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THE TEMPORAL RELATIONSHIP BETWEEN ANXIETY DISORDERS AND URINARY INCONTINENCE AMONG COMMUNITY-DWELLING ADULTS

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Abstract

OBJECTIVE—The purpose of this paper was to carefully examine the temporal relationships between anxiety disorders and urinary incontinence among community-dwelling adults.

METHOD—In all, 1,071 persons aged 30 and over were the continuing participants in a population-based longitudinal study of community-dwelling adults. Participants were classified as incontinent if any uncontrolled urine loss within the 12 months prior to the interview was reported. Condition-specific functional loss secondary to urinary incontinence 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 keyed to the diagnostic criteria.

RESULTS—In multivariate models that controlled for potentially influential characteristics the association between urinary incontinence with condition-specific functional loss and newly-incident anxiety disorders was statistically significant (adjusted relative odds (RO) = 2.55, 95% confidence interval (CI) [1.05, 6.20]).

CONCLUSIONS—Urinary incontinence with condition-specific functional loss predicted onset of newly-incident anxiety disorders among community-dwelling adults.

Keywords

Urinary incontinence; anxiety; functional impairment; aged

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1. INTRODUCTION

Urinary incontinence and anxiety disorders are common conditions with important social and psychological consequences. Prevalence estimates of urinary incontinence among community-dwelling adults range from 24 to 34% for men and 41 to 55% for women (Dooley et al., 2008; Minassian, Drutz, & Al-Badr, 2003). The prevalence of anxiety disorders in older adults ranges from 3.2 to 14.2% (Wolitzky-Taylor, Castriotta, Lenze, Stanley, & Craske, 2010). Urinary incontinence affects emotional well-being as well as social functioning. Outpatients describe their experience with incontinence as embarrassing, upsetting, and distressing. 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. Incontinent persons may restrict their activities because of an increased burden of coping, embarrassment, and poor self-perception (Nicolson, Kopp, Chapple, & Kelleher, 2008).

Urinary incontinence related functional loss includes changes in day-to-day routines or activities. The International Continence Society defined urinary incontinence in 1988 as “the involuntary loss of urine that is a social or hygienic problem” recognizing the emotional and physical impact of this symptom (Abrams, Blaivas, Stanton, & Andersen, 1988). In 2003, the definition of urinary incontinence was changed to be more inclusive and now the published definition by the Standardisation Sub-committee of the International Continence Society is “urinary incontinence is the complaint of *any* involuntary leakage of urine” (Abrams et al., 2003). However, urinary incontinence related functional loss may be self-imposed to help manage the disease, through the restriction of social and physical activities (Johnson II, Kincade, Bernard, Busby-Whitehead, & DeFries, 2000). The social implications include loss of freedom and increased social isolation (Nicolson et al., 2008; Tubaro 2004). The need to be near a toilet may result in reduced participation in exercise, household chores, work, and other physical activities. Changes in functioning may be related to feelings of loss of control, shame, and embarrassment. Urinary incontinence may therefore exacerbate anxiety symptoms. Although there is a number of potential mechanisms linking urinary incontinence and anxiety disorders, functional loss secondary to urinary incontinence could lead to worsening of anxiety symptoms over time.

In addition, an underlying anxiety disorder could predispose to urinary incontinence and urinary incontinence related functional loss (Perry, McGrother, & Turner, 2006). Causes of urinary incontinence are incompletely understood and include psychological and physiological factors outside the lower urinary tract. The hypersensitivity of the bladder in urinary incontinence has led researchers to look at psychological factors which may be important including depression and anxiety. Changes in not only the stability but also the sensitivity of the bladder may result in urinary incontinence. Persons with anxiety may be more sensitive to physical symptoms which may in turn influence the experience and presentation of urinary incontinence. Women with anxiety have been found to be more likely to report worsening lower urinary tract symptoms (Gopal et al., 2008). Urinary incontinence related functional loss may also be related to the perception of the ability to control urination. Persons who believe they are at risk for incontinence may be unable to maintain continence and may engage in safety behaviors such as going to the toilet frequently or limiting participation in social activities. Temporal relationships between urinary incontinence and anxiety have not fully been explored.

Prior cross-sectional investigations in clinical and population-based samples have revealed high rates of anxiety symptoms among persons with urinary incontinence (Bogner, Gallo, Swartz, & Ford, 2002; Coyne et al., 2009; Mehta et al., 2003). However, only a few prospective studies have attempted to examine the temporal relationships between urinary

incontinence and symptoms of anxiety with conflicting results. Perry et al. found that anxiety symptoms were predicted by the presence of urge incontinence at baseline and incident cases of urge incontinence were predicted by anxiety symptoms at baseline in a general practice based sample. Anxiety and urge incontinence appeared to exacerbate each other (Perry et al., 2006). Tinetti (1995) found that a high anxiety score on the Spielberger State-Trait Anxiety Inventory was a predisposing factor for urinary incontinence. Heidrich et al. found a cross-sectional association between urinary incontinence and anxiety among community-dwelling elderly women. However, urinary incontinence was not associated with a greater risk of anxiety prospectively over a 6-year period (Heidrich & Wells, 2004). Waetjen (2009) found an association between anxiety during menopausal transition stages and the development of incontinence symptoms. Mechanisms underlying these relationships are unclear. No longitudinal studies have examined urinary incontinence and anxiety disorders over time.

Our investigation differs in several other ways from prior work examining the temporal association between urinary incontinence and anxiety. We employed standardized interviews keyed to the diagnostic criteria for anxiety disorders compared to other prospective studies which have focused on symptoms of anxiety (Heidrich & Wells, 2004; Perry et al., 2006; Tinetti et al., 1995; Waetjen et al., 2009). Our sample is an ongoing prospective observational study allowing for the examination of temporal effects in disease causation over approximately a decade of follow-up, nearly twice the length of follow-up of other studies. Our investigation is strengthened because we are starting with community-dwelling adults without anxiety disorders to consider whether urinary incontinence at baseline is associated with development of an anxiety disorder at follow-up, and in addition, community-dwelling adults without urinary incontinence to consider whether anxiety at baseline is associated with development of urinary incontinence at follow-up. Our data include variables for the assessment of self-imposed functional loss resulting in lifestyle modifications specific to urinary incontinence allowing for the examination of the role of condition-specific functional loss as a potential mechanism underlying the association between urinary incontinence and anxiety.

The purpose of this paper was to carefully examine the temporal relationships between anxiety disorders, urinary incontinence, and urinary incontinence related functional loss among a community sample of adults. We hypothesized: 1) persons with urinary incontinence and condition-specific functional loss would be more likely than incontinent persons without condition-specific functional loss to meet criteria for newly-incident anxiety disorders; and 2) persons with anxiety disorders would be more likely than persons without anxiety disorders to develop newly-incident urinary incontinence with condition-specific related functional loss.

2. METHOD

2.1 The Epidemiologic Catchment Area Program

The Epidemiologic Catchment Area (ECA) Program was a survey of psychiatric disorders in the general population conducted by the National Institute of Mental Health (NIMH) between 1980 and 1984 at five university-based sites in the United States. The Baltimore site of the ECA Program (Eaton & Kessler, 1985) probabilistically sampled 175,211 adult household residents in Eastern Baltimore in 1981, selecting 4,238 persons for participation. Among persons selected, 3,481 completed household interviews (82% of persons selected by random sample). In 1982, a second wave of interviews was conducted among 2,768 participants interviewed in 1981 (79.5%). Between 1993 and June of 1996, 1,920 of participants interviewed in 1981 (69.4%) were interviewed again (Eaton et al., 1997) (Since most interviews were conducted in 1993 this wave is referred to as 1993). Between 2004

and 2005, 1,071 participants interviewed in the prior wave (1993–1996) were interviewed again (55.8%) (Since most interviews were conducted in 2004 this wave is referred to as 2004). Data collected in 1993 and in 2004 are included in our analysis. Urinary incontinence was not assessed between 1981 and 1982 and therefore data from this wave are not included in our analysis. ECA data were obtained through highly structured interviews in a private place, usually the participant's home. At the baseline interview participants gave permission for future follow-up. The protocol was approved by the Committee on Human Research of the Johns Hopkins University Institutional Review Board. The ECA study design and methods have been described in detail elsewhere (Bogner, de Vries, Maulik, & Unutzer, 2009).

2.2 Urinary incontinence

The symptom of urinary incontinence was assessed by the question: “Have you ever had any difficulty in controlling your water, that is, losing your urine or having trouble getting to the bathroom on time?” which conforms to the current definition of the symptom of urinary incontinence provided by the International Continence Society (Abrams et al., 2003). Persons reporting any uncontrolled urine loss within the 12 months prior to the interview were classified as having urinary incontinence. Persons denying uncontrolled urine loss within the 12 months prior to the interview were classified as continent.

2.3 Urinary incontinence and condition-specific functional loss

Four questions assessed condition-specific functional loss associated with urinary incontinence. Participants were asked if their urinary incontinence resulted in: “avoiding social gatherings, visiting friends, going to church or traveling”; “not going shopping”; and “avoiding physical activities.” Urinary incontinence was the only condition in the ECA assessing condition-specific functional loss. Participants with a positive response to any of these questions were categorized as having condition-specific functional loss due to urinary incontinence.

2.4 Anxiety Disorders

The diagnoses of anxiety disorders were 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 Third Edition of the Diagnostic and Statistical Manual of the American Psychiatric Association. 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, panic disorder, or obsessive compulsive disorder.

2.5 Covariates

Gender, educational attainment (less than high school or greater than high school), self-identified ethnicity (white or non-white), and marital status were assessed using standard questions. Activities of daily living (ADLs) were assessed by standard survey items on using the toilet, knife or fork to cut up food, getting to bed by oneself, dressing and undressing, and taking a bath or shower. Instrumental activities of daily living (IADLs) were assessed by standard survey items on keeping track of money and bills, being able to get together with friends preparing meals, cleaning house, and using the telephone. Consistent with previous ECA reports (Bogner, 2004; Bogner & Gallo, 2002; Bogner et al., 2002), individuals were characterized as having ADL or IADL impairment at follow-up if they were unable to perform at least one activity without help.

The Mini-Mental State Examination (MMSE) is a short standardized mental status examination widely employed for clinical and research purposes (Folstein, Folstein, & McHugh, 1975). MMSE scores were analyzed as a continuous variable. Participants were asked if they had ever had diabetes, heart trouble, arthritis, stroke and cancer. A positive response to any of these conditions was considered a medical comorbidity.

2.6 Study sample

Of the 1,920 persons interviewed in the household survey in Baltimore in 1993, 1,071 were again interviewed in 2003 and 2004. Our investigation consisted of creating two risk sets. In one risk set, we aimed to examine the relationship between condition-specific functional loss due to urinary incontinence in 1993 and newly-incident anxiety disorders in 2004. In order to examine the onset of anxiety disorders directly, we excluded 297 adults because their interview data showed that an anxiety disorder had developed prior to the 1993 interview. These exclusionary criteria allowed us to begin the observation interval with a cohort of individuals who had never met criteria for an anxiety disorder. In addition, 59 people were excluded because they did not have complete data for other variables in our analysis, leaving a sample size of 715 for the first risk set. In a second risk set, we aimed to examine the relationship between anxiety disorders in 1993 and newly-incident urinary incontinence in 2004. In order to examine the onset of urinary incontinence directly, we excluded adults if they reported urinary incontinence in 1993. These exclusionary criteria allowed us to begin the observation interval with a cohort of individuals without urinary incontinence. In all, 190 people were excluded because they reported urinary incontinence in 1993 and 75 people were excluded because they did not have complete data for other variables in our analysis, leaving a sample size of 805 for the second risk set.

2.7 Analytic Strategy

The analytic plan proceeded in three phases. The first phase consisted of examining bivariate associations between anxiety disorders, urinary incontinence, and other important variables before carrying out multivariate analyses. The second phase consisted of employing separate multivariable logistic regression models to assess the relationship of anxiety disorders in 1993 to newly-incident urinary incontinence with and without condition-specific functional loss in 2004. The third phase consisted of employing separate multivariable logistic regression models to assess the relationship of urinary incontinence with and without condition-specific functional loss in 1993 to newly incident anxiety disorders in 2004. We examined anxiety disorders separately and as a group. Multivariable models adjusted for age, gender, education level, ethnicity, ADL impairment, IADL impairment, and chronic health conditions by including them in the final models. All multivariate models were assessed for goodness-of-fit using the Hosmer-Lemeshow test (Hosmer & Lemeshow, 1989).

3. RESULTS

3.1 Urinary Incontinence and Newly-incident Anxiety Disorders

Our first risk set included 715 individuals who had never met criteria for an anxiety disorder in 1993. The mean age of our first risk set was 48.3 years, and the age range was 30 to 86 years. The participants were 62.1% white and 59.6% women. Of 715 participants, 120 (16.8%) reported having urinary incontinence during the past year. Among persons who reported having urinary incontinence, 88 of 120 (73.3%) participants were aged 30 to 59 and 32 of 120 (26.7%) were aged 60 and older. Twenty-five adults with urinary incontinence (20.8%) reported condition-specific functional loss.

The association between UI and newly-incident anxiety disorders was examined using multiple logistic regression. Persons with urinary incontinence in 1993 were more likely to meet criteria for a newly-incident anxiety disorder in 2004 than were persons without urinary incontinence in 1993 (unadjusted relative odds (RO) = 2.03, 95% confidence interval (CI) [1.21, 3.40]). These findings did not remain statistically significant after adjusting for age, gender, education level, ethnicity, ADL impairment, IADL impairment, and chronic health conditions (adjusted RO = 1.52, 95% CI [0.86, 2.68]).

3.2 Urinary Incontinence, Urinary Incontinence with Condition-specific Functional Loss, and Newly-incident Anxiety Disorders

Multivariate analyses incorporating UI with and without condition-specific functional loss were performed. Three categories were created: no urinary incontinence, urinary incontinence with condition-specific functional loss, and urinary incontinence without condition-specific functional loss. Results for these analyses are presented in the last row of Table 1. The comparison group consisted of persons without urinary incontinence. Persons with UI with condition-specific functional loss in 1993 were more likely to meet criteria for a newly-incident anxiety disorder in 2004 than were persons without UI in 1993 (unadjusted RO = 3.46, 95% CI [1.53, 7.85]) and (adjusted RO = 2.55, 95% CI [1.05, 6.20]). A goodness-of-fit diagnostic and plots of the deviance residuals versus fitted values predicted by the model showed that the coefficient estimates were not influenced appreciably by any one observation.

Next, we examined individual anxiety disorders separately (see Table 1). When compared to persons without urinary incontinence, persons who reported urinary incontinence with condition-specific functional loss in 1993 were more likely to meet criteria for panic disorder in 2004 (unadjusted RO = 5.60, 95% CI [1.43, 21.20]). However, in the final model after adjusting for age, gender, education level, ethnicity, ADL impairment, IADL impairment, and chronic health conditions these findings did not remain statistically significant (RO = 3.48, 95% CI [0.79, 15.34]).

3.3 Anxiety Disorders and Newly-incident Urinary Incontinence

Our second risk set included 805 individuals who did not report UI in 1993. The mean age of our second risk set was 47.1 years, and the age range was 30 to 86 years. The participants were 60.4% white and 57.0% women. Of 805 participants, 189 (23.5%) met criteria for an anxiety disorder.

The association between anxiety disorders and newly-incident UI was examined using multiple logistic regression. Persons who met criteria for an anxiety disorder in 1993 were more likely to report newly-incident UI in 2004 than were persons who did not meet criteria for an anxiety disorder in 1993 (unadjusted RO = 1.67, 95% CI [1.05, 2.66]). These findings did not remain statistically significant after adjusting for age, gender, education level, ethnicity, ADL impairment, IADL impairment, and chronic health conditions (RO = 1.55, 95% CI [0.94, 2.55]).

3.4 Anxiety Disorders, Newly-incident Urinary Incontinence, and Newly-incident Urinary Incontinence with Condition-specific Functional Loss

Multivariate analyses incorporating newly-incident UI with and without condition-specific functional loss were performed. Results for these analyses are presented in the bottom row of Table 2. Persons who met criteria for an anxiety disorder in 1993 were more likely to report newly-incident UI with condition-specific functional loss in 2004 than were persons who did not meet criteria for an anxiety disorder in 1993 (unadjusted RO = 2.07, 95% CI [1.16, 3.69]). These findings approached but did not reach statistical significance after adjusting

for age, gender, education level, ethnicity, ADL impairment, IADL impairment, and chronic health conditions (RO = 1.79, 95% CI [0.97, 3.30]).

Next, we examined individual anxiety disorders separately (see Table 2). Persons who met criteria for panic disorder in 1993 were more likely to report newly-incident urinary incontinence with condition-specific functional loss in 2004 compared to persons who did not meet criteria for panic disorder in 1993 (unadjusted RO = 9.87, 95% CI [1.95, 49.85]) and (adjusted RO = 8.63, 95% CI [1.62, 45.88]). Persons who met criteria for agoraphobia in 1993 were more likely to report newly-incident urinary incontinence with condition-specific functional loss in 2004 compared to persons who did not meet criteria for agoraphobia in 1993 (unadjusted RO = 2.56, 95% CI [1.22, 5.33]) and (adjusted RO = 2.27, 95% CI [1.01, 5.09]). The small number of persons with UI without UI related functional loss and a diagnosis of panic disorder precludes estimation of a stable relative odds estimate for the corresponding cells in Table 2.

4. DISCUSSION

According to this large study of community-dwelling adults, persons reporting urinary incontinence associated with changes in day-to-day routines or activities in 1993 were more likely to meet the criteria for a newly-incident anxiety disorder in 2004 than were persons who did not report urinary incontinence in 1993. In our initial analyses, meeting criteria for an anxiety disorder in 1993 also signaled an increased risk of newly-incident urinary incontinence with changes in day-to-day routines or activities in 2004. However, when the multiple regression model was used to control for potentially influential covariates, persons meeting criteria for an anxiety disorder in 1993 were no more likely to report newly-incident urinary incontinence with changes in day-to-day routines or activities in 2004 than were persons who did not meet criteria for an anxiety disorder in 1993. When we examined anxiety disorders separately, persons meeting the criteria for agoraphobia and panic disorder in 1993 were more likely to report newly-incident urinary incontinence associated with changes in day-to-day routines or activities in 2004 than were persons not meeting the criteria for agoraphobia and panic disorder in 1993. Anxiety disorders appear to be a consequence of excess urinary incontinence related functional disability, and panic disorder and agoraphobia may also be a risk factor for urinary incontinence with condition-specific functional loss.

Before further discussing our findings and placing them within the context of other studies, some potential study limitations deserve comment. First, only recently have several validated questionnaires that measure type (urge, stress, or mixed) and severity of urinary incontinence been published (Hagen, Hanley, & Capewell, 2002; Litwin et al., 2005; van der Vaart, de Leeuw, Roovers, & Heintz, 2003). Because we were not able to use one of these instruments in 1993, our measure of urinary incontinence may be limited. However, utilizing these instruments in 2004 when they were available would have meant significant measurement changes and a loss in the ability to make individual longitudinal comparisons between 1993 and 2004. Furthermore, a crude examination of all types of urinary incontinence together would likely reduce the chance of finding an association with anxiety disorders, and would have biased our results toward the null. In addition, the symptom of UI as measured by the Baltimore site of the ECA is consistent with the current International Continence Society definition (Abrams et al., 2003). Therefore, the symptom of urinary incontinence in our study would be expected to be comparable with other published studies that also report urinary incontinence based on this same definition. Second, 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 and by adjusting for several potentially influential covariates. In addition, the self-report of urinary incontinence among community-dwelling adults has been found to be reliable (Resnick, Beckett, Branch, Scherr, & Wetle, 1994). 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 depression or other psychiatric disturbances at baseline on loss to follow-up (Eaton et al., 2008).

Nonetheless, despite limitations our results should be of interest to researchers and policymakers who seek to understand risk factors for urinary incontinence and anxiety disorders. Our findings are consistent with many studies that have found that anxiety and medical problems can have a reciprocal influence (Kogan, Edelstein, & McKee, 2000). Our study assesses temporal effects in disease causation of urinary incontinence and anxiety over approximately a decade of follow-up, the longest period of follow-up for data has been examined to-date. We created a risk set allowing for the assessment of temporal sequence of urinary incontinence at baseline with the development of an anxiety disorder at follow-up, and in addition, anxiety at baseline with development of urinary incontinence at follow-up. Standardized diagnostic criteria for anxiety disorders were employed, as opposed to symptoms of anxiety employed in previous research, in assessing the relationship between urinary incontinence and anxiety allowing for application in a broader range of settings and the examination of the effects of distinct anxiety disorders. Our data demonstrated a bidirectional relationship between anxiety disorders and urinary incontinence. Urinary incontinence and anxiety appear to interact and exacerbate each other. 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. In particular, persons who reported urinary incontinence with changes in day-to-day routines or activities secondary to urinary incontinence were more likely to meet the criteria for a newly-incident anxiety disorder. In fact, a positive response to any of the questions addressing how urinary incontinence interferes with daily activities had the strongest association with newly-incident anxiety disorders. Urinary incontinence may lead to anxiety or concern about the possibility of a urinary accident in public.

When separate anxiety disorders were examined, persons who met the criteria for agoraphobia and panic disorder in 1993 were more likely to report urinary incontinence associated with changes in day-to-day routines or activities in 2004 than were persons who did not meet the criteria for agoraphobia and panic disorder in 1993. Persons with panic disorder may be excessively apprehensive and less tolerant of a mild physical symptom. Persons with agoraphobia may have excessive worry about a catastrophic outcome from an urinary accident in a public space. Panic disorder has been conceptualized as being influenced by neuroanatomic pathways related to vigilance for somatic sensations, resulting in greater perceptions of somatic cues and consequent spiraling of anxiety and panic (Bouton, Mineka, & Barlow, 2001). Evidence suggests that patients with panic disorder compared to those with other anxiety disorders may be more sensitive to benign stimuli (Charney, 2003). In patients with urinary incontinence who have panic disorder, loss of urine or other physical sensations and cognitions associated with incontinence may plausibly become false alarms which trigger a panic attack and become integrated into a fear network in the brain. The result is that in addition to the physical impairments associated with urinary incontinence, patients can also become disabled by panic attacks and avoidant behavior such as agoraphobia. Patients with panic disorder have been shown to have a history of negative life events and stressors frequently precede the development of agoraphobia or panic attacks (Last, Barlow, & O'Brien, 1984). In addition to neurobiological and cognitive theories of anxiety, functional disability and symptoms associated with urinary incontinence may

constitute stressors which increase the vulnerability of a person who is already predisposed to anxiety. These results suggest urinary incontinence can not only lead to anxiety but that anxiety may also play a key role in the urinary incontinence disablement process.

In summary, urinary incontinence with condition-specific functional loss may identify persons at increased risk for meeting criteria for a newly-incident anxiety disorder. If replicated and clarified in other studies, these observations could have important implications for the design of preventive interventions. On the other hand, panic disorder and agoraphobia signaled an increased risk of newly-incident urinary incontinence with condition-specific functional loss. Anxiety disorders may be a marker of vulnerability signaling an increased likelihood of urinary incontinence with condition-specific functional loss. The comorbidity of anxiety disorders and urinary incontinence appears to be associated with excess urinary incontinence related functional disability. Improving our ability to identify older individuals at risk for chronic conditions such as urinary incontinence, functional loss, and anxiety is of interest to both clinicians and researchers.

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Table 1

Association between urinary incontinence (UI) with and without condition-specific functional loss in 1993 and newly-incident anxiety disorders in 2004 (n = 715)

	Social phobia (n = 34)	Agoraphobia (n = 37)	Panic disorder (n = 16)	Obsessive compulsive disorder (n = 13)	Any anxiety disorder (n = 87)
UI with UI related functional loss					
Crude RO	1.64 [0.37, 7.26]	1.99 [0.58, 6.85]	5.60* [1.43, 21.20]	1.70 [0.22, 13.68]	3.46* [1.53, 7.85]
Adjusted RO	1.54 [0.32, 7.36]	1.24 [0.34, 4.50]	3.48 [0.79, 15.34]	1.87 [0.22, 15.73]	2.55* [1.05, 6.20]
UI without UI related functional loss					
Crude RO	2.19 [0.96, 5.02]	1.07 [0.40, 2.81]	1.88 [0.51, 6.95]	0.54 [0.07, 4.23]	1.63 [0.88, 3.00]
Adjusted RO	2.23 [0.90, 5.49]	0.79 [0.29, 2.20]	1.39 [0.35, 5.51]	0.40 [0.05, 3.37]	1.27 [0.66, 2.45]

Note: The comparison group consisted of persons without urinary incontinence. 95% Confidence Interval in brackets.

Asterisk denotes $p < 0.05$. RO, relative odds.

Table 2

Association between anxiety disorders in 1993 and newly-incident urinary incontinence (UI) with and without condition-specific functional loss in 2004 (n = 805)

	UI with UI related functional loss	UI without UI related functional loss
Social phobia (n = 118)		
Crude RO	1.40 [0.69, 2.87]	1.56 [0.73, 3.33]
Adjusted RO	1.25 [0.59, 2.64]	1.58 [0.72, 3.47]
Agoraphobia (n = 86)		
Crude RO	2.56* [1.22, 5.33]	0.80 [0.24, 2.66]
Adjusted RO	2.27* [1.01, 5.09]	0.76 [0.22, 2.63]
Panic disorder (n = 14)		
Crude RO	9.87* [1.95, 49.85]	No estimate
Adjusted RO	8.63* [1.62, 45.88]	No estimate
Obsessive compulsive disorder (n = 18)		
Crude RO	4.35 [1.10, 17.23]	3.37 [0.68, 16.60]
Adjusted RO	2.62 [0.55, 12.43]	1.71 [0.29, 9.90]
Any anxiety disorder (n = 189)		
Crude RO	2.07* [1.16, 3.69]	1.26 [0.63, 2.52]
Adjusted RO	1.79 [0.97, 3.30]	1.21 [0.58, 2.52]

Note: The comparison group consisted of persons who did not meet criteria for an anxiety disorder. The number of persons with UI without UI related functional loss and a diagnosis of panic disorder was too small to yield a stable relative odds estimate. 95% Confidence Interval in brackets.

Asterisk denotes $p < 0.05$. RO, relative odds.