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ANXIETY DISORDERS AND DISABILITY SECONDARY TO URINARY INCONTINENCE AMONG ADULTS OVER AGE 50*

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Abstract

Objective: No previous research has investigated whether there is an association between anxiety disorders and urinary incontinence. We hypothesized that anxiety disorders would be associated with increased urinary incontinence related disability.

Method: Continuing participants who were aged 50 years and older in a longitudinal study of community-dwelling adults who were initially living in East Baltimore in 1981 ($n = 787$). Participants were classified as incontinent if any uncontrolled urine loss within the 12 months prior to the interview was reported. Urinary incontinence related functional loss was further assessed based on a series of questions relating directly to participants' inability to engage in certain activities due to their urinary incontinence. Anxiety disorders were assessed with standardized interviews.

Results: Persons meeting criteria for an anxiety disorder were no more likely to have urinary incontinence than were persons without anxiety disorders (unadjusted odds ratio (OR) = 1.36, 95 percent confidence interval (CI) [0.96, 1.93]). Among people with urinary incontinence ($n = 159$), persons meeting criteria for anxiety disorders in 1981 and in 1994 were much more likely to report urinary incontinence related functional impairment in 1994 (adjusted OR = 6.51, 95 percent CI [1.42, 29.86]).

Conclusions: Individuals with changes in day-to-day routines or activities secondary to urinary incontinence were more likely to meet criteria for an anxiety disorder than were other older adults. Further studies must tease out the temporal relationship and whether early detection of urinary incontinence and associated anxiety improves quality of life and functioning.

Keywords

Urinary incontinence; anxiety; functional impairment; aged

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INTRODUCTION

Urinary incontinence is a common condition with important social and psychological consequences. Significant urinary incontinence may cause shame and lead to withdrawal from social activities. Elderly outpatients describe their experience with incontinence as embarrassing, upsetting, and distressing [1]. Persons with urinary incontinence may be anxious about not having ready access to a toilet and may worry about the possibility of a urinary accident in public. For these reasons, we hypothesized that anxiety disorders may be associated with urinary incontinence.

Although sampling and methodologic differences account for variability in estimates from surveys [2], the prevalence of urinary incontinence among community-dwelling older adults has been reported as at least 10 percent for men and 20 percent for women [3,4]. Anxiety disorders are also common and, like urinary incontinence, can have a marked detrimental effect on quality of life [5]. Anxiety disorders have been found to have the highest overall prevalence rate among the mental disorders with a six-month rate of 8.9 percent and a lifetime rate of 14.6 percent [6]. Overall, anxiety disorders affect 26.9 million individuals at some point in their lives [6]. Ten to twenty percent of older patients experience clinically important symptoms of anxiety [7], and about 5 to 10 percent of community-dwelling adults aged 65 years and older meet criteria for an anxiety disorder [8].

The high comorbidity of anxiety with medical illness is probably multifactorial. Anxiety is complex and may be a reaction to a physical illness, may be expressed as physical symptoms, or may be a side effect of medications. An association between anxiety and many medical illnesses has been noted for diverse conditions such as dementia [9], hyperthyroidism [10], diabetes mellitus [11], sudden cardiac death [12], chronic obstructive pulmonary disease [13], Parkinson's disease [14], and gastrointestinal disorders [15].

Much of the research on urinary incontinence has concentrated on the epidemiology, etiology, and treatment of the condition, and much less is known about psychiatric comorbidity. This is a critical gap because psychiatric conditions are a major contributor to disability [16]. Previous studies have suggested an association between urinary incontinence and depression [17-23]. In addition, some authors have found an association between elevated scores on anxiety scales and urinary incontinence [17,24]. However, no previous research has investigated whether there is an association between anxiety disorders and urinary incontinence. We believe this is the first study to examine the comorbidity of anxiety disorders and urinary incontinence.

We hypothesized that persons with urinary incontinence and anxiety disorders would be more likely than incontinent persons without anxiety disorders to have urinary incontinence related functional loss. Urinary incontinence related functional loss includes changes in day-to-day routines or activities. It has been suggested that some of the urinary incontinence related functional loss may be self-imposed by older persons to help manage their disease, such as going out only for short trips [25]. However, a change in routine may also be related to feelings of loss of control and symptoms of anxiety. The social implications include loss of freedom and restriction of social activities. The purpose of this article was to carefully examine the association between anxiety disorders, urinary incontinence, and urinary incontinence related functional disability among a community sample of older adults.

METHODS

The Epidemiologic Catchment Area Program

The Epidemiologic Catchment Area (ECA) Program was a survey of psychiatric disorders in the general population between 1980 and 1984 at five university based sites in the United

States. All persons in a household over 65 were interviewed to oversample the elderly at the Baltimore site. ECA data consists of highly structured interviews of community-dwelling adults. Each interview was conducted in a private place, usually the respondent's home. All interviewers were non-clinicians who received specific training in the questionnaires employed. Details of the study design of the ECA have been published elsewhere [26,27].

The Baltimore ECA Follow-Up

At the Baltimore site an initial cohort of 3,481 respondents aged 18 and over was interviewed in 1981 and then an attempt to retrace and re-interview the entire cohort was made from 1993 to 1996 (most interviews were carried out in 1994 and so these interviews will be referred to as the 1994 interviews). The participants gave permission for future follow-up at the baseline interview, and the protocol was reviewed and approved by the Committee on Human Research of the Johns Hopkins University School of Hygiene and Public Health. Our analysis was also reviewed and approved by the Institutional Review Board at the University of Pennsylvania. For this investigation, we selected adults who were aged 50 years and older during the 1994 interviews.

Anxiety Disorders

The diagnoses of anxiety disorders was based on the National Institute of Mental Health Diagnostic Interview Schedule (DIS). The DIS is a highly structured survey interview designed to produce diagnoses of specific mental disorders according to the criteria of the Fourth Edition of the Diagnostic and Statistical Manual of the American Psychiatric Association [28]. Persons were considered to currently have an anxiety disorder if any of the following disorders were present within the 12 months prior to the interview: social phobia, agoraphobia, simple phobia, panic disorder, or obsessive compulsive disorder.

Urinary Incontinence

Consistent with our prior analyses [23], persons were classified as having urinary incontinence if any uncontrolled urine loss was reported within the 12 months prior to the interview. Persons were classified as continent if they denied uncontrolled urine loss within the 12 months prior to the interview. Information on urinary incontinence was available for the 12 months prior to the 1994 interviews only.

Urinary Incontinence and Urinary Incontinence Related Functional Loss

Urinary incontinence related functional loss was assessed by four questions in the interview. Participants who reported urinary incontinence were asked if, because of their urinary incontinence, any of the following applied to them: "avoiding social gatherings, visiting friends, or going to church"; "avoiding travel"; "not going shopping"; and "avoiding physical activities." Urinary incontinence was the only condition assessed in the ECA in which functional loss was evaluated in relation to a specific condition. We considered persons with a positive response to any of these questions as indicating that urinary incontinence related functional loss was present.

Medical Conditions

Data on medical conditions were obtained by participant's self-report. The participants were asked if they had ever had the following conditions: diabetes, heart trouble, arthritis, stroke, and cancer. A positive response to any of these conditions was considered as a medical comorbidity.

Other Covariates

Persons were asked about sociodemographic characteristics including age, gender, ethnicity, and education level. Activities of daily living (ADLs) were assessed in relation to standard survey items on getting to bed by oneself, dressing and undressing, taking a bath or shower, using the toilet, and using a knife or fork to cut up food. Instrumental activities of daily living (IADLs) were assessed in terms of preparing meals, cleaning house, using the telephone, keeping track of money and bills, and being able to get together with friends. Impairment of ADL or IADL status was gauged in relation to an inability to perform at least one activity without help, consistent with previous ECA reports [23,29,30]. Cognitive status was assessed with the Mini-Mental State Examination (MMSE; [31]). MMSE scores were analyzed as a continuous variable. Lifetime history of major depression was based on responses to the DIS at the 1994 interview.

Study Sample

A total of 3,481 persons were interviewed in the household survey in Baltimore in 1981; of this number, 1,920 were contacted and interviewed during 1993 to 1996 [32]. In the case of respondents who were too ill or impaired to interview, an informant was enlisted to provide current information on functional and cognitive status. For respondents who required an informant interview, and for a limited number of respondents who completed only a short version of the interview instrument, information on urinary incontinence was not available ($n = 162$). In addition, 35 people were excluded from analysis because participants did not know whether they had been incontinent in the past year. Our study sample included 787 persons aged 50 and older who had complete information on urinary incontinence.

Analytic Strategy

Data analysis was performed using STATA 7.0 for Windows. The analytic plan proceeded in three phases. We first examined bivariate associations between anxiety disorders and urinary incontinence before carrying out multivariate analyses. The second phase consisted of employing separate multivariable logistic regression models to assess the relationship of anxiety disorders to urinary incontinence and urinary incontinence with and without urinary incontinence related functional loss. We examined anxiety disorders separately and as a group. All models were adjusted for age, gender, ethnicity, chronic health conditions, IADL impairment, ADL impairment, cognitive status, lifetime history of major depression, and education level assessed in 1994 by including them in the final models. Our metric for measuring association was the odds ratio. The third phase consisted of using multivariable logistic regression models to examine the relationship of the pattern of anxiety disorders in the 1981 and the 1994 interviews to urinary incontinence and with urinary incontinence related functional loss consistent with the strategy used in another ECA study [23]. This was the only part of the analysis which incorporated data from the 1981 interviews. The third phase examined whether, among persons with urinary incontinence, persons who met criteria for an anxiety disorder in the past report more urinary incontinence related functional loss. Goodness-of-fit was assessed for all multivariable models using the Hosmer-Lemeshow test [33].

RESULTS

Baseline Characteristics

The mean age of our study sample was 67.2 years, and the age range was 50 to 96 years. The participants were 69 percent white and 64 percent women. Of 787 participants, 159 (20 percent) reported having urinary incontinence during the past year. Twenty-nine adults with urinary incontinence (18 percent) reported urinary incontinence related functional loss.

Anxiety Disorders and Urinary Incontinence

Persons meeting criteria for anxiety disorders were not more likely to have urinary incontinence than were persons who did meet criteria for anxiety disorders (unadjusted odds ratio (OR) = 1.36, 95 percent confidence interval (CI) [0.96, 1.93]). These findings were also not significant after adjusting for age, gender, ethnicity, chronic health conditions, IADL impairment, ADL impairment, cognitive status, lifetime history of depression, and education level (adjusted OR = 1.23, 95 percent CI [0.84, 1.79]). A goodness-of-fit diagnostic and plots of the deviance residuals versus fitted values of the logit showed that the observed estimates were not influenced appreciably by any one observation.

Anxiety Disorders and Urinary Incontinence Associated with Urinary Incontinence Related Functional Loss

Additional multivariable analyses were performed incorporating urinary incontinence with and without reported urinary incontinence related functional loss as the dependent variable in the models. Three categories were created: no urinary incontinence, urinary incontinence with urinary incontinence related functional loss, and urinary incontinence without urinary incontinence related functional loss. An overall association of anxiety disorders and these three categories was found ($p < .001$). Results for these analyses are presented in the last row of Table 1. The comparison group consisted of persons without urinary incontinence. Persons who did not report urinary incontinence related functional loss along with urinary incontinence were no more likely than persons without urinary incontinence to meet criteria for any anxiety disorder (unadjusted OR=1.22, 95 percent CI [0.84, 1.78]). However, persons who reported urinary incontinence related functional loss secondary to urinary incontinence were more likely to have an anxiety disorder as measured by the DIS than were persons without urinary incontinence (unadjusted OR = 4.79, 95 percent CI [2.02, 11.39]). These findings remained significant even after adjusting for age, gender, ethnicity, chronic health conditions, IADL impairment, ADL impairment, cognitive status, lifetime history of depression, and education level (OR = 3.98, 95 percent CI [1.61, 9.84]).

Next, we examined individual anxiety disorders separately (see Table 1). When compared to persons without urinary incontinence, persons who reported urinary incontinence related functional loss due to urinary incontinence were not more likely to meet criteria for obsessive compulsive disorder (unadjusted OR = 4.53, 95 percent CI [0.95, 21.68]) at conventional levels of statistical significance. However, in the final model after adjusting for age, gender, ethnicity, chronic health conditions, IADL impairment, ADL impairment, cognitive status, lifetime history of depression, and education level persons who reported urinary incontinence related functional loss were significantly more likely to meet criteria for obsessive compulsive disorder (OR = 5.50, 95 percent CI [1.01, 29.97]). In addition, persons who reported urinary incontinence related functional loss were significantly more likely to meet criteria for social phobia as measured by the DIS than were persons without urinary incontinence (unadjusted OR = 3.43, 95 percent CI [1.46, 8.08]). These findings remained significant in the final model even after adjustment (OR = 2.97, 95 percent CI [1.19, 7.37]). Finally, persons who reported urinary incontinence related functional loss were significantly more likely to meet criteria for simple phobia as measured by the DIS than were persons without urinary incontinence (unadjusted OR = 4.16, 95 percent CI [1.87, 9.30]). These findings also remained significant in the final model after adjustment (OR = 3.34, 95 percent CI [1.44, 7.76]).

Pattern of Psychological Distress Over the 13-Year Follow-Up

We wished to assess whether the relationship between urinary incontinence related functional loss and anxiety disorders was associated with the time course of the psychiatric condition. For these analyses, we restricted our attention to the persons who reported any urinary incontinence at follow-up interviews in 1994 ($n = 154$). Five individuals were excluded from analysis

because complete information on anxiety disorders was not available. The results for these analyses are presented in Table 2. Persons with remitted anxiety disorders (presence of anxiety disorder in 1981 but not in 1994) were not more likely to report urinary incontinence related functional loss than were persons who did not meet criteria for any anxiety disorder both in 1981 and 1994 (unadjusted OR = 1.68, 95 percent CI [0.17, 16.19]). Persons with a new anxiety disorder (anxiety disorder present in 1994 but not in 1981) were more likely to report urinary incontinence related functional loss than were persons never meeting criteria for anxiety disorders (unadjusted OR = 4.57, 95 percent CI [1.55, 13.47]). However, after adjusting for age, gender, ethnicity, chronic health conditions, IADL impairment, ADL impairment, cognitive status, lifetime history of depression, and education level the 95 percent confidence interval of the estimate of association included the null value (OR = 2.99, 95 percent CI [0.86, 10.36]). In contrast, a very strong association with reported functional disability due to urinary incontinence was found for persons who met criteria for anxiety disorders within 12 months of the 1981 and 1994 interviews. Specifically, persons with chronic anxiety disorders were much more likely to report urinary incontinence related functional loss than were persons who never met criteria for anxiety disorders (unadjusted OR = 5.36, 95 percent CI [1.44, 19.91]). These findings remained significant after adjustment (OR = 6.51, 95 percent CI [1.42, 29.86]).

DISCUSSION

In this large study of community-living elderly persons, anxiety disorders were not more common in persons with urinary incontinence. However, persons meeting the criteria for social phobia and simple phobia were more likely to report urinary incontinence associated with changes in day-to-day routines or activities than were persons not meeting the criteria for social phobia and simple phobia. The comorbidity of anxiety disorders and urinary incontinence appears to be associated with excess urinary incontinence related functional disability. Furthermore, persons who persistently met criteria for anxiety disorders in 1981 and 1994 were most likely to report urinary incontinence related functional loss suggesting that anxiety may directly contribute to the occurrence of change in routine or activities that can occur with urinary incontinence.

Before further discussing our findings and placing them within the context of other studies, some potential study limitations deserve comment. First, we did not have prospective data on the presence of urinary incontinence so we were unable to fully delineate the temporal relationships between anxiety disorders and urinary incontinence. However, we did attempt to assess whether pre-existing or new anxiety disorders, determined using prospective data gathered 13 years earlier, were associated with increased reports of urinary incontinence related functional loss among persons with the condition. Second, we did not have information on the type of incontinence (urge, stress, mixed, overflow, or functional) and were therefore unable to make any conclusions concerning different types of incontinence. Third, there is the potential for all the sources of error associated with self-report interview data including imperfect recall and response bias (e.g., socially desirable responding). Study data are based on self-reports, and anxious persons may over-estimate disability. We attempted to mitigate these biases by limiting recall to the previous 12 months, by adjusting for several potentially influential covariates, and by using available prospective data on anxiety disorders. In addition, the self-report of urinary incontinence among community-dwelling older adults has been found to be reliable [34]. Fourth, selection bias is a potential limitation because, although the initial study was based on a community sample, the follow-up data that we used consisted of all people that could be found and re-interviewed. However, studies based on the ECA follow-up data have shown little influence of baseline depression [35] or other psychiatric disturbances including anxiety disorders [32] on loss to follow-up. In addition, because the sample was not restricted to persons using health services, our reported association of anxiety disorders with urinary incontinence is unlikely to be due to Berkson's bias. We were able to adjust our estimates of

association for the presence of depression that commonly accompanies anxiety disorders [36, 37].

Nonetheless, despite limitations our results have important clinical and research implications. Our results should be of interest to researchers and policymakers who seek to understand disability associated with anxiety disorders. At the very least our study provides support to the concept of increased vulnerability to the daily challenges resulting from urinary incontinence in persons with anxiety disorders. Our data did not demonstrate an overall association between persons with anxiety disorders and urinary incontinence. However, persons with anxiety disorders and urinary incontinence were significantly more likely to report changes in day-to-day routines or activities secondary to urinary incontinence. In fact, a positive response to any of the questions addressing how urinary incontinence interferes with daily activities had the strongest association with anxiety disorders. When separate anxiety disorders were examined, persons with urinary incontinence associated with changes in day-to-day routines or activities were found to be more likely to meet criteria for social phobia and simple phobia than were persons with urinary incontinence who did not report urinary incontinence related functional impairment. In addition, in our adjusted models persons meeting criteria for obsessive compulsive disorder were more likely to have urinary incontinence with urinary incontinence related functional loss. In addition, chronic anxiety disorders over the course of a 13-year follow-up were found to be very strongly associated with the report of urinary incontinence related functional loss secondary to urinary incontinence. Specifically, persons with a chronic anxiety disorder who reported urinary incontinence in 1994 were about 6 times as likely to report urinary incontinence related functional impairment secondary to urinary incontinence than were persons who were below the threshold for anxiety disorders at both interviews in 1981 and 1994. This result suggests that anxiety plays a key role in the urinary incontinence disablement process among older persons with urinary incontinence.

Our findings are consistent with many studies that portray an almost uniform picture of anxiety disorders as illnesses that compromise both health and functioning. Markowitz and colleagues found that among persons with panic disorder in the community, 35 percent felt they were in fair or poor physical health [38]. Schneier and colleagues found that more than half of patients with social phobia reported at least moderate impairment in psychosocial functioning at some time in their lives due to social anxiety and avoidance [39]. Kessler and Frank found that individuals with anxiety disorders showed statistically significantly higher rates of work impairment when compared to individuals without anxiety disorders [40]. Our study extends this body of research which emphasizes the important psychosocial and physical health consequences of anxiety disorders.

A next step for research in this area may be to focus on treatments for anxiety disorders or other psychological issues in persons with urinary incontinence. Anxiety disorders may affect a person's ability to benefit from treatments for urinary incontinence. Many older adults that present for treatment of their urinary incontinence may have coexisting anxiety that can interfere with the learning and cooperation necessary for successful treatment. Treatment for urinary incontinence depends on the cause and type of the urinary incontinence. However, treatment of the two most common types of urinary incontinence, stress incontinence and urge incontinence, usually involve pelvic muscle exercises, bladder training, and medications [41-43]. Adherence to these measures that limit urinary incontinence may indeed be hampered by anxiety.

Though not life-threatening, anxiety symptoms may identify persons at increased risk for urinary incontinence related functional loss secondary to urinary incontinence. Accurately identifying older individuals at risk of losing functional abilities is of interest to both clinicians and researchers focused on aging. Successful treatment of anxiety may help older persons lead

an independent life despite urinary incontinence. Furthermore, chronic anxiety disorders may be a marker of a vulnerability for lowered coping effort in individuals with urinary incontinence leading to increased functional impairment. Better understanding of the impact of anxiety disorders on health and quality of life is worthy of further research. Our investigation suggests that when anxiety disorders are present in persons with urinary incontinence, there is an increased likelihood of urinary incontinence related functional loss. Early detection and treatment of anxiety disorders, then, may help to improve functioning in persons with urinary incontinence.

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Table 1

Association between Urinary Incontinence (UI) With and Without Urinary Incontinence Related Functional Loss and Individual Anxiety Disorders

	Crude OR		Adjusted OR	
	UI with UI related functional loss	UI without UI related functional loss	UI with UI related functional loss	UI without UI related functional loss
Social phobia (<i>n</i> = 85)	3.43* [1.46, 8.08]	1.11 [0.61, 2.01]	2.97* [1.19, 7.37]	1.04 [0.55, 1.95]
Agoraphobia (<i>n</i> = 56)	2.32 [0.77, 6.99]	1.39 [0.71, 2.73]	2.08 [0.62, 6.98]	1.08 [0.51, 2.27]
Simple phobia (<i>n</i> = 285)	4.16* [1.87, 9.30]	1.04 [0.71, 1.54]	3.34* [1.44, 7.76]	0.94 [0.62, 1.42]
Panic disorder (<i>n</i> = 6)	5.51 [0.60, 50.92]	1.13 [0.13, 10.23]	1.75 [0.04, 69.34]	1.63 [0.08, 33.89]
Obsessive compulsive disorder (<i>n</i> = 13)	4.53 [0.95, 21.68]	0.45 [0.06, 3.54]	5.50* [1.01, 29.97]	0.36 [0.04, 2.96]
Any anxiety disorder (<i>n</i> = 329)	4.79* [2.02, 11.39]	1.22 [0.84, 1.78]	3.98* [1.61, 9.84]	1.07 [0.72, 1.61]

Note: The comparison group consisted of persons without urinary incontinence. 95 percent confidence interval in brackets. Asterisk denotes $p < 0.05$. OR, odds ratio.

Table 2

Association between Pattern of Anxiety Disorders and Urinary Incontinence with Urinary Incontinence Related Functional Loss ($n = 154$)

Pattern of anxiety disorders	1981	1994	Crude OR	Adjusted OR
Chronic ($n = 20$)	+	+	5.36* [1.44, 19.91]	6.51* [1.42, 29.86]
New ($n = 53$)	–	+	4.57* [1.55, 13.47]	2.99 [0.86, 10.36]
Remitted ($n = 9$)	+	–	1.68 [0.17, 16.19]	1.62 [0.12, 21.82]
None ($n = 72$)	–	–	1.00	1.00

Note: A “+” sign indicates that an anxiety disorder was present at that interview while a “–” sign indicates that an anxiety disorder was not present within 12 months of interview. 95 percent confidence interval in brackets. Asterisk denotes $p < 0.05$. OR, odds ratio.