Multimorbidity is associated with higher levels of urinary incontinence: A cross-sectional study of 23,089 individuals aged ≥15 years residing in Spain

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Abstract

Background: One can assume a relatively high prevalence of urinary incontinence in people with multimorbidity. However, literature in this area is scarce. There is a need for further robust research to aid general practitioners to identify patients at a particular risk for urinary incontinence, and to initiate the early treatment and multidisciplinary management of this condition.

Aim: To examine the association between multimorbidity and UI in 23,089 individuals aged ≥15 years residing in Spain.

Design and Setting: This study used data from the Spanish National Health Survey 2017, a cross-sectional sample of 23,089 participants aged ≥15 years from Spain [54.1% female; mean (standard deviation) age 53.4 (18.9) years].

Method: Urinary incontinence and 30 other physical and mental chronic conditions were self-reported. Multimorbidity was defined as the presence of at least two physical and/or mental chronic conditions (excluding urinary incontinence). Control variables included sex, age, marital status, education, smoking, and alcohol consumption. Multivariable logistic regression analyses were conducted to assess the association between multimorbidity and urinary incontinence.

Results: The prevalence of urinary incontinence was 5.9% in this sample. Urinary incontinence was more frequent in the presence than in the absence of each one of the 30 chronic conditions (p-values<0.001). The proportion of people with urinary incontinence was also higher in the multimorbidity than in the no-multimorbidity group (9.8% versus 0.7%, p-value<0.001). After adjusting for several potential confounders (i.e., sex, age, marital status, education, smoking,

alcohol), there was a significant and positive relationship between multimorbidity and urinary incontinence (odds ratio=5.02, 95% confidence interval 3.89-6.59, p-value<0.001).

Conclusion: In this large representative sample of Spanish individuals aged ≥15 years, suffering from multimorbidity was associated with a significantly higher level of UI.

Keywords: multimorbidity; urinary incontinence; Spain; cross-sectional study.

How this fits in

- Understanding multimorbidity and urinary incontinence is critical for medical practitioners.
- This study found that urinary incontinence was more frequent in the presence than in the absence of chronic conditions.
- Those with multimorbidity were five times more likely to suffer from urinary incontinence
- General practitioners should be aware that those with multimorbidity are at an increased risk of urinary incontinence.

1. Introduction

According to the International Continence Society, urinary incontinence (UI) is defined as "the complaint of any involuntary leakage of urine" [1]. The global prevalence of UI is 3-17% in women and 3-11% in men, with varying prevalence across countries [2]. Although it is most common in older adults, the condition can affect people of all ages. For example, in a study carried out in nulliparous women, the incidence of UI increased from 3% in those aged 25-34 years to 7% in those aged 55-64 years [3]. Moreover, another study found that the prevalence of moderate-severe UI in community dwelling women was 7%, 17%, 23% and 32% in those aged 20-39, 40-49, 60-79 and ≥80 years, respectively [4]. In studies carried out on men and women, the prevalence of UI was found to be between 11-34% in men older than 65 years, and about twice the frequency in women, suggesting that UI is more common in women than men [5]. UI is associated with impaired quality of life [6] and imposes a tremendous economic burden [7].

Multimorbidity is defined as the simultaneous occurrence of two or more chronic diseases in one person and can include both physical and mental health complications. It has been found that in developed countries more than 40% of the population have at least one chronic condition and approximately 25% have greater than one condition [8]. Similar to UI, multimorbidity is most common among older adults, but can affect people of all ages [9]. Multimorbidity is a public health concern as it has been shown to be associated with high mortality [10], reduced functional status [11], and increased use of both inpatient and ambulatory health care [12,13]. Multimorbidity is more difficult to manage than singular conditions, and requires close coordination across specialists and generalists.

Owing to a multifactorial etiology behind UI and that cognitive, neurological, muscular and urological systems must be robust to maintain continence [14,15], one can assume a relatively high prevalence of UI in people with multimorbidity. However, literature in this area is scarce. In one study in 622 Brazilian women aged 50 years and over it was found that approximately two thirds of women suffering from UI reported multimorbidity [16]. The authors of the present manuscript are not aware of any other literature on this topic. Clearly there is a need for further research investigating the association between multimorbidity and UI among people of multiple ages and from other countries in representative population-based samples to establish a better understanding of this topic, as well as the underlying risk factors for urinary incontinence. Consequently, aiding general practitioners to identify patients at a particular risk for UI, and to initiate the early treatment and multidisciplinary management of this condition. Therefore, the aim of the present study was to examine the association between multimorbidity and UI in 23,089 individuals aged ≥15 years residing in Spain.

2. Subjects and Methods

2.1. The survey

Data from the Spanish National Health Survey 2017 were analyzed. This survey was undertaken in Spain between October 2016 and October 2017. Details of the survey method have been already published [17]. For the data collection, a stratified three-stage sampling was used in which the census sections were first considered, then the family dwellings, and then an individual aged ≥15 years was selected within each dwelling. The sections were selected within each stratum with probability proportional to their size. The dwellings, in each section, were selected with equal probability by systematic sampling, prior arrangement by size of the dwelling. This procedure leads to self-weighting samples in each stratum. For the selection of

the person who had to complete the Adult Questionnaire, the random Kish method was used, which assigns equal probability to all adults in the household. The sample was representative of the population residing in Spain and consisted of 23,089 individuals aged 15-103 years. There were no exclusion criteria in the present study, and the overall sample was included in the statistical analyses. The method of data collection used was computer-assisted personal interviewing (CAPI), conducted in the homes of the selected participants. The interviewers, previously trained, completed the questionnaires with the information provided by the participants. All of them signed an informed consent form before responding to the survey questions. This study obtained ethical approval by the Spanish Statistics Institute (ENS-2017) and was conducted in accordance with the Declaration of Helsinki.

2.2. Multimorbidity (independent variable)

Multimorbidity was defined as the presence of two or more chronic conditions (excluding urinary incontinence). Those who answered affirmatively to the yes-no question ‘‘Have you ever been diagnosed with *‘chronic condition”*?” were considered to have the specific chronic condition. All conditions except obesity were assessed with this question. Previous research has confirmed the validity and high accuracy of self-reported diagnosis of chronic conditions [18,19]. Using the standard WHO definition, obesity was defined as body mass index (BMI)≥30 kg/m^2, and BMI<30 kg/m^2 was considered no obesity [20]. BMI was calculated as weight in kilograms divided by height in meters squared based on self-reported weight and height. The chronic conditions that were included are listed in **Table 1**, classified following the International Classification of Diseases, 11th Revision (ICD-11), of the World Health Organization (https://icd.who.int).

2.3. Urinary incontinence (dependent variable)

Those who answered affirmatively to the question ‘‘Have you ever been diagnosed with urinary incontinence?” were considered to have UI. Previous research has confirmed the validity and high accuracy of self-reported diagnosis of urinary incontinence [21].

2.4. Control variables

The selection of the control variables was based on previous studies showing that these factors are associated with both the independent [22-26] and the dependent variable [27-30]. Sociodemographic variables included sex, age, marital status, and education. Marital status was categorized as married and not married (single/widowed/divorced/separated). Education was based on the highest educational level achieved and was categorized as ≤ primary, secondary, and ≥ tertiary. Smoking status was self-reported and categorized as never, past and current smoking. Alcohol consumption in the last 12 months was self-reported and categorized as yes (any) and no (none).

2.5. Statistical analysis

The statistical analysis was performed with R 3.5.2 (The R Foundation) [31]. All the analyses were carried out taking into account the cross-sectional design of the survey, using appropriate tests for this design. Differences in the sample characteristics (by multimorbidity status) and in the prevalence of UI (by chronic condition and multimorbidity status) were assessed by chi-squared tests for all variables except age (t-test). The association between multimorbidity (independent variable) and UI (dependent variable) was assessed using multivariable logistic regression. Independent variables were included in the models as categorical variables with the exception of age which was included as a continuous variable. UI was included in the model as dichotomous variable. Models were adjusted for basic

sociodemographic and behavioral variables (i.e., sex, age, marital status, education, smoking, alcohol) [22-30]. There were missing data only for the following variables: marital status (n=39, 0.17%), smoking (n=22, 0.10%), alcohol consumption (n=26, 0.11%), and obesity (n=1070, 4.63%). Complete-case analysis was carried out. Results from the logistic regression analyses are presented as odds ratios (ORs) and 95% confidence intervals (CIs). Confidence intervals and p-values were corrected using the Benjamin-Yekutieli and the Benjamin-Hochberg adjustment method to control the false discovery rate. The level of statistical significance was set at $p < 0.05$.

3. Results

There were 23,089 individuals aged ≥15 years included in this cross-sectional study [54.1% of women; mean (standard deviation) age 53.4 (18.9) years; **Table 2**]. The proportion of women, married individuals, people with ≤primary education, past smokers, and people with no alcohol consumption was more frequent in the multimorbidity than in the no-multimorbidity group, while people with multimorbidity were older than those without multimorbidity. The prevalence of UI was 5.9% in this sample. UI was more frequent in the presence than in the absence of each one of the 30 chronic conditions (p-values<0.001; **Figure 1**). The proportion of people with UI was also higher in the multimorbidity than in the no-multimorbidity group (9.8% versus 0.7%, p-value<0.001). The results of the regression analysis are displayed in **Table 3**. After adjusting for several potential confounders (i.e., sex, age, marital status, education, smoking, alcohol), there was a significant and positive relationship between multimorbidity and UI (odds ratio=5.02, 95% confidence interval 3.89-6.59, p-value<0.001).

4. Discussion

Summary

In this large and representative sample of the Spanish population, it was found that the prevalence of UI was 5.9%. Moreover, those with multimorbidity were five times more likely to suffer from UI. These findings support previous literature where another study showed in a small sample of Brazilian women that approximately two thirds of those with UI suffered from multimorbidity [16]. The present study adds to this literature through showing that such an association exists in a representative sample of men and women residing in Spain.

Strengths and limitations

The present study investigated the relationship between multimorbidity and UI in a large representative sample of men and women. However, the present findings must be interpreted in light of the study limitations. Both UI and all chronic conditions were self-reported, potentially introducing bias. The stem question asked was ‘‘Have you ever been diagnosed with ‘chronic condition’?” owing to the wording of the question it is possible that a person used to have a specific chronic condition but no longer does, potentially inflating the prevalence of multimorbidity observed in this study. Furthermore, participants were only asked whether they suffered from UI and not the type of UI; different types of UI may have different associations with multimorbidity, and further research is now required to address this question. Data on length of time one had a chronic condition for was not available and thus potentially introducing some bias into analyses. Moreover, there was no information on parity, although parity is a well-known risk factor for UI in women. Finally, the cross-sectional nature of the study means the direction of observed associations is not known. Therefore, future longitudinal studies are needed to clarify the direction of causality.

Nevertheless, the mere coexisting presence of UI with chronic conditions and multimorbidity highlights an important health priority and informs targeted intervention.

Comparison with existing literature

In this large and representative sample of the Spanish population, the prevalence of UI was 5.9% and the prevalence of multimorbidity was 56.9%. This prevalence is comparable with existing literature. For example, a systematic review assessed the global prevalence of UI in different samples of adults from Europe, the United States, Asia, and Africa, obtaining varying UI prevalence estimates with ranges of 1.8-30.5% in European populations, 1.7-36.4% in US populations, and 1.5-15.2% in Asian populations, with prevalence dependent on age and gender [7]. Regarding the prevalence of multimorbidity, another systematic review including 70,057,611 patients in 12 countries found a multimorbidity prevalence ranging from 12.9% to 95.1% [32].

There are several plausible mechanisms that likely increase one's risk of UI when suffering from multimorbidity. First, changes in age-related immune functions, hormonal changes, and increasing incidence of comorbid diseases may facilitate urinary tract infections that can result in UI [33]. Second, poor sleep quality [34] is associated with nocturia (waking from sleep to void). Third, multimorbidity is associated with mild cognitive impairment [35,36] and with cognitive decline [37] and, in turn, those with a dementia diagnosis (a condition not available in the present study) have approximately three times the rate of diagnosis of UI [38]. Fourth, another possible mechanism is polypharmacy (often defined as the prescription of at least five different drugs), as polypharmacy is strongly associated with multimorbidity [39], while the frequency of polypharmacy is high among patients attending a specialist outpatient department for UI [40]. Fifth, sarcopenia could have also a mediating role in the association between multimorbidity and UI, as previous studies have found associations of sarcopenia with both multimorbidity [41] and UI [42]. Sixth, another important factor is physical activity,

as less physical activity is associated with a higher prevalence of multimorbidity [43] and UI [44].

Implications for Research and/or practice

Understanding multimorbidity and UI is critical for medical practitioners. First, in managing multimorbidity, UI can easily be overlooked or eclipsed by other more pressing complaints, especially if patients feel too embarrassed to mention the topic. In this case, it is incumbent upon the medical provider to elicit this information from the patient. Our findings suggest that UI should become a standard feature of clinical interviews, given that treatment for UI could involve a number of interventions (e.g. pelvic floor exercises, medications, surgery, medical devices) that must figure into already complicated treatment plans for patients with multimorbidity. Second, UI is associated with significant impairment in occupational, social, sexual, and recreational functioning. That is, daily activities may be constrained by geographic proximity to bathrooms. Patients with multimorbidity may already face significant impairment from multiple underlying conditions, and often treatment for these conditions aim to maximize overall functioning and independent living. The presence of UI can interfere with this treatment aim. Third, UI is associated with falls and other injuries that are especially concerning if occurring among people with multimorbidity, given that they are already physically vulnerable, and may likely suffer more serious injuries or take longer to recover. Taking that into account, addressing UI may help prevent further injury. Finally, data on those who recieved the survey and did not respond is not avaliable. Moreover, there are no recent avaliable national statistics to compare the present sample to. Therefore, the representativeness of the present sample is not known.

In conclusion, in this large representative sample of Spanish individuals aged ≥15 years, suffering from multimorbidity was associated with a significantly higher increased risk of UI.

Interventions specifically designed for those with multimorbidity to reduce or manage co-occurring UI are required. Finally, urologists and general practitioners should be aware that those with multimorbidity are at an increased risk of UI.

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