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Correlation of urinary incontinence with depression severity of patients treated for depression

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Introduction Urinary incontinence (UI) is a major public health issue because of the high number of individuals affected, its adverse effects on job-related functioning, and the decline in quality of life. The association between UI and symptoms of depression has been evaluated extensively for the general population. However, relationships between UI and depression have not been adequately assessed for specific patient groups. Thus, we investigated the association between UI and depression severity in patients treated for depression.

Material and methods This study was a single-center, prospective, cross-sectional inquiry. We analyzed questionnaire data on UI and depression from depressed patients treated in our Department of Adult Psychiatry. Patients completed the International Consultation on Incontinence Questionnaire Short Form and General Health Questionnaire whereas psychiatrists administered the Hamilton Rating Scale for Depression.

Results One hundred two patients were enrolled in the study. Most patients had mild depression. Patients who were incontinent mostly reported moderate UI and UI was statistically more prevalent in women than in men. Further, with the General Health Questionnaire, depression severity in women was significantly associated with the severity of UI. We did not observe correlation between depression severity analyzed with the Hamilton Rating Scale for Depression and UI.

Conclusions In the cohort of patients treated for depression, UI affected more women than men. In women, UI was associated with the severity of depression. Because UI and depression may coexist and share the symptom burden, particularly in women, clinicians should be aware of the interconnection between these two conditions.

Key Words: urinary incontinence ‹› depression

INTRODUCTION

Urinary incontinence (UI) has a strong impact on patient physical and emotional health and quality of life. Involuntary loss of urine may cause embarrassment, social isolation, impaired occupational functioning, demoralization, and poor self-esteem [1]. As a result, UI may induce symptoms of depression.

Several cross-sectional and longitudinal studies showed correlations between depressive symptoms and UI [2, 3]. On the basis of these findings, researchers should consider a bidirectional nature of the relationship between depressive symptoms and

UI. Although strides have been made in understanding this relationship, the association has not been explored fully for specific patient populations but only for the general population (i.e., mentally healthy persons without diagnosis of depression or other psychiatric disorders). Currently, there are no published data regarding the correlation between UI and depression severity in depressed patients. These data are necessary to better understand the UI-depression association that has been observed in the longitudinal and cross-sectional studies conducted in the general population. Describing the interconnection between UI and depression in specific populations may provide a more comprehensive understanding of the medical workup and the integrated care that such patients need. To address this vacuum, we analyzed correlations between UI and depression severity in patients treated for depression.

MATERIAL AND METHODS

This examination was a single-center, cross-sectional study with prospectively collected data. Patients were enrolled after approval of the study (KBET/266/B/2013) by the research ethics committee of the Jagiellonian University Medical College, Cracow, Poland.

We invited all consecutive patients treated for depression in our out-patient and in-patient Department of Adult Psychiatry at the University Hospital in Cracow, Poland between 2014 and 2015 to participate in this study. All the included patients met both DSM-5 and ICD-10 criteria for depression, and psychiatrists established the diagnoses of all patients.

Instruments

The Hamilton Rating Scale for Depression (HRSD) is a 17-item questionnaire used to provide an indication of depression and information on depression severity or as a guide to evaluate recovery [4]. The total score ranges between 0 and 54. For this study, patients were also classified as in remission – no depression (0–7), with mild depression (8–16), with moderate depression (17–23), and with severe depression (≥24). Psychiatrists completed the HRSD questionnaire.

The General Health Questionnaire (GHQ-30) is a well-known measure of an individual's mental health and psychological distress [5]. In contrast to the HRSD, it is a self-assessment scale that enables clinicians to obtain information from a patient's perspective. The instrument analyzes the inability to perform normal functions and the appearance of new and distressing phenomena; thus, its properties enable investigation of the effects of psychiatric conditions on quality of life. This attribute is often lacking in other questionnaires, particularly in questionnaires administered by physicians instead of those self-administered by patients. The GHQ-30 consists of 30 items, and the total score ranges between 0 and 90. Responses are given on a Likert-like scale (0–1–2–3).

The International Consultation on Incontinence Questionnaire-Short Form (ICIQ-UI SF) has four specific questions that assess the burden of urinary incontinence and its effect on patient quality of life [6]. The questions cover frequency, severity, and overall impact of urinary incontinence. The total score ranges between 0 and 21. The ICIQ-UI SF may be divided into the following four severity categories: slight (1–5), moderate (6–12), severe (13–18), and very severe (19–21) [7]. The ICIQ-UI SF, a patient self-administered questionnaire, is used widely in routine clinical care of both male and female UI patients.

Statistical analyses

Means, standard deviations (SDs), medians, minimum and maximum values (range), and 95% confidence intervals (CI) were used to present descriptive results for continuous data and counts and percent for discrete data. The Shapiro-Wilk test was used to analyze distribution and Leven (Brown-Forsythe) test was used to investigate the hypothesis of equal variances. To evaluate differences between two groups, we used Student's t-test (or Welch test in the absence of variance homogeneity) or Mann-Whitney U test (if the Student's t-test could not be applied or for variables measured on the ordinal scale). The significance of differences between more than two groups was analyzed with F (ANOVA) or Kruskal-Wallis test with appropriate post-hoc tests (Tukey test for F, Dunn test for Kruskal-Wallis). For qualitative variables, we used Chi-square independence test (with Yates correction for size group less than 10, verification Cochran conditions, exact Fisher test). To establish a link, strength, and direction between variables, correlation analysis was used by calculating Pearson and/or Spearman correlation coefficients. Statistical significance was considered when p value was <0.05. Data analysis was conducted with STATISTICA Software (StatSoft Inc, 2014, ver 12.0).

RESULTS

Demographics and clinical characteristics

Our study included 102 patients with a mean age of 46.1 ±11.3 (range 20–67) years. There were more

women than men (60 females vs. 42 males). Most of the included patients were employed, had a higher education, and were in a stable relationship. Table 1 presents the detailed demographic characteristics.
The mean time between diagnosis of depression and inclusion in the study was 10.7 years. For the study cohort, the mean number of hospitalizations related to depression was 2.4 (range 0–20). We observed concomitant anxiety, personality, obsessive-compulsive, and eating disorders in nineteen, four, three, and three patients, respectively. The familial history of depression was investigated for 31 individuals.
Most of the patients in our cohort were treated with selective serotonin re-uptake inhibitors (SSRIs) and serotonin norepinephrine re-uptake inhibitors (SNRIs). Table 2 lists the medications taken by the included patients.

Instruments

Investigation of depression severity showed that sixteen patients were in remission, thirty-seven experienced mild depression, twenty-nine had moderate depression, and twenty had severe depression. The mean score from the HRSD questionnaire was 15.9 (SD 10.2). There was no significant difference between men and women in the HRSD score ($p = 0.6101$). In addition, we did not observe differences in the HRSD score relative to age ($p = 0.5056$).
The mean scores of the GHQ-30 was 61.2 (SD 21.6). There was no significant difference between men and women in the GHQ-30 score ($p = 0.4937$). We did not observe differences in the GHQ-30 score relative to age (GHQ-30 $p = 0.2982$).
Thirty-seven patients reported UI (score of ≥1 from ICIQ-UI SF), a prevalence of 36.3%. UI was highest among the middle-aged, and lowest among the youngest. UI affected more women than men (28 versus 9, respectively), and this relationship was statistically significant ($p = 0.0185$) (Table 3). We did not find a correlation between the ICIQ-UI SF score and age groups ($p = 0.3387$).
UI patients were assigned to four severity categories: slight (15 patients), moderate (19 patients), severe (2 patients), and very severe (1 patient). The mean score from the ICIQ-UI SF questionnaire was 7.2 (SD 4.3).
With the ICIQ-UI SF, depressed patients also assessed the degree to which urine leak interfered with their daily life; the question (#3 in the ICIQ-UI SF) consisted of a Likert-like scale from 0 'not at all' to 10 'a great deal'. Table 4 presents the results. Notably, nine patients assessed the impact of UI as 5 or more.

Table 1. *Demographics of included patients*

Specification	Total, N (%)
Number of included patients	102 (100%)
Gender	
Male	42
Female	60
Education	
Primary	3
Secondary (including students)	45
Higher	54
Employment status	
Employed	55
Unemployed	13
Pensioners	30
Students	4
Relationship	
Stable relationship/marriage	73
Unstable relationship/marriage	12
Single	17

Table 2. *Drugs taken by the included patients*

Drugs	Number of patients
Antidepressants	
SNRIs	47
SSRIs	46
TCAs	23
NaSSAs	21
SARIs	21
Lithium	14
Others antidepressants	10
Anti-epileptics	
Valproate	23
Lamotrigine	16
Carbamazepine	10
Neuroleptics, first generation	
Phenothiazines	35
Thioxanthenes	13
Butyrophenones	6
Neuroleptics, second generation	
Quetiapine	24
Sulpiride	16
Olanzapine	14
Aripiprazole	8
Other neuroleptics	6
Anxiolytics	
Benzodiazepines	33
Hydroxyzine	10
Buspirone	3

Of note: Other antidepressants – tianeptine, norepinephrine and dopamine reuptake inhibitors (NDRIs), norepinephrine reuptake inhibitors (NRIs), reversible monoamine oxidase inhibitor (RIMAs), agomelatine. Other neuroleptics – risperidone, clozapine, amisulpride
SNRIs – serotonin norepinephrine reuptake inhibitors; SSRIs – selective serotonin reuptake inhibitors; TCAs – tricyclic antidepressants; NaSSAs – noradrenergic and specific serotonergic antidepressants; SARIs – serotonin antagonist and reuptake inhibitors

Table 3. *Comparative gender characteristics of the studied group in terms of urinary incontinence assessed with the ICIQ-UI SF*

	Female (N = 59)	Male (N = 43)	All (N = 102)	P-value
ICIQ-UI SF				0.0185
Mean (standard deviation)	3.5 (4.9)	1.3 (2.9)	2.6 (4.3)	
Range	0.0–20.0	0.0–12.0	0.0-–0.0	
95% confidence interval	(2.2; 4.8)	(0.4; 2.2)	(1.7; 3.4)	

Table 4. *Overall impact of UI assessed with question #3 of the ICIQ-UI SF*

Likert scale	0	1	2	3	4	5	6	7	8	9	10
Number of patients	7	8	3	7	3	1	0	3	4	0	1

Correlations

There was no correlation between the HRSD score and urinary incontinence (the ICIQ-UI SF score) for the analyzed patients, including sub-analyses for women, men, and age groups.

However, a significant and positive correlation was obtained for women between the GHQ-30 score and the ICIQ-UI SF (correlation coefficient R = 0.27, p = 0.0415) (Figure 1). Therefore, depression severity analyzed with the GHQ-30 for women correlated with the severity of urinary incontinence. For men, there was no correlation between depression severity and urinary incontinence (correlation coefficient R = 0.14, p = 0.3679).

We did not find associations between prevalence or severity of UI and psychiatric medications that our cohort used.

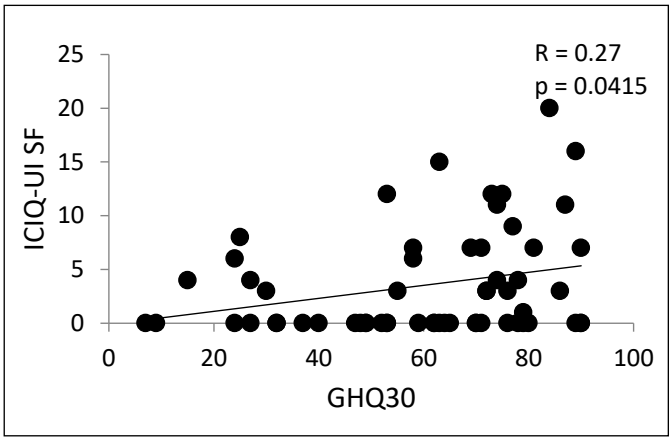

Figure 1. *Correlations between depression severity assessed with the GHQ-30 and urinary incontinence based on ICIQ-UI SF in women.*

DISCUSSION

To our knowledge, this study is the first to analyze correlations between UI and depression severity in patients treated for depression. We demonstrated that UI was often observed, with more women than men affected. In depressed women, UI also correlated with depression severity. As UI is often a complex condition with various mechanisms or underlying pathologies, it may be an important issue in day-to-day clinical practice with patients, particularly women, treated for depression.

A strength of this study was the homogenous group of depressed patients who all met DSM-5 and ICD-10 criteria for depression. In all cases, psychiatrists confirmed the diagnoses. The study results, therefore, clearly showed the relationship between UI and depression severity in this specific patient group. In other studies of UI and depression, investigators included participants from the general population [2, 8] or patients who were already incontinent [9], and then they analyzed depressive symptoms in cross-sectional or longitudinal fashion. These researchers have used a wide range of questionnaires, sometimes not even standardized measures, to assess depression. This variability in assessment instrument may have caused significant bias and misleading conclusions because the diagnosis of depression was not confirmed by psychiatrists, and it was based only on the results of single instruments. Notably, measures that were utilized in studies focusing on the general population are only used to screen for depression, and they are not diagnostic even if they are good tools to assess symptom load [10]. Therefore, all these earlier studies, in fact, analyzed correlations between UI and depressive symptoms, not depression. Furthermore, some authors admitted low participation of patients with increased depressive symptoms in their studies conducted in the general population [2, 11]. Thus, our study is the

first that analyzed the correlation between UI and depression in a group of reliably diagnosed patients who were treated for depression. Another strength of our study was its use of the validated scales for assessment of both UI and depression, which reduced the possibility of both under- and over-reporting of urological and psychiatric symptoms. Thus, we were able to investigate the associations between the severity of UI reflected in the overall score of the ICIQ-UI SF and depression severity evaluated with the HRSD (physician's perspective) and GHQ-30 (patient's perspective).

We did not find a correlation between UI and depression severity with the HRSD scale. A reason for the absence of a correlation may be the administration mode of the questionnaire. The HRSD is an instrument administered by the clinician, not by the patient. Importantly, qualitative research showed that, in 25–37% of cases, clinicians underestimate the extent to which patients are affected by lower urinary tract symptoms (LUTS) [12]. Therefore, the patient's perspective is an important factor in routine clinical practice, and our study appears to support this approach. Current recommendations suggest that patient subjective assessment of bother is a crucial factor in treatment-decision making for LUTS, including UI [13]. In addition, we did not observe correlation between UI and depression severity in men. This lack of correlation may be related to a small sample size and lower prevalence of UI in men compared with women, similar to studies that assessed the general population [14]. Nonetheless, studies of the general population showed that LUTS, including UI, correlate less frequently with depressive symptoms in men than in women [15].

UI is one of the most bothersome LUTS that can lead to depressive symptoms [16]. In the general population, large cohort longitudinal and cross-sectional studies have shown a bidirectional nature of the relationship between UI and depressive symptoms. In a recent study from Norway with a 10-year follow-up, Felde et al. found a correlation between depressive symptoms at baseline and development of UI in women (OR 2.09, CI 1.55–2.83) [2]. Thom et al. also found that women with depressive symptoms at baseline had a relative risk of 1.6 (1.2–2.0) of being diagnosed with UI during a 9-year follow-up [17]. In an 18-year follow-up study with a median follow-up of 12 years, depressive symptoms were associated with the incidence of UI with a hazard ratio of 1.31 (1.09–1.56) [18]. Conversely, Felde et al. demonstrated a significant correlation between UI at baseline and the incidence of mild depressive symptoms (OR 1.45, CI 1.23–1.72) during 10-year follow-up [2]. In another one-year longitudinal study, UI at baseline led to depressive symptoms as well [19].

We need to consider several shared pathological pathways in the relationship between UI and depression/depressive symptoms. First, social stigma related to UI may initiate or further increase functional loss and decreased personal hygiene. These effects may lead to impaired autonomy, sadness, loss of the joy of living, and isolation (e.g., avoiding places without access to public toilets, restricted physical activities). Patients who have UI may view themselves as having signs of weakness, aging, and poor health, which results in decreased self-esteem. Affective disorders may develop as a consequence of this significant emotional distress related to UI [1]. Second, there are relatively few reports on association between antidepressant use and incident of UI [20]. In a detailed analysis of psychiatric medications administered to our cohort, we did not find correlations between the drugs taken and the incidence or severity of UI. This lack of a correlation might have been related to the different combinations of medications used to treat the patients in our group. Nonetheless, the impact of antidepressants on UI still remains a matter of dispute and only single studies, mostly case reports, have confirmed positive associations between UI and antidepressants [20]. Finally, a hypothesis that UI and depression share a common neurochemical pathogenesis can partially explain the presented relationship. Altered concentrations of serotonin and norepinephrine in the central nervous system and increased adrenergic tone with impairment of the hypothalamic-pituitary axis may also affect the associations between LUTS, including UI, and depression/depressive symptoms [21, 22]. Our study supports a growing body of evidence that shows an association between UI and depression/depressive symptoms.

UI often remains underdiagnosed because many patients never consult a doctor. Depression could also contribute to a delay in help-seeking for UI, and depression may negatively affect the perception, development, and prolongation of all LUTS [1]. Moreover, psychiatrists may have limited perception of LUTS in their patients [23]. Therefore, it is necessary to adequately inform and educate psychiatrists in terms of the impact of UI and other LUTS on patient management, prognosis, and quality of life. Clinicians most likely will benefit when they are aware of the association between UI and depression, and they may suggest that patients with a comorbid urological illness be treated more thoroughly and aggressively by other health-care professionals. Screening depressed patients, particularly women, for UI and arriving at a treatment plan for both

conditions are imperative because these disorders tend to coexist and may compound the severity of one another. Notably, we always need to consider different mechanisms that may lead to or exacerbate UI (e.g., urology, gynecology, neurology, cardiology, and endocrinology disorders) to comprehensively evaluate depressed individuals.

Our study has several limitations determined by its cross-sectional, one-institutional design. We were not able to assess patients longitudinally. However, we obtained the data used in this study from a prospectively and carefully maintained database, which reduced the risk of errors and/or omissions. We could not determine causality of UI due to the cross-sectional design. In addition, we did not classify UI as either stress UI or urgency UI. Subtyping would have yield greater detail because these two types of UI have different mechanisms. Some studies of the general population showed a stronger association with depression symptoms and urgency UI than with stress UI [11, 24]. Nevertheless, we used a validated tool to recognize and quantify UI. Future studies should be conducted to clarify the relationship between depression and different types of UI; the use of a bladder diary may further improve obtained data. We acknowledge that the patients evaluated represented a highly selected cohort, treated at a single, high-volume academic center; thus, the results may not be fully transferable to daily clinical practice for all patients treated for depression. Although our sample size was large enough for powerful statistical analysis, possibly, with a larger patient group, a significant correlation between UI and depression severity in men may be determined. Thus, further large-cohort prospective studies should investigate these important issues. Longitudinal analyses would be of value because both UI and depression are dynamic conditions, in terms of their natural history and treatment. These further investigations will help to clarify whether UI causes or exacerbates depression, depression causes or exacerbates incontinence, or the two conditions coexist just by the coincidence.

CONCLUSIONS

This study provided exclusive data to determine the role of UI in patients who experience depression. In our cohort, patients had a high overall rate of UI. In women, UI correlated with depression severity. Because coexistence of UI and depression may increase the symptom burden more than the impact of only one disorder, it is important to be aware of the association between these two conditions. This study should lead to improvement of the knowledge and clinical practice of physicians who care for patients with depression. Further studies, preferably longitudinal with a larger number of patients, are needed to validate our findings.

CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

COMPLIANCE WITH ETHICAL STANDARDS

This study was approved by the research ethics committee of the Jagiellonian University Medical College, Cracow, Poland (KBET/266/B/2013). All participants provided written informed consent. This study was carried out in agreement with applicable laws and regulations, good clinical practice, and ethical principles, as described in the Declaration of Helsinki of 1975, and revised in 2008.

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