



Depression and the incidence of urinary incontinence symptoms among young women: Results from a prospective cohort study



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ABSTRACT

Objective: To examine the association of depressive symptoms with subsequent urinary incontinence (UI) symptoms among young women.

Subjects and methods: Data were from a cohort of 5391 young women (born 1973–1978) from the Australian Longitudinal Study on Women's Health. Generalised Estimating Equations (GEEs) were used to link depressive symptoms, and history of doctor diagnosed depression at Survey 2 (S2) in 2000 with the incidence of UI symptoms in subsequent surveys (from S3 in 2003 to S6 in 2012).

Results: 24% of women reported the incidence of UI over the nine-year study period, while the prevalence rose over time from 6.8% (at S2, aged 22–27 years) to 16.5% (at S6, aged 34–39). From univariable GEE analysis, women with depressive symptoms or a history of depression were more likely to report subsequent UI symptoms. This remained after adjusting for socio-demographic, body mass index, health behaviours and reproductive factors, with depressive symptoms associated with 37% higher odds (odds ratio 1.37, 95% CI 1.16 to 1.61) and history of depression with 42% higher odds (1.42, 1.17 to 1.74) of incidence of UI.

Conclusions: When woman seek treatment for UI symptoms, health professionals should consider her current or history of depression.

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1. Introduction

Urinary incontinence (UI) has a detrimental impact on quality of life and overall health perception [1–9], and is estimated to affect between 25% and 45% of Australian women [8]. Studies have established that depression and UI are often comorbid [10–16], but the role of depression as a cause or consequence of UI is less clear. Furthermore, previous studies have primarily focussed on mid-age and older women, with the result that much less is known of the aetiology of UI and links between depression and the condition among younger women [5].

Findings from studies of UI with a wide age range of women has shown that various socio-demographic, and reproductive factors, and lifestyle factors, including being overweight or obese, having had a hysterectomy are associated with mixed (urge and stress) UI symptoms, while having given birth or being obese are linked with stress incontinence [4,8,9]. Depression, and superficially its temporal relationship with UI, was investigated by longitudinal study of

mid-age women in the US that found the onset of UI was predicted by major depression at baseline, whereas UI did not increase the risk of subsequent depression [17]. This result is consistent with earlier research involving mid-age and older women, though the findings there suggested that the relationship of depression related to subsequent stress UI rather than urge UI [18,19].

This study draws on a decade of longitudinal data from a cohort of young Australian women to describe the prevalence of UI symptoms in this age group and to investigate the relationship between depression and subsequent reporting of UI symptoms, while controlling for a range of socio-demographic and reproductive factors, body mass index (BMI), and health behaviours.

2. Methods

2.1. Study population

The Australian Longitudinal Study on Women's Health (ALSWH) is a broad-ranging, national prospective study of factors affecting health and wellbeing of Australian women. In 1996, wide-ranging baseline survey data were collected for more than 40,000 women in three age cohorts: the 1973–1978 cohort (aged 18 to 23 years in

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1996) that is the subject of this study; the 1946–1951 cohort; and the 1921–1926 cohort. Women in the 1996 sample were randomly selected from the national health insurance database (Medicare), which includes all Australian citizens and permanent residents. Women from rural and remote areas were deliberately oversampled. Informed consent was obtained from all participants, and approval was obtained from ethics committees at the University of Newcastle and the University of Queensland. Further details of the recruitment methods and response rates have been described elsewhere [20].

2.2. Participants

The sample for this study is drawn from women in the 1973–1978 cohort who provided data from survey 2 (S2) in 2000 onwards (as detailed symptoms of depression were not collected at the 1996 baseline survey): S2 ($n=9688$), S3 in 2003 ($n=9081$), S4 in 2006 ($n=9145$), S5 in 2009 ($n=8200$), and S6 in 2012 ($n=7968$). Less than five per cent of the women were excluded from the analysis due to omitting information on symptoms of urinary incontinence or depression. The final sample sizes in the current analysis were $n=9316$, 8897, 8920, 7931 and 7809 for S2 to S6, respectively, with a restricted sample of 6461 women who provided data at all five surveys. All variables listed below were ascertained at each survey unless indicated otherwise.

2.3. Study outcome

At each survey S2 to S6, women were asked whether they had experienced leaking urine in the past 12 months. Response options were: never, rarely, sometimes, or often. Women were considered to have had UI symptoms at a particular survey only if they reported experiencing leaking urine ‘sometimes’, or ‘often’.

2.4. Exposure variables

Depressive symptoms. These were measured using the Center for Epidemiologic Studies Depression Scale (CESD-10), a standardised scale designed to screen for depression symptoms experienced in the past week [21]. Scores range from 0 to 30, with scores 10 or higher indicating significant levels of depressive symptoms [21]. Thus, in the present study scores were dichotomised such that women were either identified as having depressive symptoms (CESD-10 scores of 10 and above) or not (scores below 10).

History of depression. At S2 women were asked “have you ever been told by a doctor that you have depression: in the last four years, more than four years ago.” Women who provided an affirmative answer to either question were classified as having a history of depression.

Antidepressant use. At S2, S3, and S4 women were asked if they had used prescription medication for depression in the past four weeks. At S5 women were asked to write down the names of all their medications that they have taken in the last four weeks and these were classified as antidepressant or not according to the Anatomical-Therapeutic-Chemical (ATC) drug classification system.

2.5. Covariates

The following variables were included in the analysis as potentially confounding variables [1] and were collected at every survey unless indicated otherwise: area of residence (urban, rural, or remote); highest educational attainment (year 12 or less, apprenticeship/certificate/diploma, university degree, or higher university degree); oral contraceptive pill use (yes or no); maternal age at first birth in years (nulliparous, less than 20 years, 20 to 25, 25.1 to 30

years, more than 30.1 years); number of deliveries – reported at S6 – during which a vaginal tear requiring stitching occurred (0, 1, or 2 or more tears); and parity (0, 1, 2 or 3 or more children).

Body mass index (BMI) was calculated, from self-report weight and height, as weight (in kg) divided by height squared (in metres). BMIs were classified as: underweight (BMI <18.5), acceptable weight (BMI \geq 18.5 and <25), overweight (BMI \geq 25 and <30), obese (BMI \geq 30) [9]. A physical activity score was derived from questions on frequency and total duration of various types of activity (inactive, low, moderate, high) [22]. Cigarette smoking was classified as none, past, or current smoker; and alcohol consumption as non-drinker, rarely, low-risk or risky, high-risk drinker [23].

2.6. Data analysis

The prevalence of UI symptoms at each survey over the study period (S2 to S6) was calculated using the restricted sample of women from the cohort who responded to all five surveys with respect to UI symptoms and depression.

The incidence of UI symptoms at a particular survey was defined by the presence of symptoms at that survey and absence of symptoms at all preceding surveys. Chi-squared analyses were used to compare the characteristics of women at S2 who developed UI symptoms between S3 and S6 with those who remained symptom-free.

Generalised estimating equation (GEE) models were then used to relate each of depressive symptoms, use of antidepressant, history of depression (at S2), socio-demographic characteristics, reproductive factors, and BMI and health behaviours reported at S2 to S5 with the incidence of UI symptoms at the immediately subsequent survey (S3 to S6). The GEE model was used to handle the multiple observations from each woman. The analyses were performed using the GENMOD procedure in SAS with a logit link function and an exchangeable correlation structure. Women without UI symptoms were considered as the reference category.

To obtain a fully adjusted model relating depression with the incidence of UI symptoms the analysis was carried out in a series of steps. First the univariable GEE analysis was repeated but using the restricted sample of women with responses on UI symptoms across all the surveys to identify unadjusted associations between the incidence of urinary incontinence and each exposure: depressive symptoms, history of depression, use of antidepressant; and confounding variables: socio-demographic factors, reproductive factors, BMI and health behaviours. Factors that were significant at the 10% level with the incidence of urinary incontinence were then selected for inclusion in the multivariable model to reveal the extent to which the effects of depression, history depression, and antidepressant use were associated with age and survey years (Model 1), then attenuated by reproductive factors (Model 2) and then attenuated further by socio-demographic factor, BMI, alcohol intake and physical activity level (Model 3). Statistical analysis was conducted using SAS version 9.2, and differences with p -values <0.05 were considered to be statistically significant.

3. Results

From the restricted sample, the prevalence of UI symptoms (Fig. 1) increased with age from 6% at S2 when the women were aged 22–27 years to 16% by S6 (aged 34–39 years). Women with depressive symptoms (CES-D \geq 10), however, reported a consistently higher prevalence of UI symptoms, rising from 9% at S2 to more than 21% at S6.

Similar results were evident for the incidence of UI symptoms (Table 1), which were reported by one in four women (24.6%) between S3 and S6, with differences evident across a range of

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