthy Versus GAD Without Comorbidity**	**Effect Size[b] Healthy Versus GAD Plus Comorbidity**
LLFDI						
Activity limitation	73.7 (6.9)	62.4 (12.4)	60.4 (12.8)	38.1	0.21	0.17
Participation restriction (frequency)	62.9 (6.4)	57.4 (8.3)	55.9 (9.2)	19.5	0.30	0.26
MOS SF-36						
General health	80.5 (13.3)	58.8 (18.5)	57.7 (21.6)	41.2	0.18	0.17
Physical functioning	78.6 (18.5)	59.4 (27.0)	61.3 (26.8)	16.2	0.31	0.30
Mental health	91.7 (5.5)	59.3 (15.2)	55.6 (16.6)	94.7	0.02	0.01
Vitality	72.3 (14.5)	46.2 (17.8)	40.2 (20.5)	62.9	0.10	0.12
Bodily pain	74.5 (19.7)	55.4 (22.3)	56.0 (25.0)	21.7	0.28	0.25
Social functioning	97.6 (6.3)	69.0 (22.1)	66.0 (25.0)	59.7	0.11	0.13
Role limitations—physical health	86.3 (21.5)	46.3 (40.7)	45.4 (40.5)	33.2	0.22	0.22
Role limitations—emotional health	95.2 (15.7)	45.7 (38.2)	46.7 (39.5)	51.3	0.16	0.15
Health service utilization (no. of visits, past 6 months)	3.3 (2.4)	6.7 (7.8)	6.3 (9.4)	7.9	0.34	0.36

Note: GAD: Generalized anxiety disorder; LLFDI: Late Life Function and Disability Instrument; MOS SF-36: Medical Outcomes Study 36-Item Short Form Survey Instrument.

[a] Degrees of freedom for Kruskal-Wallis *H* statistic = 2; all p values <0.001 except Health Service Utilization (p = 0.02).

[b] Values closer to 0 indicate larger effect sizes with GAD group having poorer scores; 0.50 indicates no difference between groups.

TABLE 3

Associations Between Anxiety Severity and HRQOL and Disability

	HRSA		GADSS		PSWQ		
	r	*β*	*r*	*β*	*r*	*β*	ΔR^{2a}
LLFDI							
Activity limitation	−0.39[b]	−0.26[c]	−0.31[b]	−0.20[d]	0.01	0.19[d]	0.11[b]
Participation restriction (frequency)	−0.30[b]	−0.15	−0.22[c]	−0.07	−0.04	0.07	0.02
MOS SF-36							
General health	−0.27[b]	−0.07	−0.29[b]	−0.11	−0.21[c]	−0.14	0.05[d]
Physical functioning	−0.39[b]	−0.30[b]	−0.28[b]	−0.14	−0.05	0.16	0.11[b]
Mental health	−0.36[b]	−0.05	−0.48[b]	−0.20[c]	−0.56[b]	−0.37[b]	0.22[b]
Vitality	−0.42[b]	−0.19[c]	−0.41[b]	−0.21[c]	−0.23[c]	0.11	0.10[b]
Bodily pain	−0.25[b]	−0.13	−0.25[b]	−0.17	−0.07	0.02	0.05[d]
Social functioning	−0.31[b]	−0.09	−0.32[b]	−0.14	−0.17	−0.03	0.03
Role limitations—physical health	−0.30[b]	−0.19[d]	−0.28[b]	−0.16	−0.08	0.05	0.06[d]
Role limitations—emotional health	−0.23[b]	−0.10	−0.23[b]	−0.12	−0.14	−0.03	0.03
Health service utilization	0.10	—	0.003	—	0.13	—	—

Note: LLFDI: Late Life Function and Disability Instrument; MOS SF-36: Medical Outcomes Study 36-Item Short Form Survey Instrument; HRSA: Hamilton Rating Scale for Anxiety; GADSS: Generalized Anxiety Disorder Severity Scale, with items 5 and 6 removed; PSWQ: Penn State Worry Questionnaire; *β*: partial regression coefficients; ΔR^2: percentage of unique variance explained by anxiety measures, after controlling for depressive symptoms and medical burden.

[a] *df* = (3, 159) for activity limitation and participation restriction; *df* = (3, 157) for all MOS-SF-36 subscales.

[b] p <0.001.

[c] p <0.01.

[d] p <0.05.