ORIGINAL

Prevalence of overactive bladder and its related factors in Japanese patients with diabetes mellitus

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Abstract. The objectives of this study were to examine the prevalence of overactive bladder (OAB), including both with and without urinary incontinence, in patient with diabetes, and to explore factors related to the presence of OAB. This was a single-center, cross-sectional prospective survey. Patients with diabetes aged ≥ 18 years were consecutively enrolled in this study. Items related to OAB symptoms, neuropathic symptoms, clinical characteristics regarding diabetes management, and demographics were collected. The presence of OAB was assessed using the Overactive Bladder Symptoms Score (OABSS). Relationships between presence of OAB and potential related factors were explored by logistic regression analysis. The prevalence of OAB in the study cohort ($n=652$) was 24.2%, of which 71.5% was dry OAB (without urgency incontinence). Multivariate analysis showed that age (odds ratio [OR] 1.64, 95% confidence interval [CI] 1.07-2.50) and symptomatic diabetic polyneuropathy (DPN) (OR 2.41, 95% CI 1.64-3.54) were significantly related to the presence of OAB. The OAB prevalence in our sample of patients with diabetes was approximately 2-fold higher than that of the Japanese general population, which was based on results obtained from questionnaires similar to the present study, although the OAB prevalence of 24.2% may slightly differ from the true value due to assessment of OAB using the questionnaire only. As OAB which is deteriorated QOL can be identified and treated, screening of OAB in patients with diabetes who have DPN or aged ≥ 65 years may contribute to achieving the therapeutic aim of maintaining QOL.

Key words: Diabetes mellitus, Diabetic polyneuropathy, Overactive bladder, OABSS, Prevalence

UROLOGICAL symptoms, such as polyuria and urinary frequency associated with osmotic diuresis and excess fluid intake, increase of post-void residual urine volume and difficulty in urination associated with bladder dysfunction caused by autonomic disturbance, are well-known complications in patients with diabetes. These symptoms could reflect progression of diabetic autonomic neuropathy, and has been classically termed bladder cystopathy [1]. However, bladder cystopathy most likely represents end stage bladder failure and is relatively uncommon [1].

In addition to the symptoms above, we often encounter diabetic patients with complaint of overactive bladder (OAB) symptoms, which differ from the symptoms

mentioned above. OAB is defined as urgency (the complaint of a sudden compelling desire to pass urine that is difficult to defer), with or without incontinence, usually with urinary frequency and nocturia (the complaint that an individual has to wake at night one or more times to void). Therefore OAB is diagnosed on the basis of subjective symptoms and without the complexity of urodynamic studies. Urodynamic studies are not always necessary for diagnosis or starting treatment [2, 3]. OAB is categorized as either “dry OAB,” where there is no incontinence, or “wet OAB,” which is accompanied by incontinence [3]. Since OAB can substantially have negative impact on patient’s quality of life (QOL) in social, psychological, occupational, physical, and sexual aspects [4], these symptoms have increasingly become a concern in the management of diabetes. However, few reports have examined associations between OAB and diabetes. Although several studies have reported associations between urological

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complications and diabetes, most of these earlier studies have focused only on urinary incontinence, which can be either wet OAB or other etiology, or a combination of these etiologies, among patients with diabetes [5-10]. Importantly, dry OAB can impair patient's QOL to the same degree as wet OAB [11]. It should be also considered that dry OAB accounts for approximately half of the OAB population, according to the survey conducted by Homma *et al.* [12]. In addition, most of these studies included only female patients. As another concern, multilateral evaluation of diabetic polyneuropathy (DPN) including symptoms, vibratory sense, and ankle reflex was not conducted. Furthermore, no report has demonstrated that DPN was the related factor of increased prevalence of OAB, although we have often noted OAB symptoms in diabetic patients with DPN in clinical practice. These findings and observations suggest the usefulness of examining the relationship between OAB and diabetes including both dry and wet pathologies.

This study therefore aimed to examine the prevalence of OAB in patients with diabetes using the Overactive Bladder Symptoms Score (OABSS) [13, 14], which can assess both dry and wet OABs, and also examined the association between presence of OAB and related factors among patients with diabetes.

Materials and Methods

Design and patients

This was a single-center, cross-sectional prospective survey conducted between October 2012 and February 2013 (date of the last patient enrolled) at the Social Insurance Yamanashi Hospital (Yamanashi, Japan). Patients with type 1 or 2 diabetes aged ≥ 18 years old, whether or not they were being currently treated for a bladder conditions, were consecutively enrolled to participate in this study. Patients who had spinal cord damage (*e.g.*, spinal cord injury, lumbar spondylosis, spina bifida, etc.) and neurologic disorders (*e.g.*, Parkinson disease, multiple sclerosis, etc.) were excluded from the study.

The protocol for this study has been approved by the institutional ethics committee of the Social Insurance Yamanashi Hospital, within which the work was undertaken and it conforms to the provisions of the Declaration of Helsinki. Written informed consent was obtained from all the participating patients prior to enrolment.

Survey questionnaire

The patient-reported survey questionnaire consists of items related to OAB symptoms, neuropathic symptoms, and clinical characteristics regarding diabetes management.

OAB was assessed using the OABSS [13, 14], a symptom assessment measurement designed to quantify OAB symptoms into a single score (Supplementary Table S1). This questionnaire consists of the following four questions related to symptoms of OAB: Q1. daytime frequency; Q2. night-time frequency; Q3. urgency; and Q4. urgency incontinence (the complaint of involuntary leakage accompanied by or immediately preceded by urgency). Patients were asked to rate the severity of each symptom on scales that ranged from 0 to a maximum (worst) score of 2, 3, 5 and 5, respectively. The total score ranges from 0 to 15, and a higher score indicates more severe OAB. The scoring for these questions is designed to place more weight on urgency (Q3) and urgency incontinence (Q4) than on the frequencies. The OABSS was developed in Japan, and has been psychometrically validated in the Japanese population [13]. The English version of OABSS has also been linguistically validated [14]. In the present study, patients who satisfied criteria of both an urgency score (Q3 in Table S1) of ≥ 2 (once a week or more) and total score of ≥ 3 were considered to have OAB [13]. Among patients with OAB, those with an urgency incontinence score (Q4 in Table S1) ≥ 2 (once a week or more) were considered to have wet OAB and those with an urgency incontinence score of 1 (less than once a week) or 0 (not at all), were considered to have dry OAB [3, 12]. Severity of OAB was categorized based on total score (Mild: 5 or less; Moderate: 6 to 11; and Severe: ≥ 12) [3, 15].

DPN was assessed using the "Abbreviated diagnostic criteria for distal symmetric polyneuropathy" [16]. The diagnostic criteria have two prerequisites for all patients: 1) presence of diabetes mellitus, and 2) absence of other peripheral neuropathies except distal symmetric polyneuropathy. DPN was diagnosed, if a patient who satisfied both prerequisites meets more than two of the following three criteria for neuropathy: 1) subjective symptoms, defined as numbness, pain, or dysesthesia in the tips of the toes and the bottom of the feet, presumably caused by DPN, 2) bilateral decrease or absence of ankle reflexes, tested in the kneeling position, and 3) decrease in vibration sense on bilateral medial malleoli, confirmed based on a perception time

of the vibratory stimulus from a 128 cps tuning fork of less than 10 seconds. On evaluation of these criteria, the effects of aging must be taken into account. Even without meeting any of the criteria for neuropathy, DPN was diagnosed for those who satisfied the prerequisites, and either of another set of criteria: 1) two or more nerves exhibiting abnormalities in nerve conduction velocity, amplitude or latency in a nerve conduction study, and 2) clinical symptoms signifying the definite presence of diabetic autonomic neuropathy, which should ideally be confirmed based on the autonomic function testing.

In this present study, patient demographic characteristics (age, sex, height, body weight, and body mass index [BMI]), diabetes-related variables (HbA1c, random plasma glucose, current treatment, and duration of diabetes), variables for the assessment of DPN (ankle reflexes and vibratory sense) and OAB (OABSS) were collected on the same day.

Statistical analysis

Demographic characteristics and clinical variables were summarized with descriptive statistics. Means and standard deviation (SD) were used for continuous variables and percentages for categorical variables. Severity of bladder conditions based on OABSS among OAB patients was summarized.

Relationships between presence of OAB and all potential related factors which were collected in the questionnaire were explored by logistic regression analysis. Results of logistic regression analysis were summarized by odds ratios (ORs) and the respective 95% confidence intervals (CIs). In this analysis, the presence of OAB was defined by the answer of both an urgency score (Q3) of ≥ 2 (once a week or more) and total score of ≥ 3 in the OABSS. The potential risk factors included individual characteristics and clinical characteristics of diabetes management. The individual characteristics included sex, age, and BMI. The clinical characteristics of diabetes management included duration of diabetes, HbA1c level, current treatment (diet therapy, oral antidiabetic agents, or Insulin), DPN (absent/ present), ankle reflex (normal/ loss of reflex for both ankles), vibratory sense (normal/ diminished), symptomatic DPN (absent/ present), and history of stroke (yes/ no). Obesity was defined as BMI of 25 kg/m^2 or higher according to the criteria proposed by the Japan Society for the Study of Obesity [17], whereas the World Health Organization (WHO)

definition of obesity is BMI of 30 kg/m^2 or higher [18]. The cutoff point of HbA1c was set at 7.0% which is the target for the prevention of diabetic complications recommended by the Japan Diabetes Society. Crude ORs were calculated by univariate logistic regression analysis, as were subsequently adjusted ORs calculated by multivariate logistic regression analysis. For multivariate logistic regression analysis, we retained all the variables excluding variables which are considered multicollinearity. The variables which have to be considered multicollinearity, of which those presenting the highest odds ratio were retained. All statistical analyses were carried out using the Minitab 16 statistical software (Minitab, State College, PA, USA).

Results

Characteristics of the study participants

Overall, data were collected from 652 patients with diabetes, including four patients with type 1 diabetes. Patient characteristics are shown in Table 1. Mean (SD) age of the patients was 64.5 (12.5) years, and 62.8% of patients were male. Mean duration of diabetes was 14.6 (9.2) years, and the mean HbA1c was 6.6 (1.2)%. The most common current diabetes treatment was oral anti-diabetic drugs (65.6%). Diabetic neuropathy was present in 55.1%; 43.3% had symptomatic neuropathy and 11.8% had asymptomatic neuropathy.

Prevalence of OAB

The prevalence of OAB in this population ($n=652$) was 24.2% (Table 1). Among patients with OAB, the severity of OAB symptoms based on OABSS were "Mild" in 48.1% (76/158) of patients, "Moderate" in 48.1% (76/158), and "Severe" in 3.8% (6/158). Dry OAB (without urgency incontinence) was seen in 71.5% (113/158), and wet OAB in 28.5% (45/158).

Association between presence of OAB symptoms and potential related factors

Uni- and multivariate logistic regression analyses were performed with data from the 647 patients with no missing data. Results of univariate regression analysis are shown in Table 2. Statistical significance was shown in the following variables: age ($<65 \text{ yrs/} \geq 65 \text{ yrs}$), duration of diabetes ($<10 \text{ yrs/} \geq 10 \text{ yrs}$; $<15 \text{ yrs/} \geq 15 \text{ yrs}$), DPN (present/ absent), ankle reflex (normal response/ loss of reflex for both ankles), and symptomatic DPN (present/ absent). Considering multicol-

Table 1 Characteristics of the study population (n=652)

Variables	Mean $\pm$ SD, or n (%)
Age (yrs)	64.5 $\pm$ 12.5
Sex	
Male	404 (62.8%)
Female	248 (38.8%)
BMI (kg/m ²)	23.3 $\pm$ 4.2
Duration of diabetes (yrs)	14.6 $\pm$ 9.2
HbA1c (%) ^a	6.6 $\pm$ 1.2
HbA1c ^a	
<7%	526 (80.8%)
$\geq$ 7%	125 (19.2%)
Random plasma glucose (mg/dL)	143.5 $\pm$ 58.1
Current treatment for diabetes	
Diet therapy alone	126 (19.3%)
Oral anti-diabetic drugs	428 (65.6%)
Insulin	98 (15.0%)
Prevalence of DPN ^a	359 (55.1%)
Asymptomatic	77 (11.8%)
Symptomatic	282 (43.3%)
Prevalence of OAB	158 (24.2%)
Dry OAB	113 (17.3%)
Wet OAB	45 (6.9%)
OAB severity based on OABSS	
Mild ($\leq$ 5)	76 (11.7%)
Moderate (6 to 11)	76 (11.7%)
Severe ($\geq$ 12)	6 (0.9%)
History of acute lower urinary tract infection ^a	55 (8.4%)
History of stroke ^a	45 (6.9%)

^a n=651

OAB: based on the OABSS, an urgency score of ≥ 2 (once a week or more) and total score of ≥ 3 [13]. Wet OAB: Among patients with OAB based on the OABSS, those with an urgency incontinence score (Q3 in OABSS; see Table 2) of ≥ 2 (once a week or more). DPN was assessed using "Abbreviated diagnostic criteria for distal symmetric polyneuropathy" [16].

linearity, of two categories, variables presenting the highest odds ratio were respectively selected: duration of diabetes (<15 yrs/ $\geq$ 15 yrs) and symptomatic DPN. And the following variables: age and duration of diabetes (<15 yrs/ $\geq$ 15 yrs) were retained, since the correlation of these was weak. Age and symptomatic DPN remained statistically significant in the multivariate analysis (Table 3). The odds of having OAB were 2.41-fold higher in patients with symptomatic DPN than in patients without symptomatic DPN (OR 2.41, 95% CI 1.64-3.54).

Discussion

In the present study, the prevalence of OAB in patients with diabetes was 24.2% (Table 1). According to a national survey of Japan conducted in 2002, the estimated prevalence of OAB was 12.4% in the general population aged 40 years or older in Japan [12]. Compared to this, the prevalence of OAB in patients with diabetes derived from our sample was approximately 2-fold higher, suggesting that factors related to patients with diabetes could contribute to an increased risk of OAB. The prevalence in our study was consistent with other earlier studies although direct comparison may not be appropriate due to the differences in the clinical characteristics of the sample populations. A survey of 3962 women in the United States demonstrated that 21.4% of female patients with diabetes had OAB [7]. In a survey of 1359 Taiwanese patients with diabetes, prevalence rate of OAB was 22.5% [8]. Interestingly, the proportion of dry (17.3%) and wet OAB (6.9%) in our study (Table 1) was notably different from the survey results in the Japanese general population, which presented an almost 1:1 ratio (6.0% and 6.4%) [12]. Although the reason for this difference is unclear, this observation indicates the likelihood that dry OAB, compared with wet OAB, is a more common form of OAB in patients with diabetes. Since dry OAB does not include obviously symptomatic incontinence, dry OAB may not be easily captured in regular visits for diabetes cares, despite dry OAB could have significantly impacted on patient's QOL as well as wet OAB [11].

With regard to factors related to the presence of OAB, multiple regression analysis revealed aged ≥ 65 years old and presence of symptomatic DPN as the factors contributing to the increased risk of OAB (Table 3). In another study [8], only age and sex (male) were identified as contributing factors, and DPN did not remain as a contributing factor. This difference may be partly explained by differences in methodology, as in the previous study, vibratory sense was the only used to assess presence of DPN. Thus the prevalence of DPN might have been underestimated. On the other hands, in our study, DPN was assessed multilaterally with symptoms, ankle reflex and vibratory sense. This approach has enabled more reasonable assessment of DPN, including both asymptomatic and symptomatic DPN.

Several pathophysiological mechanisms can be hypothesized to explain the association between diabe-

Table 2 Results of univariate logistic regression analysis (n=647)

		Non OAB (n=491)	OAB (n=156)	OR (95%CI)	p value
Sex	Male	301 (74.7%)	102 (25.3%)	0.84 (0.58-1.22)	0.360
	Female	190 (77.9%)	54 (22.1%)		
Age (yr)	<65	252 (82.4%)	54 (17.6%)	1.99 (1.37-2.90)	<0.001
	≥65	239 (70.1%)	102 (29.9%)		
BMI (kg/m ²)	<25	350 (74.6%)	119 (25.4%)	0.77 (0.51-1.17)	0.224
	≥25	141 (79.2%)	37 (20.8%)		
Duration of Diabetes (yrs)	<10	201 (80.7%)	48 (19.3%)	1.56 (1.06-2.29)	0.024
	≥10	290 (72.9%)	108 (27.1%)		
	<15	312 (80.4%)	76 (19.6%)	1.83 (1.28-2.64)	0.001
	≥15	179 (69.1%)	80 (30.9%)		
HbA1c (% NGSP)	<7	400 (76.5%)	123 (23.5%)	1.18 (0.75-1.84)	0.469
	≥7	91 (73.4%)	33 (26.6%)		
Current treatment	Diet therapy	94 (75.2%)	31 (24.8%)	0.93 (0.59-1.48)	0.760
	OADs	326 (76.5%)	100 (23.5%)		
	Insulin	71 (74.0%)	25 (26.0%)	1.07 (0.58-1.97)	0.833
DPN	Absent	238 (81.8%)	53 (18.2%)	1.83 (1.26-2.66)	0.002
	Present	253 (71.1%)	103 (28.9%)		
Ankle reflex	Normal response	216 (80.0%)	54 (20.0%)	1.48 (1.02-2.16)	0.039
	Loss of reflex for both ankles	275 (72.9%)	102 (27.1%)		
Vibratory sense	Normal response	253 (76.0%)	80 (24.0%)	1.01 (0.70-1.45)	0.957
	Diminished	238 (75.8%)	76 (24.2%)		
Symptomatic DPN	Absent	306 (83.2%)	62 (16.8%)	2.51 (1.73-3.63)	<0.001
	Present	185 (66.3%)	94 (33.7%)		
History of stroke	No	462 (76.7%)	140 (23.3%)	1.82 (0.96-3.45)	0.066
	Yes	29 (64.4%)	16 (35.6%)		

BMI: BMI ≥25 is defined as obesity in Japan [17]. OADs: oral antidiabetic agents. DPN: diabetic polyneuropathy. DPN was assessed using the Abbreviated diagnostic criteria for distal symmetric polyneuropathy [16]. Symptomatic DPN: Subjective symptoms defined as numbness, pain, or dysesthesia in the tips of the toes and the bottom of the feet, presumably caused by DPN. ORs and 95%CI for factors to the presence of OAB were estimated using logistic regression modeling.

Table 3 Results of multivariate logistic regression analysis (n=647)

		Non OAB (n=491)	OAB (n=156)	OR (95%CI)	p value
Sex	Male	301 (74.7%)	102 (25.3%)	0.68 (0.46-1.01)	0.059
	Female	190 (77.9%)	54 (22.1%)		
Age (yr)	<65	252 (82.4%)	54 (17.6%)	1.64 (1.07-2.50)	0.022
	≥65	239 (70.1%)	102 (29.9%)		
BMI (kg/m ²)	<25	350 (74.6%)	119 (25.4%)	0.88 (0.56-1.37)	0.57
	≥25	141 (79.2%)	37 (20.8%)		
Duration of Diabetes (yrs)	<15	312 (80.4%)	76 (19.6%)	1.48 (0.99-2.22)	0.059
	≥15	179 (69.1%)	80 (30.9%)		
HbA1c (% NGSP)	<7	400 (76.5%)	123 (23.5%)	1.12 (0.67-1.86)	0.674
	≥7	91 (73.4%)	33 (26.6%)		
Current treatment	Diet therapy	94 (75.2%)	31 (24.8%)	0.69 (0.41-1.13)	0.140
	OADs	326 (76.5%)	100 (23.5%)		
	Insulin	71 (74.0%)	25 (26.0%)	0.71 (0.37-1.39)	0.323
Symptomatic DPN	Absent	306 (83.2%)	62 (16.8%)	2.41 (1.64-3.54)	<0.001
	Present	185 (66.3%)	94 (33.7%)		
History of stroke	No	462 (76.7%)	140 (23.3%)	1.52 (0.77-3.00)	0.230
	Yes	29 (64.4%)	16 (35.6%)		

BMI: BMI ≥25 is defined as obesity in Japan [17]. OADs: oral antidiabetic agents. DPN: diabetic polyneuropathy. DPN was assessed using the Abbreviated diagnostic criteria for distal symmetric polyneuropathy [16]. Symptomatic DPN: Subjective symptoms defined as numbness, pain, or dysesthesia in the tips of the toes and the bottom of the feet, presumably caused by DPN. ORs and 95%CI for factors related to presence of OAB were estimated using logistic regression model with sex, age, BMI, duration of diabetes, HbA1c, current treatment, symptomatic DPN and history of stroke. For multivariate analysis, all the collected variables were retained, excluding variables which are considered multicollinearity. The variables which have to be considered multicollinearity, of which those presenting the highest odds ratio were retained.

tes mellitus and OAB. Since the storage and periodic expulsion of urine as lower urinary tract functions are integratively controlled by both central and peripheral nerves, DPN itself can be a cause of OAB. In addition, recent papers also show evidences that OAB in patients with diabetes could be due to multiple factors that originate in diabetic vasculopathy, such as chronic ischemia in the bladder [19, 20] and central nervous system [21].

There is a possibility that “duration of diabetes” is another factor associated with the presence of OAB symptoms (OR 1.48, 95%CI 0.99-2.22, $p=0.059$), although findings in this study were not statistically significant. Patients with longer duration of diabetes are more likely to show higher prevalence of DPN due primarily to the progressive nature of the disease.

Among urological diseases, complications in patients with diabetes, the impact of diabetic cystopathy with voiding symptoms such as urinary retention or difficulty in urination is large, because these complications can eventually cause urinary tract infections or upper urinary tract disorders. Therefore, as various diabetic reviews or guidelines also specify, these above diabetic complications should be regularly checked by non-invasive test such as ultrasound and primarily addressed in patients with diabetes [1, 22, 23], although the acontractile bladder appears to be quite uncommon [1]. In this study, we examined prevalence of OAB focused on as a complication potentially associated with patients with diabetes. Complications of diabetes have the potential to greatly impact on patient QOL. In fact, it is reported that QOL in patients with diabetes was more likely to be deteriorated if they had complications [24, 25]. The OAB can be one of complications that may substantially deteriorate patients' QOL. It was reported that health-related QOL assessed with the Short Form-36 was similarly low in both patients with diabetes and patients with OAB [26]. As one of the important goals of diabetes treatment is to maintain patient's QOL at a level comparable to that in healthy non-diabetic individuals, in addition to better glycemic control, identifying and treating OAB is also important. And the achieving and maintaining targeted glycemic level can contribute to delaying the onset of diabetic complications including OAB, and also to reducing future medical cost.

This study has several limitations. First, it was a single-center study, and our sample might not represent the general population of diabetes in Japan. Second,

the OAB prevalence of 24.2% may slightly differ from the true value because other diseases which should be excluded such as bladder tumors, bladder stones and urinary tract infections may not have been completely excluded. Therefore, our result may cause the overestimation. In contrast, there is possible to contain patients who are been treating concomitant medication such as alpha-1 blocker or anticholinergic agent which could influence the results. This may lead to underestimate OAB prevalence in our study. However, the prevalence of OAB in the general population of Japan (12.4%) which was used as the control is also based on results obtained from questionnaires similar to the present study and, as in our study, all of the other diseases above that should be excluded were not necessarily excluded and the concomitant medications such as alpha-1 blocker or anticholinergic agent were not also considered [12]. Accordingly, the result showing that the prevalence of OAB was twofold suggests the complication by OAB in patients with diabetes is higher than in the general population. Finally, in approximately 80% of patients, HbA1c was relatively well-controlled to be less than 7% when data were collected. Conversely, it is noteworthy that OAB might occur even if glycemic level is relatively well-controlled. A prospective longitudinal study that examines the association between OAB and long-term glucose control would be helpful.

The prevalence of OAB was 24.2% among 652 Japanese patients with diabetes, and approximately 70% of these patients were dry OAB. In the management of diabetes, for which a primary goal is preventing the deterioration of QOL, screening of dry OAB by using the OABSS is useful. Our results suggest that symptomatic DPN might play a significant role in the development of OAB among patients with diabetes. Since OAB, including dry OAB, which might not be clinically apparent due to the absence of incontinence, significantly affects patient QOL, appropriate assessments of OAB are required. Screening for OAB in patients with diabetes who have DPN or aged ≥ 65 years by using the OABSS is recommended, as this simple, 4-item questionnaire is able to screen for both dry and wet OAB without requiring much effort in patients.

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Author contribution: MI designed the study, collected data, interpreted the data and reviewed the manuscript. KN contributed to designing of the study, conducting statistical analyses, interpreting the results and writing the manuscript.

Disclosure

Costs associated with publication were paid by Pfizer Japan Inc. MI did not receive honoraria for his contribution to this manuscript from Pfizer Japan Inc., and MI does not have any Conflict of Interests to be disclosed. KN is an employee of Pfizer Japan Inc.

Supplementary Table S1 Overactive Bladder Symptoms Score (OABSS)

Question	Frequency	Score
Q1. How many times did you typically urinate from waking in the morning until sleeping at night?	≤7	0
	8-14	1
	≥15	2
Q2. How many times did you typically wake up to urinate from sleeping at night until waking in the morning?	0	0
	1	1
	2	2
	≥3	3
Q3. How often did you have a sudden desire to urinate, which is difficult to control?	Not at all	0
	Less than once a week	1
	Once a week or more	2
	About once a day	3
	2-4 times a day	4
	5 times a day or more	5
Q4. How often did you accidentally urinate because you couldn't control the sudden desire to urinate?	Not at all	0
	Less than once a week	1
	Once a week or more	2
	About once a day	3
	2-4 times a day	4
	5 times a day or more	5

Patients were instructed to circle the score that best applies to their urinary conditions during the past week in response to each question. Homma Y, Fujimura T. Linguistic validation of the English version of the Overactive Bladder Symptom Score. *Int J Urol* 2014;21:229.

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