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Overactive Bladder in Taiwanese Women: Re-Analysis of Epidemiological Database of Community From 1999 to 2001

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Aims: To update our previous computerized epidemiological data according to the new taxonomy, we re-evaluated and re-analyzed the data using the current definitions of lower urinary tract symptoms (LUTS) which were approved and published by the ICS in 2002 and 2010 according to patient perception. Further, we divided overactive bladder (OAB) symptoms into OAB dry and OAB wet to assess their prevalence percentages by using the current definitions. **Methods:** OAB syndrome in our computerized database was re-defined as having the following storage symptoms present, that is, frequency, urgency, nocturia, urgency incontinence, or stress urinary incontinence (SUI). The prevalence of OAB syndrome was determined with a different taxonomy for those five storage symptoms either singly or in combination. OAB symptoms which were probably associated with mixed incontinence were either ignored or excluded. **Results:** The prevalence of OAB syndrome varied from 34.76% to 28.33% to 20.95% using different classifications of the above five storage symptoms. The prevalence of OAB wet symptoms increased with advancing age and this finding was consistent with three different definitions. **Conclusions:** The prevalence of OAB using the current definition is slightly higher than the result found in our previous published data using a defective classification system of OAB symptoms. The effects of mixed symptoms and probable misclassification cannot be overlooked because many women with OAB (with or without urgency incontinence) might also have SUI. *Neurourol. Urodynam. 31:56–59, 2012.*

Key words: epidemiological data; overactive bladder; prevalence

INTRODUCTION

In 2002, the International Continence Society (ICS) defined overactive bladder (OAB) as a symptom syndrome without any obvious pathology.[1] The current definition of OAB highlights the symptom-specific nature of this disorder and also highlights a symptom-based treatment approach to this syndrome.[2] Physicians can empirically treat this symptom syndrome if there is no obvious pathology or no determinate etiology.

In clinical practice, lower urinary tract symptoms (LUTS) rarely occur singly but in combination with other symptoms to form symptom syndromes. Since 2002, this new taxonomy of LUTS according to patient perception instead of urodynamic diagnosis of detrusor overactivity has been used worldwide to diagnose LUTS syndrome. The population survey has revealed that OAB has currently become a large economic burden on health services and will continue to be in the future. OAB is a disabling condition that affects health-related quality of life.[2–5] In one of our previous manuscripts, published in 2006, we conducted a survey of hospital-based female patients and found that no single or isolated symptom presented in patients with OAB. We found that OAB patients could be categorized into three groups, that is, patients with dry symptoms (urgency, frequency, and nocturia), patients with wet symptoms (urgency, urge incontinence, and mixed incontinence) and a small group with OAB symptoms combined with voiding difficulty symptoms.[6]

In 2003, we published a manuscript in the Journal of Neurourology and Urodynamics, Issue 22, pages 109–117, regarding the prevalence of urinary incontinence and OAB in Taiwanese women aged 20 years and older by a nurse interviewing the participants, which was conducted from 1999 to 2001.[7] The prevalence of stress urinary incontinence (SUI), OAB, and mixed incontinence, mutually exclusive of each other, was 18.0%, 18.6%, and 17.1%, respectively, from the participants' perceptions. However, the prevalence of SUI, OAB, and mixed incontinence became very low, that is, 4.3%, 2.4%, and 1.8%, respectively, if we used the old relatively restrictive ICS definition of SUI which emphasized causing a hygienic or social problem for the participants.[8] We categorized those LUTS as mutually exclusive of each other. However, OAB was

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re-defined and the new definition of OAB was published in 2002. To make matters worse, the aforementioned manuscript was accepted in August 2001 before the new terminology had been defined and published in 2003. Some of our previous results were contradictory to the current ICS definition due to terminological changes. These unintentional shortcomings of the previous taxonomy caused a relative distortion of the exact prevalence of OAB in our previous manuscript. Our data in that manuscript cannot be quoted correctly especially in incontinence subgroups such as urge incontinence and mixed incontinence. It is also difficult to use the results in our previous manuscript for comparison of the prevalence of OAB with other epidemiological data.

In order to update the new taxonomy for our epidemiological data and to avoid confusion for investigators who are interested in surveying the prevalence of LUTS in Taiwan as well as elsewhere or misquoting our results, we would like to re-evaluate and re-analyze our computerized database. The prevalence of LUTS has been re-defined by the current definitions of LUTS which were approved and published by the ICS in 2002 and 2010.[1,9] OAB symptoms have also been divided into OAB dry and OAB wet according to the definition in our previous hospital-based survey.

MATERIALS AND METHODS

Originally, this epidemiological study was conducted from 1999 to 2001 in a stable community, Dali, in central Taiwan using a validated Mandarin version of a modified Bristol Female Urinary Tract Symptoms questionnaire[10] to survey 1,247 women aged 20 years or more. A nurse interviewed the participants and assisted the women (12.5%) who did not have an educational background or could not read through and understand the questionnaire, especially women over the age of 65. The prevalence of OAB and SUI was published in the Journal of Neurourology and Urodynamics, Issue 22, pages 109–117.[7] In that manuscript, OAB was defined as having symptoms of frequency and urgency or nocturia, with or without urge incontinence[11] indicated by participants' perceptions.

Our computerized database was re-evaluated and re-analyzed in September 2010, based on the current OAB definition. OAB in our previous article was defined as having symptoms of frequency and urgency, or nocturia, with or without urge incontinence which Wein and Rovner also used in their article.[11] OAB syndrome is now defined as: urinary urgency, usually accompanied by frequency and nocturia, with or without urgency urinary incontinence, in the absence of urinary tract infection or other obvious pathology.[1,9] The mixed incontinence subgroup in the previous manuscript was either ignored or discarded from this re-evaluation process to prevent skewing in the re-grouping. In the previous epidemiological survey it was also difficult to characterize whether OAB or stress incontinence was predominant in mixed incontinence (women with OAB also have SUI). In this manuscript, we focused only on the prevalence of OAB. The number of women in our database who had urgency, frequency, nocturia, and urgency urinary incontinence were 157 (12.6%), 263 (21.1%), 318 (25.5%), and 113 (9.1%), respectively. For easy comparison of age-specific prevalence between our previous and present results, same age cohorts were used to assess the occurrence of OAB. The elderly were clustered into one group because only 145 women were over 65 and the group could not be more refined. Further, in order to analyze the subsets of OAB, we categorized OAB syndrome as OAB dry and OAB wet according to the NOBLE program, a study conducted by Stewart et al.[3] Women who had OAB symptoms without urgency urinary incontinence were categorized as OAB dry. Women with OAB symptoms having urgency urinary incontinence were categorized as OAB wet. SAS software version 9.1 (SAS Institute, Inc., Cary, NC) was used for the data analysis.

RESULTS

The prevalence of OAB syndrome according to the different definitions in each age cohort among 1,247 women is shown in Table I and Figure 1. Overall, 434 women (34.8%) had OAB when sorted according to the definition of OAB as a single symptom or combination of urgency, frequency, nocturia, or urgency incontinence. Of the women with OAB syndrome, 26.6% did not have urgency incontinence (OAB dry) and 8.2% of the women had OAB wet symptoms. However, the occurrence of OAB syndrome using the current definition according to patients' perceptions increased to nearly double the prevalence of OAB with our previous definition (34.8% vs. 18.0%). The prevalence of OAB wet symptoms gradually increases with age (from 2.5% in women aged 20–30 years to 20.0% in women over 65).

SUI is usually combined with frequency or nocturia in women. In our computerized database, we found 77 women with SUI who complained of a single associated storage symptom and were therefore excluded from the analysis. The prevalence of women who were defined as having OAB syndrome (with a single symptom of urgency, frequency, nocturia, or urgency incontinence or in combination) was 28.33% when women with OAB symptoms coexisting with SUI (having mixed symptoms) were excluded. In this condition, mixed incontinence was not taken into consideration, and the prevalence of OAB dry (frequency, urgency, or nocturia presented as in combination) was 19.3% and the prevalence of OAB wet (urgency incontinence) was 9.1%. The percentage of OAB dry in each age cohort was as follows: 20–30 years: 14.6%; >30–40 years: 15.7%; >40–50 years: 20.0%; >50–65 years: 23.9%; >65 years: 29.7%. The percentage of OAB wet in each age cohort was as follows: 20–30 years: 2.5%; >30–40 years: 6.3%; >40–50 years: 11.2%; >50–65 years: 11.7%; and >65 years: 20.7%. The occurrence of OAB dry or OAB wet increased with age.

According to the current ICS definition, a single symptom is not sufficient for the classification of OAB syndrome.[12] We excluded women who have a single symptom such as nocturia or frequency only for calculating prevalence of OAB. The prevalence of OAB was 20.9% (261 women) if we excluded the women who were categorized as having OAB with a single symptom (i.e., 69 women with frequency only and 114 women with nocturia only were excluded from the analysis). The prevalence of women with OAB dry symptoms (urgency, frequency or nocturia in combination) was 12.0% and was 9.1% for women with OAB wet symptoms (urge incontinence single or combined with other OAB symptoms). The occurrence of OAB wet symptoms in women also gradually increased with advancing age (from 2.5% to 20.7%).

DISCUSSION

The prevalence of OAB varied with a different taxonomy of the storage symptoms in our computerized database. The prevalence of OAB was 34.76% if we defined OAB as either a single symptom of frequency, urgency, nocturia or urgency incontinence or in combination. The prevalence decreased to 28.33% if we excluded cases where OAB was probably associated with SUI symptoms. Using the current ICS definition of

TABLE I. Prevalence of Overactive Bladder as Defined by Patients' Perceptions With a Different Classification System (N = 1,247)

	Patient perception, n (%)					
Age (years)	OAB[a]	OAB[b]	OAB[c]	OAB	OAB dry	OAB wet
20–30	28 (11.7)	52 (21.7)	41 (17.1)	27 (11.3)	21 (18.8)	6 (2.5)
>30–40	55 (13.3)	118 (28.6)	91 (22.0)	67 (16.2)	41 (9.9)	26 (6.3)
>40–50	54 (20.7)	108 (41.6)	81 (31.1)	63 (24.2)	34 (13.1)	29 (11.2)
>50–60	38 (20.2)	75 (40.4)	67 (35.6)	54 (28.7)	32 (17.0)	22 (11.7)
>65	57 (39.3)	80 (55.2)	73 (50.3)	50 (34.5)	20 (13.8)	30 (20.7)
Overall	224 (18.0)	434 (34.8)	353 (28.3)	261 (20.9)	148 (11.9)	102 (9.1)

OAB: overactive bladder syndrome using current ICS definition and women with a single symptom (69 women with frequency only and 114 women with nocturia only) were excluded from the analysis (n = 261) according to the current ICS definition, a single symptom (e.g., nocturia or frequency alone) is not sufficient for the classification of OAB syndrome[12]; OAB dry: OAB symptoms without urgency urinary incontinence; OAB wet: women with OAB symptoms with urgency urinary incontinence.

[a]Using old criteria and mutually exclusive with stress urinary incontinence and mixed incontinence which is shown in Table III in our previous manuscript (n = 224).[7]

[b]Defined by a single symptom or combination of urgency, frequency, nocturia or urgency incontinence (n = 434).

[c]Defined by a single symptom or combination of urgency, frequency, nocturia or urgency incontinence and excludes 77 women with OAB who also have stress urinary incontinence (n = 353).

OAB syndrome,[1,9] 20.9% of the women in our previous computerized database had OAB syndrome by excluding the cases with a single symptom (e.g., frequency or nocturia alone). The percentages of women with OAB dry and OAB wet symptoms were 11.98% and 9.08%, respectively. Our re-analyzed results show that using the current ICS definition for OAB syndrome according to patients' perceptions in a shift away from urodynamic observations seems to be reasonable. However, we cannot overlook the fact that differences in target populations, survey methodology, and questionnaire design can cause variability in the estimated prevalence rate of OAB.[13]

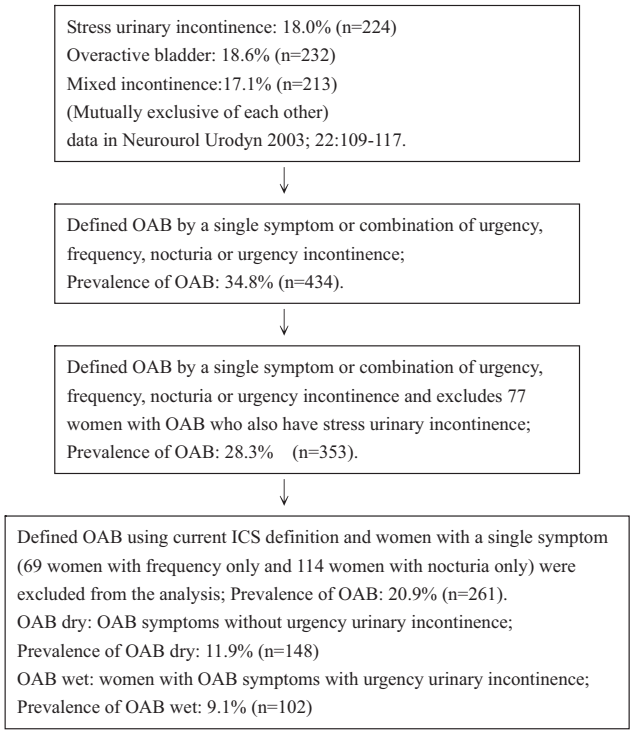

Fig. 1. Different definitions have been used to re-analyze our computerized database (in Table I).

A study published by Temml et al. in the area of Vienna using the Bristol Lower Urinary Tract Symptoms questionnaire (same as our questionnaire) through the use of the interview method showed 16.8% of women had OAB. The prevalence of OAB in women from our current results (20.9%) is slightly higher when compared to the prevalence of OAB in women (18.7%) in a small rural community survey by Yu et al.[14] who also used a trained public health nurse to administer the questionnaire. Stewart et al.[3] used a clinically validated computer-assisted telephone interview questionnaire to find that 16.9% of the women in their study had OAB, and the prevalence of OAB syndrome (according to the ICS criteria) was found to be 14.7% in Canadian women using a population-based telephone cross-section survey of adults aged 18 years or older.[15] The methods used in these five studies to collect data are similar. All the data were collected by interviewing methods and was not self-administered by the participants. However, the prevalence of OAB in women in our current results is slightly higher than that of others.

In our results, 11.9% of the women have OAB dry symptoms and 9.1% have OAB wet symptoms. The prevalence percentages for both OAB with urgency incontinence (OAB wet) and OAB without urgency incontinence (OAB dry) are 43.3% and 56.7% in our results. The percentages in our study are different from those reported in the NOBLE program by Stewart et al.[3] which were 33% for OAB with urgency incontinence (OAB wet) and 66% for OAB without urgency incontinence (OAB dry), as well as 38.7% for OAB wet and 61.3% for OAB dry as reported by Temml et al. (OAB wet and OAB dry were 6.5% and 10.3% in women, respectively). However, our results showed that the prevalence of OAB wet gradually increases with age. OAB wet increased from 2.5% in women 20–30 years of age up to 20.7% in women older than 65 (Table I). This trend is similar to the findings of Stewart et al.[3]

The prevalence of OAB syndrome is slightly higher than the prevalence of OAB that was determined using the previous definition (20.9% vs. 18.0%) if we do not take into consideration the single symptom of frequency (which might be a coping strategy to deal with SUI) or women having OAB syndrome in combination with SUI (mixed incontinence).

However, data in our previous manuscript showed that 18.6% of the women had OAB (old definition), 17.1% of the women had mixed incontinence and 18.0% of the women had pure SUI, mutually exclusive of each other.[7] Judging from our re-evaluated results, mixed incontinence seems to play a very important role in influencing the epidemiological data of OAB and SUI. The definition of mixed incontinence in the ICS terminology is a complaint of involuntary loss of urine associated with urgency and also with effort or physical exertion or with sneezing or coughing.[1,9] Previous literature has also indicated that mixed incontinence accounts for approximately 33% of all cases of incontinence in women.[16–18] Obviously, mixed incontinence in our previous results was not only the combination of stress and urgency incontinence[3] but also included urine leakage from SUI associated with a single OAB dry symptom such as frequency or nocturia. Diversity in our previous and current results implies that the taxonomy for OAB and SUI does not seem to reflect the reality of the exact prevalence of LUTS.

Misclassification among OAB, mixed incontinence and SUI would not occur if these three groups of LUTS were considered simultaneously. LUTS data cannot be completely categorized as mutually exclusive. The misclassifications of our previous epidemiological data were defective and distorted the results of the prevalence of each group and led to a misinterpretation of our results. Based on our results, it seems difficult to completely avoid taxonomic biases in community surveying. In the future, the prevalence of LUTS in epidemiological surveys needs further refinement in order to avoid misclassification.

CONCLUSION

The prevalence of OAB in Taiwanese women in our current results is slightly higher than the results from our previous published data using a defective classification system for OAB symptoms. Mixed symptoms might play a very important role in influencing the prevalence rate of OAB because many women with OAB also have SUI. A different taxonomy can influence the estimated prevalence rate of OAB.

REFERENCES

1. Abrams P, Cardozo L, Fall M, et al. The standardisation of terminology of lower urinary tract function: Report from the standardization sub-committee of the International Continence Society. Neurourol Urodyn 2002;21:167–78.
2. Tubaro A. Defining overactive bladder: Epidemiology and burden of disease. Urology 2004;64:2–6.
3. Stewart WF, van Rooyen JB, Cundiff GW, et al. Prevalence and burden of overactive bladder in the United States. World J Urol 2003;20:327–36.
4. Reeves P, Irwin D, Kelleher C, et al. The current and future burden and cost of overactive bladder in Five European countries. Eur Urol 2006;50:1050–7.
5. Dmochowski RR, Newman DK. Impact of overactive bladder on women in the United States: Results of a national survey. Curr Med Res Opin 2007;23:65–6.
6. Hung MJ, Shen PS, Ho ESC, et al. Urgency is the core symptom of the female overactive bladder syndrome based on a statistical model. J Urol 2006;176:636–40.
7. Chen GD, Lin TL, Hu SW, et al. Prevalence and correlation of urinary incontinence and overactive bladder in Taiwanese women. Neurourol Urodyn 2003;22:109–17.
8. Abrams P, Blalvas JG, Stanton SL, et al. The standardisation of terminology of lower urinary tract function: Produced by the International Continence Society Committee on Standardisalion of Terminology. World J Urol 1989;6:233–45.
9. Haylen BT, de Ridder D, Freeman RM, et al. An international Urogynecological Association (IUGA)/International Continence Society (ICS) joint report on the Terminology for female pelvic floor dysfunction. Neurourol Urodyn 2010;29:4–20.
10. Jackson S, Donovan J, Brookes S, et al. The Bristol Female Lower Urinary Tract Symptoms questionnaire: Development and psychometric testing. Br J Urol 1996;77:805–12.
11. Wein AJ, Rovner ES. The overactive bladder: An overview for primary care health providers. Int J Fertil Womens Med 1999;44:56–66.
12. Temml C, Heidler S, Ponholzer A, et al. Prevalence of the overactive bladder syndrome by applying the International Continence Society definition. Eur Urol 2005;48:622–7.
13. Milsom I. Lower urinary tract symptoms in women. Curr Opin Urol 2009;19:337–41.
14. Yu HJ, Liu CY, Lee KL, et al. Overactive bladder syndrome among community-dwelling adults in Taiwan: Prevalence, correlates, perception, and treatment seeking. Urol Int 2006;77:327–33.
15. Herschorn S, Gajewski J, Schulz J, et al. A population-based study of urinary symptoms and incontinence: The Canadian urinary bladder survey. BUJ Int 2007;101:52–8.
16. Karam MM, Bhatia NN. Management of coexistent stress and urge urinary incontinence. Obstet Gynecol 1989;73:4–7.
17. Chaliha C, Khullar V. Mixed incontinence. Urology 2004;63:51–7.
18. Khullar V, Cardozo L, Dmochowski R. Mixed incontinence: Current evidence and future perspectives. Neurourol Urodyn 2010;29:618–22.