



The impact of diabetes on overactive bladder presentations and associations with health-seeking behavior in China, South Korea, and Taiwan: Results from a cross-sectional, population-based study

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Abstract

Background: This study aimed to explore the impact of diabetes on overactive bladder (OAB) presentations and related predictors of healthcare-seeking behavior among adults aged ≥ 40 years in China, Taiwan, and South Korea.

Methods: An internet-based survey was conducted to assess the prevalence of diabetes, OAB presentations, and self-perceived urinary symptoms by a multi-national sample of 8284 individuals who completed the survey between June 2, 2015 and July 31, 2015. Independent associations with health-seeking behavior for urinary symptoms were estimated with odds ratio (OR) with 95% confidence interval (95% CI) using multivariate logistic regression.

Results: Diabetes was reported in 13.6% of participants and OAB was 20.8%. Diabetic participants were older than non-diabetic participants in both sexes. Participants with diabetes reported a higher rate of OAB (43.1%) and increased bothersome symptoms associated with OAB than those without diabetes. Participants with diabetes (OR, 3.07 [2.39-3.96]), urgent incontinence (OR, 2.38 [1.86-3.03]), frequency (OR, 1.86 [1.45-2.38]), and nocturia (OR, 1.14 [1.05-1.24]) were associated with healthcare-seeking behavior.

Conclusion: The proportion of diabetic participants with OAB was 2.5-fold higher than those without diabetes. Diabetes, urinary frequency, nocturia, and urgent incontinence are predictors of medical treatment-seeking behavior, but the key symptom of OAB-urgency is not a predictor of treatment-seeking behavior. It is important for clinicians to recognize the interplay between diabetes and OAB and to early identify various bothersome urinary symptoms for better health outcomes in daily practice.

Keywords: Asia; Diabetes mellitus; Lower urinary tract symptoms; Overactive bladder; Treatment-seeking behavior

1. INTRODUCTION

Overactive bladder (OAB) is defined as a cluster of urinary storage symptoms, including urinary urgency with or without urgent incontinence (UI), frequency, and nocturia.¹ Urgency is the cardinal symptom of OAB. Patients who do not experience UI are categorized as having OAB-dry, whereas those with UI are categorized as having OAB-wet. OAB is prevalent among patients in urology clinics,² causing significant bother, particularly for women.³ OAB negatively impacts patients' quality of

life, leading to increase anxiety, depression, and reduced productivity.^{2,3} Consequently, individuals seek healthcare from medical professionals,^{3,4} making OAB a recognized global public health burden.²

Population-based studies from various regions have reported OAB prevalence rates. For adults aged ≥ 40 years in the USA, an internet survey, defining OAB as the presence of urinary urgency occurring at least "often", found a prevalence of 32.6% for women and 15.8% for men.⁵ In an Asian population aged over 40 years, OAB symptoms affected 22.1% of women and 19.5% of men.⁶ These findings emphasize the need for healthcare consultations to enhance patients' physical and mental well-being.^{3,4,7} However, associations between OAB symptom severity and predictors of professional treatment-seeking behavior remains insufficiently understood.

Previous studies have shown that OAB syndrome commonly occurs in diabetic patients and has a significant impact on society.⁸ In a dedicated diabetic center where all patients were screened, Liu et al⁸ reported that 22.5% of patients had OAB and 48.0% of OAB patients had incontinence. However, the overall proportion of OAB in the general population with or without diabetes has seldom been reported.

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This study aimed to explore the impact of diabetes on OAB presentations and related predictors of healthcare-seeking behavior reported by individuals aged 40 years and older from China, Taiwan, and South Korea. An anonymous internet survey was conducted for eligible participants generated from the target population. In addition, we examined factors associated with participants seeking medical attention and care for urinary symptoms. These study results may assist clinicians early identifying patients who are at risk of OAB and to develop effective management strategies for patients with OAB.

2. METHODS

2.1. Study design and population

This cross-sectional, population-representative, internet-based study evaluated the internet survey data of males and females aged 40 years or older living in China, Taiwan, and South Korea between June 2, 2015 and July 31, 2015. Participants were randomly sampled from consumer survey panels representing the target population. Prospective participants who were pregnant at the time of the survey or had urinary tract infection within the preceding month were excluded. General demographic and clinical characteristics, including age, sex, general health, medical comorbidities, and healthcare-seeking and treatment data were obtained for analysis. The detailed methodology for this study was published previously,^{6,9} and the difference in OAB prevalence based on nationality had been reported and discussed.⁶

2.2. Data collection

Data collected from survey participants were analyzed, encompassing self-reported information such as age, gender, overall health, medical comorbidities, and healthcare-seeking behavior for treatment. Various disease-specific instruments,^{6,9,10} including the symptom-related metrics defined by the International Continence Society (ICS) for voiding, storage, and post-micturition (PM) symptoms, as well as OAB symptom scores (OABSS),^{6,10} and the Patient Perception of Bladder Condition scale,⁶ were evaluating for their associations with healthcare-seeking behavior. All these instruments had undergone validation in the local language.^{6,9,11}

The presence of lower urinary tract symptoms (LUTS), encompassing various categories such as voiding only, storage only, PM, voiding with storage, voiding with PM, storage with PM, and three combined symptoms (voiding, storage, and PM), were defined according to the ICS definition.^{6,9} The severity levels of OAB depend on the score of the OABSS, with “mild” indicating OABSS score ≤ 5 , “moderate” indicating a score of 6-11, and “severe” indicating a score of ≥ 12 . Furthermore, OAB was categorized as either “wet” (OABSS incontinence score ≥ 2) or “dry” (OABSS incontinence score < 2 , less than once a week or not at all).^{6,10} The bothersome nature of urinary symptoms was evaluated using the Patient Perception of Bladder Condition scale, where a score ≥ 3 indicates their significance. Examining the complete range of LUTS can assist in emphasizing the significance of OAB symptoms within this study.

2.3. Ethical considerations

Because this was a survey-based study, Institutional Review Board approval was not considered necessary. This study complied with guidelines of the World Association for Social, Opinion and Market Research and Good Clinical Practice, and followed the principles of the Declaration of Helsinki. All participants provided signed informed consent before participating in the study.

2.4. Statistical analysis

The Chi-square test and Mantel-Haenszel test were used for categorical data. The odds ratios (ORs) of predictors in treatment-seeking behavior were evaluated by the multiple logistic regression model. For all statistical tests, a *p*-value less than 0.05 was considered significant.

3. RESULTS

3.1. Participant characteristics

Table 1 shows participant characteristics by the presence of diabetes. A total of 8284 individuals completed the online survey, 49.2% (*n* = 4076) of them were male participants, and 13.6% (*n* = 1126) of them had diabetes. Female participants were older than male participants with diabetes (64.1 ± 20.6 vs 55.6 ± 19.7 years, *p* < 0.001) and without diabetes (55.0 ± 21.5 vs 51.8 ± 19.6 years, *p* < 0.001). Overall, the proportion of widower and homemakers was higher in female than male participants; however, the proportion of male participants with college or graduate degree was higher than female participants.

3.2. Diabetes and LUTS

Table 2 presents the patterns of LUTS between participants with and without diabetes. There were 5070 participants with LUTS, and 947 of them accounted for 84.1% of participants with diabetes (*n* = 1126). LUTS was prevalent in male participants (83.1%) and female participants with diabetes (85.2%). The patterns of LUTS appeared different by sex. The ratio of presenting voiding plus PM symptoms was significantly higher among female participants with diabetes compared to those without diabetes (2.1% vs 0.8%, *p* < 0.001). However, this ratio did not exhibit a significant difference between male participants with diabetes and those without (3.2% vs 3.7%, *p* = 0.53) (Table 2).

3.3. Classification and bothersome symptoms of OAB

Table 3 presents the types and bothersome symptoms of OAB between participants with and without diabetes. There were 1726 participants with OAB and 485 (43.1%) participants with diabetes (*n* = 1126). The proportions of both OAB-dry and OAB-wet were higher in participants with diabetes than non-diabetes in both sexes. The comparison between OAB-dry in participants with and without diabetes revealed rates of 15.9% vs 8.3% in males and 16.1% vs 7.9% in females, respectively.

Participants perceived bothersomeness for each specific storage symptoms (score ≥ 3 points) were generally more common in both male and female participants with diabetes than those without diabetes (Table 3). Urgency with fear of leaking had a high rate in female (53%) and male (47%) with diabetes than female (42%) and male (34%) participants without diabetes. Other bothersome symptoms of urgency, nocturia, frequency, and urinary incontinence were all more frequently occurred in patients with diabetes compared to participants without diabetes in both sexes.

3.4. Predictors associated with seeking treatment for urinary symptoms

Table 4 presents the reported rate of participants seeking medical care for urinary symptoms. Among the 1394 participants who sought medical care, 346 had OAB, representing 67.2% of participants with diabetes (*n* = 515). The proportion of diabetic participants with mild, moderate, and severe OAB was higher than those without diabetes for seeking medical care. Particularly, diabetic women who presented with moderate OAB had a high rate of seeking health professionals for treating

Table 1
Demographic data of the study population (n = 8284)

	Diabetes (n = 1126)			Without diabetes (n = 7158)		
	Male (n = 567)	Female (n = 559)	p	Male (n = 3510)	Female (n = 3648)	p
Mean age (yr) ± SD	55.6 ± 19.7	64.1 ± 20.6	<0.001	51.8 ± 19.6	55.0 ± 21.5	N.S.
Marital status, n (%)						
Married or with partner	491 (86.6)	480 (85.9)	N.S.	3047 (86.8)	2978 (81.6)	N.S.
Single	28 (4.9)	13 (2.3)	N.S.	278 (7.9)	301 (8.3)	N.S.
Widow/widower	21 (3.7)	47 (8.4)	0.001	66 (1.9)	221 (6.1)	<0.001
Divorced	25 (4.4)	14 (2.5)	N.S.	92 (2.6)	120 (3.3)	N.S.
Not to answer	2 (0.4)	5 (0.9)	N.S.	26 (0.7)	28 (0.8)	N.S.
Education, n (%)						
High school or less	161 (28.4)	235 (42)	N.S.	880 (25.1)	1323 (36.3)	N.S.
Some college	112 (19.8)	143 (25.5)	N.S.	723 (20.6)	756 (20.7)	N.S.
College degree/college graduate	251 (44.3)	163 (29.1)	<0.001	1596 (45.5)	1419 (38.9)	<0.001
Postgraduate	42 (7.4)	19 (3.4)	N.S.	310 (8.8)	150 (4.1)	N.S.
Work status, n (%)						
Working, full-time	343 (60.6)	237 (42.3)	N.S.	2449 (69.8)	1921 (52.7)	N.S.
Working, part-time	25 (4.4)	26 (4.6)	N.S.	176 (5 %)	221 (6.1%)	N.S.
Unemployed	10 (1.8)	5 (0.9)	N.S.	43 (1.2 %)	44 (1.2%)	N.S.
Retired	166 (29.3)	183 (32.7)	N.S.	669 (19.1 %)	645 (17.7%)	N.S.
Homemaker	3 (0.5)	89 (15.9)	<0.001	26 (0.7 %)	704 (19.3%)	<0.001
Other work for pay	4 (0.7)	4 (0.7)	N.S.	61 (1.7 %)	29 (0.8%)	N.S.
Disable	2 (0.4)	10 (1.8)	N.S.	12 (0.3 %)	7 (0.2%)	N.S.
Student	0 (0)	1 (0.2)	N.S.	3 (0.1 %)	5 (0.1%)	N.S.
Other	13 (2.3)	5 (0.9)	N.S.	71 (2 %)	72 (2%)	N.S.

An independent two-sample t-test for continuous data and a chi-square test for the categorized data were used.

Table 2
Participants with LUTS of this population (n = 5070) with or without diabetes per ICS symptom definition

	Male			Female			Overall		
	Diabetes	Non-diabetes	p	Diabetes	Non-diabetes	p	Diabetes	Non-diabetes	p
LUTS persons	471 (83.1%)	2089 (59.5%)	<0.001	477 (85.2%)	2034 (55.8%)	<0.001	947 (84.1%)	4123 (57.6%)	<0.001
Voiding Only	37 (6.5%)	257 (7.3%)	0.49	7 (1.3%)	70 (1.9%)	0.27	43 (3.8%)	327 (4.6%)	0.25
Storage Only	57 (10.1%)	455 (13%)	0.052	88 (15.7%)	915 (25.1%)	<0.001	145 (12.9%)	1370 (19.1%)	<0.001
PM Only	7 (1.2%)	80 (2.3%)	0.1	10 (1.8%)	57 (1.6%)	0.69	17 (1.5%)	137 (1.9%)	0.35
Voiding + Storage	97 (17.1%)	341 (9.7%)	<0.001	95 (17%)	298 (8.2%)	<0.001	192 (17.1%)	639 (8.9%)	<0.001
Voiding + PM	18 (3.2%)	130 (3.7%)	0.53	12 (2.1%)	30 (0.8%)	0.003	30 (2.7%)	160 (2.2%)	0.37
Storage + PM	16 (2.8%)	97 (2.8%)	0.9321	12 (2.1%)	109 (3%)	0.26	28 (2.5%)	206 (2.9%)	0.46
Voiding + Storage + PM	239 (42.2%)	729 (20.8%)	<0.001	253 (45.2%)	554 (15.2%)	<0.001	492 (43.7%)	1284 (17.9%)	<0.001
No LUTS persons	96 (16.9%)	1421 (40.5%)	<0.001	83 (14.8%)	1614 (44.3%)	<0.001	179 (15.9%)	3035 (42.4%)	<0.001

p-value was calculated by the chi-square test.

ICS = International Continence Society; LUTS = lower urinary tract symptoms; PM = post-micturition.

urinary symptoms (53.5%), compared to female participants without diabetes (39.2%) (Table 4).

Table 5 presents the factors associated with seeking medical care for urinary symptoms. Participants with diabetes exhibited odds three times higher than those without diabetes in their inclination to seek medical care. (OR, 3.07 [95% CI, 2.39-3.96]). Although the degree of OAB severity was not associated with seeking medical care, the bothersome OAB symptoms of UI (OR, 2.38 [95% CI, 1.86-3.03]), frequency (OR, 1.86 [95% CI, 1.45-2.38]), and nocturia (OR, 1.14 [95% CI, 1.05-1.24]) were associated with seeking medical care in the study cohort (Table 5).

4. DISCUSSION

In this survey of participants from China, Taiwan, and South Korea aged over 40 years, 13.6% of participants had diabetes.

In contrast to non-diabetic participants, both males and females with diabetes had a higher proportion of OAB and OAB-wet than non-diabetic participants. Each OAB symptom caused significant bother among diabetic men and women and, interestingly, the presentation of LUTS was more sophisticated in different subtypes among people with diabetes than among those without. Therefore, diabetic participants had a higher probability of visiting healthcare professionals for treatment of urinary symptoms. The results of multiple logistic regression in this study suggest that people with diabetes, urinary frequency, nocturia, or UI may have increased odds of seeking treatment for urinary symptoms. These findings also underscore the significance of addressing treatment-seeking behavior in diabetic women with moderate severity of OAB symptoms, not considering other conditioning factors.

In the present study, the prevalence of diabetes in adults over age 40 years was 13.6% in this Asian population, among

Table 3**OAB classification and bothersome (≥ 3) of specific OAB-related symptoms in this study population (n = 1726)**

	Male			Female			Overall		
	Diabetes	Non-diabetes	p	Diabetes	Non-diabetes	p	Diabetes	Non-diabetes	p
OAB persons	218 (38.5%)	578 (16.5%)	<0.001	267 (47.7%)	663 (18.2%)	<0.001	485 (43.1%)	1241 (17.3%)	<0.001
OAB classification									
OAB-dry	90 (15.9%)	293 (8.3%)	<0.001	90 (16.1%)	290 (7.9%)	<0.001	180 (16%)	584 (8.2%)	<0.001
OAB-wet	128 (22.6%)	285 (8.1%)	<0.001	177 (31.6%)	372 (10.2%)	<0.001	305 (27.1%)	657 (9.2%)	<0.001
No OAB persons	348 (61.5%)	2931 (83.5%)	<0.001	293 (52.3%)	2986 (81.9%)	<0.001	641 (56.9%)	5917 (82.7%)	<0.001
Specific storage symptom causes bothersome ≥ 3									
Frequency	98 (38%)	173 (21%)	<0.001	122 (41%)	193 (21%)	<0.001	221 (39%)	366 (21%)	<0.001
Nocturia	125 (40%)	220 (20%)	<0.001	146 (41%)	264 (22%)	<0.001	271 (41%)	484 (21%)	<0.001
Urgency	100 (45%)	185 (32%)	0.001	129 (51%)	228 (37%)	<0.001	229 (49%)	413 (35%)	<0.001
Urgency with fear of leaking	98 (47%)	160 (34%)	0.001	127 (53%)	223 (42%)	0.004	225 (50%)	382 (38%)	<0.001
UI-how often	80 (52%)	134 (39%)	0.007	109 (48%)	109 (48%)	0.054	188 (49%)	306 (39%)	0.001

p-value was calculated by the chi-square test.

OAB = overactive bladder.

Table 4**Visiting professional healthcare for urinary symptoms in this study population (n = 1394), stratifying by OAB severity**

	Male			Female			Overall		
	Diabetes	Non-diabetes	p	Diabetes	Non-diabetes	p	Diabetes	Non-diabetes	p
OAB persons	136 (63.6%)	235 (52.3%)	0.007	210 (69.5%)	221 (51.4%)	<0.001	346 (67.2%)	455 (51.8%)	<0.001
Mild OAB	28 (13.1%)	41 (9.1%)	0.119	35 (11.6%)	43 (10%)	0.483	63 (12.2%)	84 (9.6%)	0.116
Moderate OAB	100 (46.7%)	182 (40.5%)	0.131	161 (53.5%)	168 (39.2%)	<0.001	261 (50.7%)	351 (39.9%)	<0.001
Severe OAB	8 (3.7%)	11 (2.4%)	0.353	13 (4.3%)	9 (2.1%)	0.083	21 (4.1%)	20 (2.3%)	0.055
No OAB persons	78 (36.4%)	214 (47.7%)	0.007	92 (30.5%)	209 (48.6%)	<0.001	169 (32.8%)	424 (48.2%)	<0.001

p-value was tested by chi-square or Mantel-Haenszel test.

OAB = overactive bladder.

Table 5**Predictors of treatment-seeking behavior for unrainy symptoms in the study population by using the logistic regression model**

	Odds ratio (95% CI)	p
General characteristics		
Gender	1.13 (0.91-1.41)	0.26
Age	1.0 (0.99-1.01)	0.9
Body mass index	1.0 (0.97-1.03)	0.86
Diabetes*	3.07 (2.39-3.96)	<0.001
Hypertension	1.2 (0.95-1.52)	0.12
Cardiac disease	1.08 (0.78-1.48)	0.64
Hyperlipidemia	0.91 (0.72-1.16)	0.44
Neurological disorder	1.34 (0.84-2.17)	0.22
OAB severity		
No OAB	0.83 (0.44-1.54)	0.55
Mild OAB	0.83 (0.43-1.6)	0.59
Moderate OAB	1.34 (0.84-2.17)	0.19
OAB symptoms (bothersome ≥ 3 for single symptom)		
Frequency*	1.86 (1.45-2.38)	<0.001
Nocturia*	1.14 (1.05-1.24)	<0.001
Urgency	0.95 (0.87-1.04)	0.26
Urgent incontinence*	2.38 (1.86-3.03)	<0.001

OAB = overactive bladder.

*Indicated p < 0.05.

whom both sexes in the diabetes group had a high proportion of OAB. Nanditha et al¹² suggested that more than 60% of people with diabetes live in Asia. The increasing prevalence of diabetes in the Asian population can be attributed to multiple

interrelated factors, including rapid industrialization, urbanization, and the ensuing changes in lifestyle factors, such as adopting a Western-inspired diet and sedentary lifestyle. For example, the overall prevalence of diabetes was estimated to be 10.9% in China in 2013.¹³ The aging society and exacerbation of genetic-environmental interactions, such as epigenetic changes resulting from an adverse intrauterine environment, may further contribute to the rapid increase of diabetes in Asian countries. Among patients with diabetes, cardiovascular and kidney complications also attracted the attention of medical professionals and the public because of the high prevalence of morbidity and mortality.¹⁴ However, diabetes may lead to common sequela in diabetic bladder dysfunction (DBD) by presenting LUTS, which affect the quality of life profoundly.¹⁵ In the present study, we highlighted OAB syndrome as the major presentation of DBD.

In the present survey study, both males and females in the diabetic population may have more LUTS than those among the non-diabetic controls. Moreover, female diabetic participants presented a higher proportion of storage symptoms than non-diabetic females. DBD can manifest as a broad spectrum of bothersome LUTS that vary over time, which may develop into a sensory urgency in the early stage, and an impaired sensation of bladder fullness and impaired bladder emptying in the late stage.^{15,16} Diabetes is a group of metabolic diseases characterized by persistent hyperglycemia majorly caused by insulin resistance. In the early stage of DBD, the pathophysiology of OAB syndrome may be elicited from several aspects of metabolic disturbances, such as insulin resistance in the bladder mucosa,¹⁷ or excessive metabolites from the tricarboxylic acid cycle (e.g., succinate overproduction),^{18,19} and dysregulated oxidative stress,²⁰ which may trigger the OAB

syndrome of diabetic patients through extensive dysfunction in the urothelium, bladder detrusor muscle, and afferent and efferent nerves.²¹

In the present study, OAB-wet seems to be a dominant OAB category and appears to be significantly bothersome among diabetic participants. UI is a serious and debilitating condition with a social stigma attached.²² UI is also a risk factor for functional decline and reduced physical activity because of the increased risk of falls and fractures. Results of the present study revealed that diabetic patients are afraid of leakage when urgency occurs. The increased frequency in UI not only limits diabetic patients' social activities but typically also results in an economic burden.²³ In a Malaysian general population aged over 60 years, the prevalence of urinary UI and mixed UI is 3.3%.²⁴ However, in a Canadian survey, the prevalence of urinary incontinence in diabetic patients over 65 years old is around 33%.²³ In the USA, urinary incontinence is a highly prevalent symptom (e.g., 29%-48%, depending on severity) in women with type 2 diabetes.²⁵ A meta-analysis of observational studies reported that diabetes, obesity, and hypertension were risk factors for urinary incontinence.²⁶ The non-communicable metabolic diseases of diabetes, obesity, and hypertension may share common pathophysiology that results in urinary incontinence.²⁷ In the present study, both male and female diabetic participants had a high proportion of OAB-wet, with females somewhat higher than males.

The LUTS of diabetic patients are often overlooked in the clinic. In the present study, we reported that diabetes and OAB symptoms (i.e., frequency, nocturia, and UI) are predictors of treatment-seeking behavior in this study population. In previous investigations,^{4,7} symptom severity and the extent of bother would be the primary determinants of seeking help. In our online survey, female diabetic patients were more likely to visit healthcare professionals for urinary symptoms associated with moderate OAB severity. Researchers reported previously that diabetic women may have highly prevalent urinary incontinence,²⁸ which may impair their performance of activities of daily living.^{23,26} Except for the risk factor of functional decline, urinary incontinence also increases risk of falls and fractures.²² Worsening glycemic control has been suggested to be a risk factor for urinary incontinence in diabetic women.^{29,30} Healthcare providers need to be sensitive in evaluating and discussing UI with patients, since lifestyle modification and behavior therapy with or without pharmacotherapy may help to improve symptoms.^{31,32} Currently, pharmacotherapy specific to the pathophysiology of DBD, such as mirabegron, may provide potentially effective treatments for these patients.^{1,32}

In addition, we observed that the symptom of urgency is not a predictor of treatment-seeking in this study. Despite that urinary urgency is the cardinal symptom to initiate the bladder-brain circuit response in OAB,^{1,33} UI, a more severe form of urgency,³⁴ may be rated as truly bothersome by those with OAB.³⁵ Nevertheless, the psycho-social issue of treatment-seeking seems complex. Some who experience urinary urgency may consider this symptom explainable by or relative to the aging process, which does not appraise such a symptom as a health threat in need of medication.³⁶ On the other hand, the symptom of nocturia had been reported as the most bothersome symptom among adults aged 65 years and older.³⁷ Fakari et al³⁸ suggested that caregivers should try to understand the underlying facilitators and inhibitors of treatment-seeking behaviors, when attempting to improve the quality of life in LUTS patients, such as using the non-invasive treatment.³⁹

Our study has several limitations. First, this study is an internet-based study, which may introduce biases related to internet penetration rates and may confined the population selection to urban areas in these countries. Second, the participants who can access the internet may belong to a higher socioeconomic class, especially

those with a higher educational level. In the current study, our focus was on the interaction between OAB presentations and health-seeking behavior in participants with or without diabetes. As a result, demographic parameters and nationality were not adjusted in the multiple logistic regression model.

In conclusion, the results of this survey have demonstrated that diabetic patients have a higher proportion of OAB and OAB-wet in association with urinary symptoms. Diabetes, urinary frequency, nocturia, and UI appear to be the predictors of seeking treatment for urinary symptoms in this Asian population.

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