

# A Cross-sectional Case-control Study of Depression in Incontinent Women

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ABSTRACT

**Background:** Urinary incontinence (UI) presents in over 50% menopausal women affecting their quality of life leading to depression and hence needs addressal and treatment as very few of them seek medical help. **Aims:** Our aim was to determine the prevalence of depression, and the correlation of severity of UI with depression in incontinent women versus continent controls. **Methodology:** A cross-sectional case-control study of previously diagnosed 100 incontinent women (Stress/Urgency/Mixed) was done over a period of 3 months. The severity of UI was assessed on Patient Incontinence Severity Assessment (a form of Likert scale) and depression was assessed on a validated Patient Health Questionnaire-9 scale. **Statistical Analysis:** The statistical analysis was performed using SPSS version 19.0. **Results:** Most of our cases were 51–60 years, with Urge UI being the most predominant (88%). Hundred percent of our incontinent patients were depressed, with 48% and 45% being severely and moderately severely depressed, respectively. A highly significant correlation was found between the severity of incontinence, amount of leakage, leaking pattern, and depression. **Conclusion:** All of our incontinent patients were depressed, with the severity of depression increasing with the severity of incontinence.

**KEYWORDS:** Amount of leakage, depression, leaking pattern, Patient Health Questionnaire-9, Patient Incontinence Severity Assessment, urinary incontinence

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## INTRODUCTION

Urinary incontinence (UI) affects 8% of women aged 16–64 years.<sup>[1]</sup> Labeled as a social problem with a prevalence rate of over 50% in postmenopausal women, it is more common than other civilization diseases like diabetes or hypertension in this age group.<sup>[2]</sup> UI significantly affects quality of life (QOL) of women leading to depression.<sup>[3,4]</sup> Sadly fewer than half of these women seek medical help.<sup>[5,6]</sup> Urge UI (UUI) is most commonly associated with depression as compared to its other two types (Stress UI and Mixed UI).<sup>[7]</sup> Therefore, this associated depression is paramount to be identified. As high as 60.6% of women take it as normal part of their aging process and adapt to it by socially withdrawing themselves and various lifestyle modifications.<sup>[8]</sup> Weakness of pelvic floor muscles due to childbirth and vaginal surgeries along with declining estrogen levels after menopause is often implicated for

urethral hypermobility and detrusor irritability and hence UI.<sup>[9]</sup> There is a dearth of literature as regards depression in incontinent menopausal women, so this study was aimed to bring attention to this strata of women who are suffering silently and are often ignored. We aimed to determine the prevalence of depression in incontinent women versus continent controls and to determine the correlation between the severity of UI and depression.

## MATERIALS AND METHODS

This study was conducted in the urogynecology division of the department of obstetrics and gynecology of

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a tertiary care teaching hospital as a cross-sectional case-control study over a period of 3 months after obtaining ethical clearance from the Institutional Ethics Committee. 100 patients of previously diagnosed incontinence (Stress/Urge/Mixed) already coming to the OPD for follow-up were taken as cases. Similar demographically matched 100 healthy female relatives accompanying the patients without incontinence were taken as controls. The subjects were excluded from the study if they had any one of the following factors: (1) Depression due to issue other than the UI itself, (2) Physical causes of depression, (3) Normal bereavement, (4) History of maniac/hypo maniac episode, (5) UI due to senile dementia, (6) Patients with neurological disorders such as multiple sclerosis and GB syndrome, (7) Current UTI, and (8) Genitourinary fistula.

A detailed history as regards their demographic characteristics, name, age, married status, current medical complaints, medical and surgical history, gynecological history, urological history, obstetric history, menopausal status, and current medications was taken. The severity of incontinence experienced by the patient was assessed by Patient Incontinence Severity Assessment (PISA) index, which consists of a single question that asks the patient to rate the severity of her incontinence symptoms on a 5-point Likert scale (range: 1 [mild] to 5 [severe]).<sup>[10]</sup> Number of medical visits to the doctor for UI in the last 1 year, number of episodes of leakage (scale: 1 = not at all, 2 = 1–2 times per month, 3 = 4 times per month, 4 = 2–3 times per week, 5 = 1 time per day, 6 = 1–2 times per day, 7 = 3–4 times per day, and 8 =  $\geq$ 5 times per day), and amount of leakage (scale: 1 = small amount, 2 = moderate amount, 3 = large amount) was asked. To diagnose depression, the Prime-MD Patient Health Questionnaire, 9-item (PHQ-9) was used, in conformity with the Diagnostic and Statistical Manual of Mental Disorders, 4<sup>th</sup> Edition (DSM-IV) criteria for major depression after permission. It has excellent agreement with diagnosis of major depression based on a psychiatric structured interview and has been especially validated for use in obstetrics and gynecology outpatient clinics.<sup>[11]</sup> The PHQ-9 scores of 0–4, 5–9, 10–14, 15–19, and 20–27 represents none or minimal, mild, moderate, moderately severe, and severe depression, respectively. PHQ-9 score of  $\geq$ 10 has 88% sensitivity and specificity for major depression. The questions in PHQ-9 are straightforward pertaining to depressive symptoms perceived over the past 2 weeks.<sup>[12]</sup> All women, cases and controls, were asked to answer the PHQ-9 questionnaire after taking a written and informed consent. The data so collected were kept confidential. The statistical analysis was performed using IBM SPSS Statistics for Windows,

version 19 (IBM Corp., Armonk, N.Y., USA) Pearson Chi-square was applied to assess the various correlations in the data.

## RESULTS

Most of our cases were 51–60 years (57%) of age, with all of them being menopausal. The majority of them were married (84%), having a parity of three (76%), belonging to low socio-economic status (SES) (62%), with only primary level of education (76%) and having a body mass index (BMI) between 25 and 29.9 Kg/m<sup>2</sup> (70%). Vaginal route of delivery was the commonest (91%). Suitably matching controls as regards to age, menopausal status, parity, education, SES, BMI, and mode of delivery were chosen to remove any kind of confounding variables [Table 1].

Eighty-eight percent of cases had UUI, and 6% each had SUI and MUI. All of our cases (100%) used pads for leakage and 100% of them said yes to social withdrawal. The amount of leakage was rated as 3 in 52%, 2 in 45%, and 1 in only 3%. The leaking pattern was rated as 7 in 50% followed by 6 in 28% of cases. The severity of incontinence (PISA) was rated as 5 by 46%, 4 by 49%, 3 by 5% and none of them marked 1 or 2, meaning thereby that most of our cases felt the severity of their incontinence as severe. Maximum daytime frequency was 12 in 34% of patients and maximum nighttime frequency (nocturia) was 4 in 41%.

The prevalence of depression (PHQ-9 scoring) showed that among UI women, as high as 48% suffered from severe depression, and 45% from moderately severe depression versus 0% and only 4% respectively for continent women ( $P < 0.001$ , highly significant) [Table 2].

Furthermore, the severity of depression (PHQ-9 Score) increased with the increase in severity of UI (PISA on Likert scale) ( $P < 0.001$ , highly significant) [Table 3].

We also correlated the amount of leakage with PHQ-9 score [Table 4]. Similar correlation was also sought for the frequency of leaking episodes per day (leaking pattern) with PHQ-9 score. Highly significant results ( $P < 0.001$ ) were obtained for both of these variables signifying that depression is also linked with the amount of leakage and with the frequency of leaking episodes per day (leaking pattern).

When the type of incontinence was correlated with depression, we found that among UUI, 47.7%, 46.6%, 3.4%, and 2.3% cases were severely depressed, moderately severe depressed, moderately depressed, and mildly depressed, respectively. For this correlation, we could not get statistically significant

**Table 1: Demographic data**

Demographic variable	Cases, n (%)	Controls, n (%)
Age group (years)		
≤50	8 (8)	8 (8)
51-60	57 (57)	57 (57)
61-70	34 (34)	34 (34)
>70	1 (1)	1 (1)
Marital Status		
Married	84 (84)	84 (84)
Never married	4 (4)	4 (4)
Divorced/separated/widowed	12 (12)	12 (12)
Parity		
1	3 (3)	3 (3)
2	5 (5)	5 (5)
3	76 (76)	76 (76)
4	10 (10)	10 (10)
5	4 (4)	4 (4)
6	1 (1)	1 (1)
7	1 (1)	1 (1)
SES (Modified Kuppuswamy's SES scale) <sup>[13]</sup>		
Upper	6 (6)	6 (6)
Upper middle	32 (32)	32 (32)
Lower middle	40 (40)	40 (40)
Upper lower	22 (22)	22 (22)
Education		
College graduate	7 (7)	7 (7)
Partial college	17 (17)	17 (17)
High school graduate only	76 (76)	76 (76)
BMI (kg/m <sup>2</sup> )		
18.5-24.9 (normal weight)	6 (6)	6 (6)
25-29.9 (over weight)	70 (70)	70 (70)
30-34.9 (obese type I)	24 (24)	24 (24)
Mode of delivery		
Vaginal	91 (91)	91 (91)
Caesarean section	9 (9)	9 (9)

BMI: Body mass index, SES: Socioeconomic status

**Table 2: Patient health questionnaire-9 scoring in cases and controls**

Depression	Cases, n (%)	Controls, n (%)	Total
None/minimal	0	71 (71.0)	71
Mild	2 (2.0)	13 (13.0)	15
Moderate	5 (5.0)	12 (12.0)	17
Moderately severe	45 (45.0)	4 (4.0)	49
Severe	48 (48.0)	0	48
Total	100 (100.0)	100 (100.0)	200

$\chi^2=164.255$ ;  $df=4$ ;  $P<0.001$ ; Highly significant, The PHQ-9 scores in cases varied between 19.41 and 21.17 with a standard error of 0.442, The PHQ-9 scores in controls varied between 4.29 and 5.85 with a SE of 0.395. PHQ-9: Patient health questionnaire-9, SE: Standard error

results ( $P = 0.066$ ) but the percentages of depression in UUI group outnumbered the other types of incontinence.

## DISCUSSION

UI is present twice as commonly in women as in men, due to the declining estrogen levels and urogenital atrophy after menopause.<sup>[9]</sup> It is a silent embarrassing disease.<sup>[2]</sup>

All of our UI women (100%) had depression with as high as 48% suffering from severe depression and 45% from moderately severe depression versus 0% and only 4% respectively for continent women ( $P < 0.001$ , highly significant), which is consistent with other studies in literature. Moghaddas *et al.* showed 52% prevalence of depression in UI women of 50-64 years of age ( $P < 0.001$ ).<sup>[14]</sup> Zorn *et al.* showed that of 115 UI women, 60% had idiopathic UUI with all UI patients reporting significant depression ( $P < 0.001$ ), similar to our results.<sup>[15]</sup> Felde *et al.* in the landmark EPINCONT study also showed a high prevalence of depression in UI women.<sup>[3]</sup> Similarly, Dugan *et al.* showed that UI women were 1.45 times more likely to have moderate-to-severe depression.<sup>[4]</sup> Another longitudinal study by Griebing in middle-aged and older Korean women showed similar results.<sup>[16]</sup> Likewise, Morrison *et al.* reported 11.6% major depression in UI women and concluded that major depression needs to be treated promptly to avoid serious consequences.<sup>[5]</sup>

Our study showed a highly significant association ( $P < 0.001$ ) between the severity of depression and severity of UI (PISA on Likert scale). Similarly, highly significant association ( $P < 0.001$ ) was shown between the severity of depression and amount of leakage. Highly significant association ( $P < 0.001$ ) was also shown between the severity of depression and leaking pattern (frequency of leaking episodes per day). Similar findings were reported by Macaulay *et al.*, Nygaard *et al.*, and Watson AJS *et al.*<sup>[17-19]</sup>

Our study also showed that UUI cases (88%) far outnumbered the other types of UI (SUI or MUI) with 94.3% of them being severe or moderately severe depressed. Jennifer L. Melville *et al.* showed an odds ratio of 9.2 with UUI and 13.5 with MUI, and concluded that current major depression is highly prevalent in women with UI.<sup>[6]</sup> Likewise, Zorn *et al.* and Pang *et al.* showed that UUI has higher rates of depression than SUI or MUI.<sup>[7,15]</sup>

This association of depression and UUI is attributed to the reduced serotonergic (5-HT) activity as shown in a landmark study by Zorn *et al.* in 1999 on 115 consecutive UI patients using beck's depression inventory. More correlation was found between depression and UUI than SUI. Serotonin (5-HT) synthesis was 52% less in UI depressed women leading to unipolar and major

**Table 3: Correlation of patient incontinence severity assessment with patient health questionnaire-9 score in cases (n=100)**

Severity of incontinence (PISA)	Depression				Total
	Mild, n (%)	Moderate, n (%)	Moderately severe, n (%)	Severe, n (%)	
Score 3	0	1 (20.0)	3 (60.0)	1 (20.0)	5
Score 4	2 (4.1)	4 (8.2)	40 (81.6)	3 (6.1)	49
Score 5	0	0	2 (4.3)	44 (95.7)	46
Total	2 (2.0)	5 (5.0)	45 (45.0)	48 (48.0)	100

$\chi^2=79.848$ ;  $df=6$ ;  $P<0.001$ ; Highly significant. PISA: Patient incontinence severity assessment

**Table 4: Correlation of amount of leakage and leaking pattern with depression patient health questionnaire-9 score**

	Depression				Total
	Mild, n (%)	Moderate, n (%)	Moderately severe, n (%)	Severe, n (%)	
Amount of leakage					
Mild	2 (66.7)	1 (33.3)	0	0	3
Moderate	0	4 (8.9)	39 (86.7)	2 (4.4)	45
Severe	0	0	6 (11.5)	46 (88.5)	52
Total	2 (2.0)	5 (5.0)	45 (45.0)	48 (48.0)	100
Leaking pattern scale					
4 (2-3 times/week)	2 (13.3)	0	13 (86.7)	0	15
5 (1 time/day)	0	2 (40.0)	3 (60.0)	0	5
6 (1-2 times/day)	0	3 (10.7)	25 (89.3)	0	28
7 (3-4 times/day)	0	0	2 (4.0)	48 (96.0)	50
8 (>=5 times/day)	0	0	2 (100.0)	0	2
Total	2 (2.0)	5 (5.0)	45 (45.0)	48 (48.0)	100

$\chi^2=142.05$ ;  $df=6$ ;  $P<0.001$ ; Highly significant

$\chi^2=115.02$ ;  $df=12$ ;  $P<0.001$ ; Highly significant

depression, and the possible role of serotonergic-based antidepressants for the same.<sup>[15]</sup>

The recent review of literature also supports the use of selective serotonin reuptake inhibitors; Imipramine and of Serotonin Norepinephrine reuptake inhibitors; (Duloxetine) for depression and UI.<sup>[20]</sup>

In view of these findings, the International Continence Society has recently suggested the inclusion of QOL data in clinical trials studying continence care, realizing the importance of mental health as an issue in incontinent women with studies showing medical costs in depressed patients being 50% higher than in nondepressed ones.<sup>[10,11]</sup>

## CONCLUSION

All of our patients of UI had depression. The severity of depression increased with severity of UI, amount of leakage, and leaking pattern. UUI was the predominant type of UI with high rates of associated depression. Thus, all UI patients MUST be assessed for depression by a standardized questionnaire as a standard of care in units dealing with incontinent patients.

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## Conflicts of interest

There are no conflicts of interest.

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