

Anxiety and Impaired Social Function in the Elderly

SUSAN K. SCHULTZ, M.D.

University of Iowa College of Medicine, Iowa City, Iowa, USA; and
Iowa City Veterans Administration Medical Center, Iowa City, Iowa, USA

ANGELA HOTH, PHARM.D.

University of Iowa College of Pharmacy, Iowa City, Iowa, USA;
and Iowa City Veterans Administration Medical Center, Iowa City, Iowa, USA

KATHLEEN BUCKWALTER, PH.D.

University of Iowa College of Medicine, Iowa City, Iowa, USA; and
University of Iowa College of Nursing, Iowa City, Iowa; and
University of Iowa College of Medicine, Iowa City, Iowa, USA

The effect of anxiety on impairment in activities of daily living was examined among elderly individuals residing in a long-term care setting. Eighty one subjects received complete assessments of psychiatric symptoms, cognitive impairment, and ability to perform daily living tasks. A multivariate analysis was conducted to determine the relative influence of anxiety, cognitive status, and depressive symptoms on daily living skills. The presence of anxiety was significantly associated with reduced functional status in performing activities of daily living. This relationship remained significant even after controlling for the presence of concurrent depressive symptoms as well as cognitive impairment. Anxiety is a significant source of morbidity among elderly individuals and substantially impairs social function over and above the effects of depression and cognitive decline. Current interventions for anxiety such as benzodiazepines may have adverse cognitive effects, hence more specific intervention strategies for anxiety may be very important for this population.

Keywords Aging; Cognition; Dementia; Anxiety; Depression; Social function.

INTRODUCTION

It is often recognized clinically that anxiety symptoms comprise a large burden of illness in the elderly population yet unfortunately these symptoms are under-studied in current research (1). Apprehensiveness, irritability and poor impulse control may be some of the presenting hallmarks of cognitive decline, incurring distress for caregivers and peers as well as interfering with the social function of the affected individual. Ferritti *et al.* explored symptoms of anxiety in

two large outpatient samples with Alzheimer's disease (AD). Anxiety symptoms or worried appearance were observed to be most common, 68% in one clinic and 71% in another. Next most common was fearfulness, tension, restlessness, and fidgeting (2). Most importantly, only 5% to 6% of subjects in this study met DSM criteria for generalized anxiety disorder. This suggests that clinically important symptoms may be occurring that are not necessarily recognized and treated. In this study we sought to quantify the magnitude of anxiety symptoms in the nursing home patient and understand the relationship of these symptoms to social functioning and cognitive status. We hypothesized that anxiety would be associated with poorer functioning and greater disability over and above that incurred by cognitive decline.

This research was funded by K08MH01633-05.

Address correspondence to Susan K. Schultz, M.D., University of Iowa, Psychiatry Research 2-207 MEB, 500 Newton Road, Iowa City, IA 52242-1000. E-mail:

METHODS

Sample

The overall sample was comprised of eighty-one subjects from a rural nursing care setting, 63 women and 18 men. Subjects participated in comprehensive evaluations of symptom ratings, cognitive and functional status. This study involved a systematic assessment of consecutive patients available for recruitment from within three participating facilities. Subjects were approached for enrollment if they were long-term residents of the facility (i.e., not simply recovering from a surgery or injury). Subjects were excluded in the presence of known chronic schizophrenia, bipolar disorder or mental retardation.

Recruitment proceeded by reviewing the study procedures with the directors of nursing of each facility. The directors then determined which skilled nursing facility residents were appropriate to approach, and obtained permission for the subject to be contacted by the research team. Based on their assessment of persons who would *not* have been appropriate, approximately 20 potential subjects were unable to cooperate due to aphasia or profound cognitive impairment, and an additional 15 had a legal decision-maker who was not available to provide informed consent. All participating subjects or legal representatives signed written informed consent after a verbal discussion of study procedures. This study was approved by the University of Iowa Human Subjects Committee.

Measures

Assessment tools included the Brief Psychiatric Rating Scale (BPRS) and the Mini-Mental Status Examination (MMSE) (3). The BPRS is an 18 item rating scale that is scored on each item in a 0–6 manner such that symptoms may range from absent to extremely severe. The BPRS covers the global range of symptom domains, including anxiety symptoms. To generate an anxiety summary score for this analysis, the following symptoms were summed from the BPRS items: anxiety, tension and somatic concern (4). The anxiety summary scores then had potential range of 0 (absent) to 18 (extremely severe in all three categories). General abilities in daily living skills were assessed with the Social-Adaptive Functioning Evaluation (SAFE) (5), where a higher score reflects a greater impairment. The scale measures seventeen social-interpersonal, basic and instrumental daily activities on a 0–4 scale ranging from no impairment to severely impaired, evaluated across a range of 17 self-care items. The resulting score ranges from 0 (no impairment) to 58 (maximal impairment). Items include bathing, dressing, feeding, money management, neatness, mobility, impulsivity, respect for property, communication, conversational skills,

instrumental social skills, social appropriateness, engagement, friendships, recreation, participation in activities, programs and treatment. This scale was developed for use in an institutional setting as opposed to the community, so it was selected as an appropriate measure for the nursing home setting. The total score for each subject was used as a global measure of life skills impairment. For the purpose of controlling for depressive symptoms, the depression subscale from the Columbia Scale for Psychopathology in Alzheimer's Disease (CUSPAD) was used as a covariate, comprised of the ratings of depressed mood, difficulty sleeping and appetite change (6).

An attempt was made to assess all available subjects regardless of medical or emotional state, provided they were able to cooperate comfortably with the study procedures. Data were collected by a trained research assistant who had established reliability in symptom and neuropsychological assessment through training with the Iowa Mental Health Clinical Research Center. The research assistant also attended training session to recalibrate on rating scale procedures to ensure an absence of rater drift over time. The ratings were obtained by direct interview and assessment of the participants themselves, with additional information gained from the nursing documentation and feedback from the facility nurses. Data were recorded through a Microsoft Access database program and transferred to JMP statistical software for analysis.

Data Analysis

Data were rank transformed prior to analysis, as they were non-normally distributed with the exception of the functional status data determined by the SAFE, which were normally distributed. A multiple regression analysis examined the relationship between anxiety symptoms, cognitive status and daily living skills. Specifically, a standard least square analysis was performed using the dependent variable of the SAFE score as the outcome of interest. The independent measures in the regression model included: ranked depression score from the CUSPAD, the ranked Mini-Mental Status Examination (MMSE) score, and the ranked BPRS anxiety score. Additionally, within this model, interactions of the MMSE score with depression scores as well as the interaction of the MMSE and anxiety scores were also entered as independent variables to determine whether interactions with these factors may influence functional impairment. Finally, a simple regression was also conducted examining the relationship between MMSE scores and functional impairment, with a grouping by the presence of absence of anxiety (as determined by positive anxiety symptoms on the BPRS), to determine the categorical effects of anxiety on functional status.

RESULTS

Eight-one subjects were included in this study, 63 women and 18 men. The mean age of the sample was 83.7 years, $SD = 11.3$ years, ranging from 62–101. The mean years of education was 13.1, $SD = 3.3$. In terms of past medical history, as one might expect in a nursing home sample, there were multiple concurrent medical conditions. To overview the most common medical problems, we observed the following: Nineteen of the 81 subjects were noted to have a history of cerebrovascular event or transient ischemic attack, 45 were noted to have a history of hypertension, 15 had congestive heart failure, 11 had a history of myocardial infarction, 9 had diabetes mellitus, 10 had chronic obstructive pulmonary disease, 11 had a history of hip replacement, 30 had hearing impairment and 57 had some degree of visual impairment. Past psychiatric history was difficult to determine from the available medical records, however we noted that approximately nineteen had received some type of psychiatric treatment prior to the age of 60. More detailed information regarding previous treatments was not available. However these medications may be summarized as follows: 35% of the participants were receiving antidepressants, 28% were receiving benzodiazepines, and 38% were receiving antipsychotic medications. Medications were used in combination in some cases, for example 4% of the subjects were on three psychotropic medications, 26% were on two medications and 23% were on one medication. Fifty-three percent of the subjects were receiving no psychotropic medications.

The mean score on Folstein's Mini-Mental Status Examination was 20.3, $SD = 7.6$. The mean BPRS anxiety score was 5.2 ($SD = 2.4$). Subjects were categorized as to whether anxiety symptoms were present using a rating of at least 3 (mild to moderate) symptoms on at least two of the three ratings (i.e., anxiety score ≥ 6). In this way we determined there were 28 participants in the sample with anxiety. The mean Social-Adaptive Functioning Evaluation (SAFE) score was 25.3, $SD = 15.4$. To determine whether there may be significant differences in anxiety between those with and without possible dementia, we conducted an analysis of two groups within the sample defined by their MMSE scores. Specifically, we compared those with a MMSE over 24 to those 24 or less in terms of anxiety measures on the BPRS. Using these criteria, we observed 49 individuals to be in the possible dementia group while 32 were not. In comparing their anxiety scores, we found no significant differences between the groups ($t[79,1] = 0.49$, $p = ns$).

In the simple regression analysis, a significant relationship was present between the MMSE score and functional impairment as measured by the SAFE; $F(76,1) = 119.8$ $p < 0.0001$. When the regression lines were grouped by the presence or absence of anxiety, a significant relationship

remained present between MMSE and impaired functioning, however there was also a significant interaction with the presence of anxiety such that anxiety conferred a greater increase in functional impairment; for those without anxiety $F(48,1) = 150.1$, $p < 0.0001$ and with anxiety $F(28,1) = 17.1$, $p < 0.0003$. The same analysis was conducted using ranked data given the non-normal distributions, and the same relationships were present. For those without anxiety: $F(48,1) = 152.5$, $p < 0.0001$ and with anxiety: $F(28,1) = 19.4$, $p = 0.0002$. Please see Figure 1 for a representation of the regression lines and the effect of the presence of anxiety conferring greater functional impairment for a given MMSE score.

In the multiple regression analysis, significant effects of the presence of anxiety as well as an interaction between anxiety and MMSE score were observed to be associated with increased functional impairment. A multiple regression was conducted using the following independent measures: depression score, MMSE score, BRPS anxiety rating and the interaction term between MMSE and depression, as well as the interaction term between the MMSE and anxiety score. All data were ranked due to their non-normal distributions with the exception of the SAFE rating. For the outcome variable of functional impairment, the following independent effects were observed: Depression $F(76,1) = 0.5$, $p = 0.49$; MMSE $F(76,1) = 61.9$, $p < 0.0001$; and Anxiety $F(76,1) = 4.5$, $p = 0.04$. The interaction effects were as

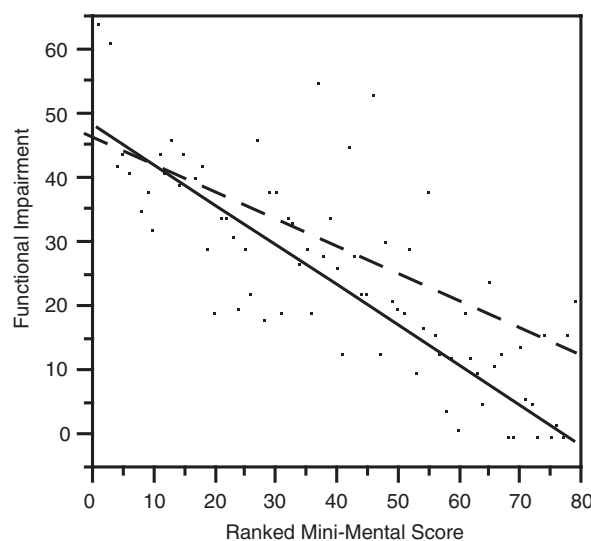


Figure 1 Impairment in activities of daily living and cognitive state: The interaction with anxiety. This demonstrates the relationship between MMSE and functional impairment, as measured by the SAFE. The regression line is grouped according to the high or low anxiety ratings (BPRS anxiety score greater or less to 6). The anxious group (dashed line) demonstrates greater functional impairment than the non-anxious group at the same degree of cognitive function as measured by the MMSE.

follows: Interaction of Anxiety and Depression ratings $F(76,1) = 1.5$, ns; and Interaction of MMSE and Anxiety $F(76,1) = 5.9$, $p = 0.02$. These findings demonstrate that when each factor was assessed in a multiple regression model, the greatest influence on functional impairment was cognitive function (MMSE score), but even after controlling for its effect in the model, there was a significant effect of anxiety on functional status as well as an interaction between anxiety and MMSE score, suggesting that changes in the two measures together also had a significant influence on functional status.

DISCUSSION

This study, like others, supports the idea that the majority of impairment in daily functioning in late-life is conferred by the presence of cognitive decline (7–12). Notably, this study also identified an additive effect of the presence of significant anxiety. Our findings demonstrate that even after controlling for the substantial contribution of cognitive decline, anxiety symptoms create another layer of impairment among nursing home residents.

In our *simple* regression analysis, we observed that simply the presence of high anxiety ratings categorically contributed to impaired social function. In our *multiple* regression analysis, we demonstrated that cognitive impairment as measured by the MMSE had a significant effect on functional impairment. However, after controlling for this effect, a significant independent effect of anxiety on functional impairment was observed. Interestingly, the interaction between depression and cognitive impairment did not significantly influence functional status, while the interaction of anxiety and cognitive impairment *did* have a significant effect on functional status. This suggests that in the presence of cognitive decline, anxiety may create more interference in social functioning than the presence of depression, a finding that warrants further investigation.

One limitation of this study is the fluctuating nature of psychiatric syndromes in the context of cognitive decline. Psychiatric symptoms may fluctuate considerably, literally from day to day, particularly in persons with dementia. Hence any cross-sectional study may detect symptoms occurring during a fluctuation that may not actually be influencing daily functioning in a sustained way for a particular subject. While psychiatric symptoms may indeed be variable, we feel that this report does at least reflect the general character of the relationship between symptoms, cognition and daily function, and provides a reasonable estimate of the degree to which they are interrelated. In reference to our assertion that anxiety incurs a greater degree of functional impairment, another consideration may be that social impairments could create more anxiety rather than anxiety

creating more social impairments. Given the potential treatment response for anxiety interventions, however, it may be more advantageous to the patient to implement treatment for the anxiety with the hope that social functioning will indeed improve.

The nature of the nursing home setting adds a layer of complexity and hence another limitation to our findings. Given that subjects in nursing facilities may have a very difficult time providing a reliable history, the findings here depended on a combination of the subject's reports as well as medical records and nursing reports regarding anxiety and other psychiatric symptoms. This multitude of sources may result in greater variability in recorded measures, this is one challenging feature that is inherent to the nursing home setting and should be noted as a limitation of this study as well.

In summary, the assessment and treatment of anxiety is particularly complex in late-life. The potential adverse events associated with anxiolytic medications make this clinical situation all the more challenging. Recent studies have suggested that even in the higher functioning community setting, approximately 20% of persons over the age of 65 use benzodiazepines for anxiety (13). Yet pharmacologic treatment of anxiety with benzodiazepines in older individuals has been associated with cognitive impairment as well as a greater likelihood of gait instability, falls and fractures (14). This suggests that new treatment strategies for anxiety are particularly important and may result in a substantial improvement in quality of life for individuals in long-term care. Better identification and characterization of anxiety in late life may help stimulate new research addressing innovative strategies for this complex problem.

REFERENCES

1. Gallo JJ, Lebowitz BD: The epidemiology of common late-life mental disorders in the community: themes for the new century. *Psychiatr Serv* 1999; 50(9): 1158–1166.
2. Ferretti L, McCurry SM, Logsdon R, Gibbons L, Teri L: Anxiety and Alzheimer's disease. *J Geriatr Psychiatry Neurol* 2001; 14(1):52–58.
3. Folstein M, Folstein S, McHugh P: Mini-mental state: A practical method for grading the cognitive state of patients for the clinician. *J Psychiatr Res* 1975; 12: 189–198.
4. Overall JE, Garham DR: The Brief Psychiatric Rating Scale. *Psychopharmacology Bull* 1988; 24:97–99.
5. Harvey PD, Davidson M, Mueser KT, Parrella M, White L, Powchik P: Social-Adaptive Functioning Evaluation (SAFE): A rating scale for geriatric psychiatric patients. *Schizophr Bull* 1997; 23(1):131–145.

6. Devanand DP: Use of the Columbia University Scale to assess psychopathology in Alzheimer's disease. *Int Psychogeriatr* 1997; 9 Suppl 1:137–142; discussion 143–150.
7. Schultz S, Ellingrod V, Turvey C, Moser D, Arndt S: The influence of cognitive impairment and behavioral dysregulation on daily functioning in the nursing home setting. *Am J Psychiatry* 2003; 160(3):582–584.
8. Schultz SK, Ellingrod VL, Moser DJ, Kutschner E, Turvey C, Arndt S: The influence of cognitive impairment and psychiatric symptoms on daily functioning in nursing facilities: A longitudinal study. *Ann Clin Psychiatry* 2002; 14(4):209–213.
9. Knopman DS, Berg JD, Thomas R, Grundman M, Thal LJ, Sano M: Nursing home placement is related to dementia progression: Experience from a clinical trial. Alzheimer's Disease Cooperative Study. *Neurology* 1999; 52(4):714–718.
10. Harwood DG, Barker WW, Ownby RL, Duara R: Relationship of behavioral and psychological symptoms to cognitive impairment and functional status in Alzheimer's disease. *Int J Geriatr Psychiatry* 2000; 15(5):393–400.
11. Green CR, Marin DB, Mohs RC, Schmeidler J, Aryan M, Fine E, Davis KL: The impact of behavioral impairment of functional ability in Alzheimer's disease. *Int J Geriatr Psychiatry* 1999; 14(4):307–316.
12. Green CR, Mohs RC, Schmeidler J, Aryan M, Davis KL: Functional decline in Alzheimer's disease: A longitudinal study. *J Am Geriatr Soc* 1993; 41(6): 654–661.
13. Jorm, AF, Grayson D, Creasey H, Waite L, and Broe GA: Long-term benzodiazepine use by elderly people living in the community. *Aust NZ J Public Health* 2000, 24(1):7–10.
14. Petrovic M, Mariman A, Warie, H, Afschrift M, Pevernagie D: Is there a rationale for prescription of benzodiazepines in the elderly? Review of the literature. *Acta Clin Belg* 2003, 58(1):27–36.

