



## Research Article

# Urinary, Fecal, and Dual Incontinence among Hispanic Women from Seven Latin-American and Caribbean Cities

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### Abstract

**Introduction:** Prevalence and risk factors of Urinary Incontinence (UI), Fecal Incontinence (FI) and Dual Incontinence (DI) among Hispanic women are not often studied. The objective of this study was to evaluate the prevalence and risk factors of UI, FI, and DI among Hispanic women in seven cities using data from the Health, Well-Being, and Aging in Latin America and the Caribbean (Salud, Bienestar y Envejecimiento en America Latina y el Caribe, or SABE) study.

**Methods:** We conducted a cross-sectional observational study, reporting the prevalence of each incontinence (UI, FI and DI). Multivariate logistic regression analyses were used to estimate the odds of each incontinence of sociodemographic and health factors.

**Results:** A total of 6,550 participants were included in this analysis. Across the seven cities, an average 20.9% of participants reported urinary incontinence, 5.4% reported fecal incontinence, and 4.1% reported dual incontinence. Current and previous estrogen use was

associated with a higher odds ratio of urinary incontinence. History of hysterectomy was only associated with fecal incontinence.

**Conclusion:** The prevalence and factors that were associated with UI, FI and DI from this study were similar to other population-based studies. However, this study has valuable implication since it only focused on Hispanic women across seven Latin American countries.

**Keywords:** Dual incontinence; Fecal incontinence; SABE; Urinary incontinence

### Summary

We identified the prevalence of urinary incontinence (20.9%), fecal incontinence (5.4%) and dual incontinence (4.1%) among Hispanic women across seven Latin American countries.

### Abbreviations

UI: Urinary Incontinence

FI: Fecal Incontinence

DI: Dual Incontinence

SABE: Salud, Bienestar y Envejecimiento en America Latina y el Caribe

PAHO: Pan American Health Organization

GDS: Geriatric Depression Scale

MMSE: Mini Mental State Examination. Medical conditions include arthritis, hypertension, diabetes, heart attack, stroke and cancer

IADL: Instrumental Activities of Daily Living

### Introduction

Urinary and fecal incontinence both have significant, negative impacts on the quality of life in older women [1,2]. Urinary and fecal incontinence are related to negative health outcomes including functional decline, depressive symptoms, higher risk of fall, higher rate of nursing home placement, and greater caregiver burden [3-8]. Given these outcomes, it is important to be able to identify when patients are experiencing incontinence. The prevalence of urinary incontinence ranges from 17% to 55%. The prevalence of fecal incontinence ranges from 7% to 15% [3,7]. The prevalence of both urinary and fecal incontinence, or dual incontinence, has been reported as 9.4% to 24% [9]. However, patients often fail to report their symptoms of incontinence due to embarrassment or misunderstanding them as part of the aging process. Subsequently, the prevalence of incontinence could be underreported [3,7]. Moreover, information regarding the various types of incontinence and its socioeconomic or clinical risk factors among Hispanic population is still lacking [10,11]. The objective of this study was to assess the prevalence of urinary incontinence, fecal incontinence, and dual incontinence, as well as the risk factors of developing each incontinence among Hispanic women in seven countries in Latin America (Argentina, Barbados, Cuba, Mexico, Uruguay, Chile and Brazil) using population data from the Health, Well-Being and Aging in Latin America and the Caribbean (Salud, Bienestar y Envejecimiento en America Latina y el Caribe, or SABE) study.

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## Materials and Methods

### Study design

We conducted a cross-sectional observational study using survey data from the SABE study.

### Study population

The population of this study was comprised of 6,550 women aged 60 years old and older from the SABE study. These women were interviewed in seven cities: Buenos Aires (Argentina), Bridgetown (Barbados), Havana (Cuba), Mexico D.F. (Mexico), Montevideo (Uruguay), Santiago (Chile) and Sao Paulo (Brazil).

### Data source

The database from the SABE study consisted of a round of cross-sectional surveys from cities in seven Latin American and Caribbean countries during 1999-2000 [12,13]. The Pan American Health Organization (PAHO) coordinated the overall SABE study and directed its logistics. The Center for Demography and Ecology from the University of Wisconsin-Madison, together with the PAHO, designed the study. The interviewers in each city were trained by local, country-based teams, which were constituted by a principal investigator and their associates. The response rates were 60% in Buenos Aires, 85% in Bridgetown, 85% in Sao Paulo, 84% in Santiago, 85% in Mexico City, 95% in Havana, and 66% in Montevideo. A classical multistage clustered sampling with stratification of the units at the highest levels of aggregation was used. The primary sampling unit was a cluster of independent households within predetermined geographic areas, grouped into socioeconomic strata, and divided into secondary sampling units, each containing a smaller number of households. Finally, the household and target individuals, persons 60 years old and older, were randomly selected. Then, the potential participants were contacted to schedule home interviews. The interviews were conducted in English in Bridgetown (Barbados), Portuguese in Sao Paulo (Brazil) and in Spanish in the rest of the cities, using the same validated questionnaires. Oral and written consent forms were approved by the Human Subjects Committee at each city with the corresponding affiliated medical research institution or university, and were obtained from all subjects, and personal identifiers were deleted [12,13]. A separate approval from the Institutional Review Board at University of Texas Health Science Center was not obtained since our study was a secondary analysis of publicly available database.

### Dependent variables

The dependent variables were urinary incontinence, fecal incontinence, or dual (urinary and fecal) incontinence. Urinary incontinence was assessed by asking if the participant had unintentionally wet herself during the last 12 months (responses: yes or no). Fecal incontinence was assessed by asking if the participant had ever lost control over her bowel movements during the last 12 months (responses: yes or no). Dual incontinence was considered if both urinary and fecal incontinence happened during the last 12 months (responses: yes or no).

### Independent variables

The independent variables of this study include sociodemographic factors, number of children, history of estrogen, history of hysterectomy, medical conditions and depressive symptoms.

Sociodemographic factors included age (response: years, 60-74 vs. 75+), marital status (response: currently married, yes or no), and years of education (response: years, 0-6 vs. 7+). The number of children was assessed by asking each woman how many children she had, not including step-children, adopted children, abortions or stillbirths (response: 0 to 22). History of estrogen was assessed by asking the participant if she had previously or is presently taking estrogen for menopause (response: yes or no). The participants were also asked if they had a history of undergoing hysterectomy (response: surgery to remove the uterus, yes or no).

Medical conditions were assessed by asking the respondent if she had been ever formally diagnosed with diabetes mellitus, arthritis, hypertension, heart disease, stroke, or cancer (response: yes or no). A summary score for medical conditions was constructed from 0 to 6, and used as a continuous variable. Depressive symptoms were measured with the Geriatric Depression Scale (GDS) [14]. The GDS contains 15 items, with a possible score of 0 to 15. Cognitive status was evaluated by the abbreviated Mini-Mental State Examination (AMMSE), which was validated in the Chilean population [12]. The AMMSE consists of 9 items (versus the 19 items of the MMSE) [15] and has a possible score of 0 to 19. Functional status was assessed by eight Instrumental Activities of Daily Living items (IADL) [16]. The participants were asked if they had difficulty performing any of these eight activities at the time of the interview: using the telephone, traveling alone, going shopping for groceries, preparing their meals, taking their medicine, handling their money, doing light house work, or doing heavy house work. To note, IADL was used as categorical variable (none vs. one or more). History of fall was assessed by asking the participant if she had ever fallen down over the last 12 months (response: yes or no).

### Data analysis

Descriptive analyses were used to report the prevalence of urinary incontinence, fecal incontinence, or dual (urinary and fecal) incontinence. Multivariate logistic regression analyses were used to estimate the odds of the outcomes (urinary incontinence, fecal incontinence or dual incontinence) by sociodemographic and health factors. Variables with a p-value less than 0.20 from bivariate analysis (tested by the Chi-square or the Student's T-test: data not shown) were finally included into the multivariate models (models 1, 2 and 3) for final analysis. History of estrogen treatment was included only in the urinary incontinence model because it was not significantly associated with fecal and dual incontinence from the bivariate analysis. P-value less than 0.05 was considered statistically significant. For all analyses, Statistical Analysis System (SAS) version 9.4 for Windows was used (SAS Institute, Cary, North Carolina and USA).

## Results

### Prevalence of incontinence

A total of 6,550 participants were included in this analysis. Of those, 36.8% were older than 75 years old. Participants in Mexico City were relatively younger than the other cities (26.9% were older than 75 years old). An average of 30.3% of the total participants was married, ranging from 21.0% in Havana to 38.8% in Mexico City. The percentage of those who received an education over 7 years was lowest in Sao Paulo (8.0%) and highest in Havana (37.3%), while the overall average was 24.3%. The average number of children

(ages 0 to 27) was  $3.6 \pm 3.1$ . The participants in Mexico City had the most children ( $5.5 \pm 3.6$ ) while Buenos Aires had the least children ( $2.5 \pm 2.5$ ). Among the total participants, 17.5% had undergone a hysterectomy, ranging from 12.8% in Buenos Aires to 30.4% in Bridgetown. An average of 2.1% of the total participants was on estrogen treatment at the time of survey. This ranged from 0% in Havana and 5.3% in Santiago. However, an average 10.6% participants from the study reported a history of estrogen treatment outside of the time of the study (ranging from 4.8% in Bridgetown to 19.3% in Sao Paulo). The overall average GDS score was  $3.1 \pm 3.3$ , with the lowest average score in Bridgetown ( $1.7 \pm 1.8$ ) and highest average score in Santiago ( $4.1 \pm 3.6$ ). The average MMSE score was  $16.3 \pm 3.0$ , with lowest average score in Santiago ( $15.2 \pm 4.2$ ) and the highest average score in Bridgetown ( $17.1 \pm 2.6$ ). The overall average of the number of medical conditions was  $1.5 \pm 1.1$ . Participants in Mexico City had the least number of medical conditions ( $1.2 \pm 1.0$ ) while those in Havana reported the highest number ( $1.8 \pm 1.2$ ). An average of 31.2% of the participants reported difficulty in performing any IADL, ranging from 19.0% in Montevideo and 44.5% in Sao Paulo (Table 1).

Across the cities, an average of 20.9% of patients reported urinary incontinence, 5.4% fecal incontinence and 4.1% dual incontinence. The prevalence of urinary incontinence was highest in Santiago with 31.1% while it was lowest in Bridgetown with 10.3%. Mexico City had the highest prevalence of fecal incontinence (8.1%) while Montevideo had the lowest (2.8%). Santiago reported the highest rate of participants who reported having dual incontinence (7%), while Montevideo reported the lowest rate (2%) (Figure 1).

### Factors that were associated with incontinence

Table 2 demonstrates multivariate analyses to predict urinary incontinence, fecal incontinence, or dual (urinary and fecal) incontinence in the combined sample of all seven cities. Significant predictors for urinary incontinence include ages 75 years and older, a higher number of children, history of taking estrogens (currently or before), a high depressive symptoms score, a lower cognitive function score, a higher number of medical conditions, having one or more IADL difficulties and a history of falls. Significant predictors for

fecal incontinence include ages 75 years and older, a higher number of children, a history of hysterectomy, a high depressive symptoms score, a lower cognitive function score, a higher number of medical conditions, and having one or more IADL difficulties. Finally, significant predictors for dual incontinence include ages 75 years and older, a higher number of children, a high depressive symptoms score, a lower cognitive function score, a higher number of medical conditions, and having one or more IADL difficulties.

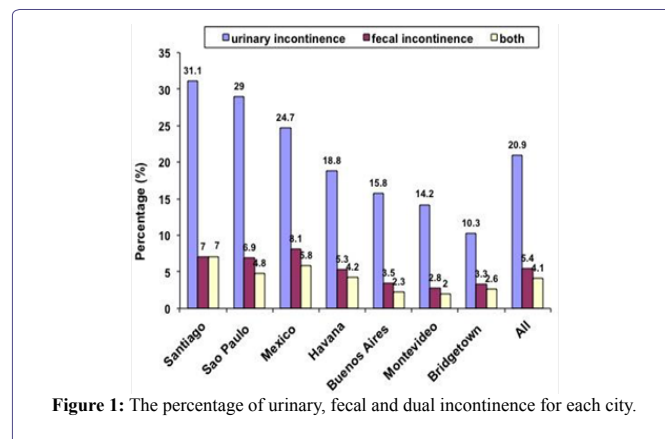


Figure 1: The percentage of urinary, fecal and dual incontinence for each city.

### Discussion

This study has assessed the prevalence and risk factors of urinary, fecal, and dual incontinence among women in seven cities in Latin America using the SABE database. Although there have been several studies assessing the epidemiology of incontinence using the SABE database, to the best of our knowledge, this is the first study using data from multiple cities from the SABE database to assess the epidemiology of all types of incontinence [7,9,17]. The overall average prevalence of urinary incontinence was 20.9%. This average is similar to previous studies [17,18]. However, the average prevalence of urinary incontinence varied from city-to-city, ranging from 10.3% in Bridgetown to 31.1% in Santiago. A wide range of prevalence of urinary incontinence is also consistent with the findings of other studies.

	Buenos Aires	Bridgetown	Sao Paulo	Santiago	Havana	Mexico City	Montevideo	Total sample
	N=656	N=924	N=1262	N=855	N=1197	N=740	N=916	N=6550
Age (yr) 75+	31.5	40.5	44.4	37.3	38.9	26.9	30.9	36.8
Married	30.0	23.7	36.5	29.2	21.0	38.8	35.2	30.3
Education (yr) 7+	23.5	20.4	8.0	31.5	37.3	18.6	32.0	24.3
Number of children (0-27)	$2.5 \pm 2.5$	$3.5 \pm 2.9$	$3.9 \pm 3.4$	$4.1 \pm 3.1$	$2.7 \pm 2.4$	$5.5 \pm 3.6$	$3.0 \pm 2.6$	$3.6 \pm 3.1$
History of hysterectomy	12.8	30.4	15.1	13.1	16.5	18.2	15.6	17.5
Currently taking estrogens	0.3	1.1	4.6	5.3	0.0	2.8	0.4	2.1
Has taken before estrogens	8.2	4.8	19.3	17.7	6.4	6.8	8.4	10.6
GDS score (0-15)	$3.0 \pm 3.1$	$1.7 \pm 1.8$	$3.4 \pm 3.2$	$4.1 \pm 3.6$	$3.2 \pm 3.6$	$3.2 \pm 3.3$	$3.3 \pm 3.4$	$3.1 \pm 3.3$
Abbreviate MMSE score (0-19)	$16.5 \pm 2.3$	$17.1 \pm 2.6$	$16.0 \pm 3.1$	$15.2 \pm 4.2$	$16.6 \pm 2.6$	$15.4 \pm 2.9$	$16.8 \pm 2.5$	$16.3 \pm 3.0$
Medical conditions (0-6)	$1.5 \pm 1.0$	$1.6 \pm 1.1$	$1.5 \pm 1.1$	$1.6 \pm 1.1$	$1.8 \pm 1.2$	$1.2 \pm 1.0$	$1.5 \pm 1.1$	$1.5 \pm 1.1$
Any IADL difficulty	30.6	22.4	44.5	35.7	30.9	30.8	19.0	31.2
Any falls previous 12 months	34.4	28.5	35.4	39.6	31.1	39.9	35.3	34.6

Table 1: Study population, women aged 60 years and older, SABE study (1999-2000).

Data is presented as percentages (%) or means  $\pm$  standard deviation. GDS= Geriatric Depression Scale. MMSE= Mini Mental State Examination. Medical conditions include arthritis, hypertension, diabetes, heart attack, stroke and cancer. IADL= Instrumental Activities of Daily Living.

Variables	Urinary incontinence		Fecal incontinence		Dual incontinence	
	Odds ratio (95% confidence intervals)	p-value	Odds ratio (95% confidence intervals)	p-value	Odds ratio (95% confidence intervals)	p-value
Age 75+ (vs. 60-74)	1.26 (1.09-1.47)	0.002	1.33 (0.99-1.77)	0.053	1.67 (1.19-2.33)	0.003
Married (vs. no)	0.93 (0.80-1.09)	0.377	1.02 (0.75-1.38)	0.906	1.11 (0.77-1.58)	0.574
Education 7+ years (vs. 0-6)	0.92 (0.77-1.07)	0.325	1.16 (0.83-1.61)	0.392	1.04 (0.69-1.55)	0.872
Number of children (0-22)	1.05 (1.03-1.07)	<.001	1.07 (1.03-1.11)	<.001	1.06 (1.02-1.11)	0.005
History of hysterectomy (vs. no)	0.96 (0.80-1.15)	0.620	1.52 (1.10-2.10)	0.012	1.42 (0.97-2.12)	0.070
Currently taking estrogens (vs. no)	2.25 (1.50-3.38)	<.001	---	---	---	---
Has taken before estrogens (vs. no)	1.42 (1.16-1.74)	<.001	---	---	---	---
GDS score (0-15)	1.11 (1.09-1.14)	<.001	1.14 (1.10-1.17)	<.001	1.14 (1.09-1.18)	<.001
Abbreviate MMSE score (0-19)	0.97 (0.94-0.99)	0.005	0.91 (0.88-0.95)	<.001	0.89 (0.85-0.93)	<.001
Number of medical conditions (0-6)	1.32 (1.24-1.40)	<.001	1.42 (1.26-1.59)	<.001	1.46 (1.28-1.68)	<.001
Any IADL difficulty (vs. none)	2.09 (1.80-2.42)	<.001	2.02 (1.51-2.70)	<.001	2.22 (1.58-3.12)	<.001
Any falls within 12 months (vs. none)	1.51 (1.32-1.74)	<.001	1.38 (1.05-1.80)	0.019	1.27 (0.93-1.74)	0.136

**Table 2:** Multivariate logistic regression analyses for sociodemographic and health factors predicting urinary, fecal or dual incontinence in women aged 60 years and older (n=6,550), combined sample of seven cities, SABE study (1999-2000).

GDS= Geriatric Depression Scale. MMSE= Mini Mental State Examination. Medical conditions include arthritis, hypertension, diabetes, heart attack, stroke, and cancer. IADL= Instrumental Activities of Daily Living. Models 1 to 3 were adjusted for all variables into the models. (An asterisk (\*) indicates that the metric was not included in multivariate regression because of non-significance from bivariate regression)

It is thought that the reason for such a wide range is due to underreport by participants due to embarrassment, misunderstanding the incontinence as a normal aging process, or variations in the definition of urinary incontinence [7,19].

The overall average prevalence of fecal incontinence was 5.4%, which is significantly lower than the prevalence of urinary incontinence. This average is somewhat lower than those from other studies. Tamanini et al., reported a rate of 13.2% for females in Brazil and Whitehead et al. reported a prevalence of 8.3% among U.S. adults [17,20]. However, another study by Gouveia Santos et al. reported the prevalence of 4% among women in Brazil [21]. The range of prevalence of fecal incontinence includes 2.8% in Montevideo to 8.1% in Mexico City. Regarding dual incontinence, the average prevalence across the cities was 4.1%. The prevalence reported in the previous studies range from 1.7% to 24%, depending on the study's design and population [9,22-25]. However, a more recent study reported a prevalence of 4.9% among community-based elderly women in Brazil, which is similar to the result of this current study [9]. The wide range of prevalence of incontinence was previously described in literature and believed to be due to inconsistent definitions of incontinence in various study settings [7].

Among the various factors that were associated with urinary, fecal, and dual incontinence, we found that age was not significantly associated with fecal incontinence, although it was significantly associated with urinary incontinence and dual incontinence. This result is somewhat similar to a previous study. Wu et al., reported that ages greater or equal to 80 years old were significantly associated with urinary incontinence and dual incontinence and not related to fecal incontinence. However, this study was comprised of U.S. men and women [25]. Use of estrogen, either prior or during the time of the study, was not significantly related to fecal or dual incontinence. However, it was highly associated with urinary incontinence. Estrogen deficiency is considered as one of the etiologies of urinary incontinence, and estrogen replacement therapy is one of the non-surgical treatment options of urinary incontinence for elderly women [26]. Given the limitation

of the cross-sectional observational study, it is not possible to identify the temporality, but it is reasonable that estrogen use has significant association with urinary incontinence only.

Having more children was significantly related to all kinds of incontinence. This is a reasonable result considering pelvic muscle changes and potential pelvic organ damage during vaginal delivery. A history of hysterectomy was not associated with urinary incontinence, but was associated with fecal incontinence and it is also probably due to the direct damage to the pelvic floor during the surgery. This pattern was also observed in previous U.S. population based study by Wu et al., [25,27].

This current study holds several limitations. First, this study is an observational study using a survey method. Thus, statistical significance of the odds ratio does not necessarily mean causality. For example, estrogen use does not mean that estrogen causes urinary incontinence, but it more likely means that the subject was on estrogen treatment for underlying urinary incontinence. However, variables such as multiparity, hysterectomy and multicorbidity could be considered as preceding risk factors of urinary incontinence. Second, the current study used relatively old data, from 1999 to 2000. However, no more recent data from the all seven Latin cities is available at this time, although more recent data from Sao Paulo is available. We conducted this project using the most available and most extensive dataset, so that the result can be generalized to other Hispanic population. Considering the significant knowledge gap in incontinence research in Hispanic population, we believe that the result of the study will be additional value in population health in this racial group, although it used old dataset.

## Conclusion

This study assessed the prevalence of urinary, fecal, and dual incontinence among women from seven cities in Latin America (Argentina, Barbados, Cuba, Mexico, Uruguay, Chile and Brazil) using population data from Health, Well-Being and Aging in Latin America and the Caribbean Study. Across the cities, an average

20.9% participants reported urinary incontinence, 5.4% reported fecal incontinence and 4.1% reported dual incontinence. Current and previous use of estrogen was associated with higher odds ratio of urinary incontinence. History of hysterectomy was only associated with fecal incontinence. No specific socioeconomic factors (education or marital status) were associated with any kind of incontinence. Despite the limitations of an observational study, this study has implications that it used a wide range of population database across the Latin American countries and assessed various covariates to identify risk factors of all kinds of incontinence focusing on Hispanic women.

### Authors' Contribution

M Kwak and R Felix - manuscript writing/editing and interpreting the results. D Carbonell and CA Reyes-Ortiz - project development, data analysis, manuscript editing.

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