

# Are Bladder Diaries Helpful in Management of Overactive Bladder?

Colby A. Dixon<sup>1</sup> · Nissirine A. Nakib<sup>1</sup>

Published online: 8 March 2016  
© Springer Science+Business Media New York 2016

**Abstract** Bladder diaries have long been used in both research and clinical practice to measure lower urinary tract symptoms in overactive bladder, yet their practical role in clinical practice remains questioned. In this review, we evaluate current literature to assess the usefulness of bladder diaries in the management of overactive bladder. A MEDLINE search was performed to identify literature regarding bladder diaries. Seven hundred sixty were returned of which 52 were considered relevant and reviewed. The review was limited to papers published in peer reviewed journals. Studies were selected based on their use of formal bladder diaries rather than short-form questionnaires in evaluating overactive bladder symptoms. Studies were excluded that focused primarily on bladder diaries for prostate and lower urinary tract symptoms (LUTS) rather than overactive bladder symptoms. Bladder diaries provide accurate data and are more reliable than patients' recollections of symptoms. In addition to being inexpensive and low risk, patients view diaries as easy to complete and helpful for their care. Bladder diaries assist providers in differentiating between urge incontinence caused by overactive bladder and stress incontinence of separate etiology, allowing for correct tailoring of treatment regimens. The level of scientific rigor surrounding the development of bladder diaries continues to increase, and there are now several

validated diaries available for clinical use. The 3- to 7-day bladder diary is a useful tool for both clinicians and patients in the management of overactive bladder. For patients, recording their voiding habits in a bladder diary provides insight into their urinary habits and symptom triggers. It allows them to contribute in the treatment decision process in a meaningful way and also empowers them to identify ways in which to control their symptoms. For providers, the bladder diary serves as an objective, prospective tool to assess the severity of patients' symptoms as well as the effectiveness of various interventions.

**Keywords** Overactive bladder · Bladder diary · Voiding diary

## Introduction

Overactive bladder is a constellation of symptoms marked by a frequent and bothersome urge to urinate, oftentimes leading to associated incontinence. More specifically, the International Continence Society defines overactive bladder as the presence of “urinary urgency, usually accompanied by frequency and nocturia, with or without urgency urinary incontinence in the absence of other pathology” [1]. The prevalence of overactive bladder has been estimated as high as 16.5 % in the general population with approximately one third of the overactive bladder population suffering from incontinence as a result of their overactive bladder. While this condition is not life threatening, it has a tremendous impact on patients' quality of life. Frequent urination and associated incontinence can lead to depression, anxiety, social withdrawal and avoidance and decreased sexual intimacy among other negative individual impacts. On a broader scale, NIH estimates from 2004 suggest that the overall cost of overactive bladder to patients and

---

This article is part of the Topical Collection on *Overactive Bladder*

✉ Nissirine A. Nakib  
naki003@umn.edu

Colby A. Dixon  
dixon320@umn.edu

<sup>1</sup> University of Minnesota, Mayo Memorial Building, 420 Delaware St. SE MMC 394, Minneapolis, MN 55455, USA

healthcare institutions in the USA including care expenses and loss of productivity is upwards of \$12 billion per year [1].

Because the diagnosis of overactive bladder is dependent on self-reporting of symptoms, much attention has been given to instruments for patient reported symptoms and outcomes. One instrument recommended by both the American Urological Association and the European Association of Urology for assessing patient symptoms is the bladder diary [2, 3]. While there is no single, standardized bladder diary used by urologists and urogynecologists, a basic bladder diary asks the patient to record several important pieces of information related to his or her voiding habits. First, patients record their daily fluid intake, including the amount and caffeine level that they are consuming. Bladder diaries also provide space to record urination patterns. This includes the number of voids throughout the day, the time of day at which they occur, and the volume voided with each episode of urination. The patient is also able to indicate whether the episode of urination was associated with feelings of urgency and what degree of urgency was experienced. Most diaries also provide space to identify episodes of incontinence, whether the episodes were associated with urgency or activity, and finally, the number of pads used throughout the day [4]. Although voiding diaries are one of the mainstays of overactive bladder evaluation, there have been only a handful of prospective studies assessing their usefulness in patient outcomes [5, 6, 7]. In this review, we evaluate the current literature in order to assess the usefulness of bladder diaries in the management of overactive bladder.

## Methods

A search of the MEDLINE database was performed to identify all relevant English language literature from 1946 to date regarding the use of bladder diaries in the management of overactive bladder. Search terms used were as follows: bladder chart, bladder diary, micturition chart, micturition diary, voiding chart, voiding diary, urinary chart, and urinary diary. This yielded 760 results. Using the papers' titles and information listed in abstracts, 50 potentially relevant studies were identified. The full papers of these studies were then obtained and reviewed in their entirety. The reference lists of these studies were further examined for additional relevant publications; this yielded an additional 12 papers for consideration from which two more full papers were obtained and reviewed for a total of 52 papers.

The review was limited to papers published in peer-reviewed journals. Studies were selected based on their use of formal bladder diaries rather than short form questionnaires in evaluating overactive bladder symptoms. Studies were excluded that focused primarily on bladder diaries for prostate and lower urinary tract symptoms (LUTS) rather than

overactive bladder symptoms. Studies examining both men and women were included although the majority of studies examined largely female or exclusively female populations.

## Results

In assessing how bladder diaries should be used in the management of overactive bladder, several points must be considered. First, are patients able and willing to accurately complete them? Second, do they offer additional insight into a patient's symptoms? Third, is the information that they provide accurate? Finally, which type of diary instrument is most likely to provide accurate and reliable data?

The usefulness of a bladder diary depends first and foremost on the patient's ability to accurately complete it. Of the 52 papers included in our study, four examined patients' ability to complete bladder diaries with two featuring prospective analysis of data completion. In a study of 201 women comparing electronic and paper bladder diaries of 3, 5, and 7 days duration, Abrams et al. found that over 90 % of women were compliant (defined as at least one data entry event per day) with their diaries [8]. Among these women, 70 % reported that completing the diary was either "easy" or "very easy." Similarly, a British study by Vella et al. surveying female patients regarding their perspective on the usefulness of a bladder diary showed that a significant majority of women found completing a bladder diary to be both highly useful and minimally burdensome [9].

A second question to consider regarding bladder diaries is what clinical insight they contribute to the care of patients with OAB. Four retrospective studies were identified addressing differences in symptoms reported in patient interviews compared to bladder diary recordings [10–13]. The consensus from these studies was that in contrast to a patient's recollection of symptoms during a clinic visit or on self-reported questionnaires, a bladder diary provides prospective assessment of urinary symptoms and is theoretically less subjective to recall bias [10]. A large retrospective study by Stav et al. examining over 600 patients' reliability in reporting their symptoms during an office visit showed that more than half of women overestimated the degree of their daytime frequency during clinician interview compared to what they had recorded in their bladder diaries [11]. This phenomenon of overestimating urinary symptoms has been noted in several smaller prospective studies as well [10, 12, 13].

The usefulness of bladder diaries is also contingent on the accuracy of the information they contain. In our literature search, only two studies were identified validating the bladder diary as a scientific tool [7, 15]. One notable review from 2011 found that in an analysis of 81 studies directly related to bladder diary development, only four studies described the methods used for development of their instruments and none

subjected their instruments to validity or reliability testing [14]. As mentioned above however, in the 5 years since that study was published, at least two groups have produced studies validating existing bladder diaries. A study detailing the development of the International Consultation on Incontinence Questionnaire (ICIQ) bladder diary found the ICIQ bladder diary to have statistically significant agreement with validated questionnaires for nocturia, incontinence, and urodynamically proven incontinence [15•]. A second study from Spain published shortly afterwards evaluating feasibility, validity, and reliability of a 3-day bladder diary in 136 women found statistically significant validity for the bladder diary compared to two externally validated short-form questionnaires (ICIQ-UI SF and BSAQ) as well as formal urodynamic testing [7•].

Once established as a validated instrument, bladder diaries can be scrutinized further to determine which particular questions and what length of monitoring provide the most reliable data. This topic is briefly mentioned in many papers but was the central focus of three of the 52 papers reviewed. The clear consensus from these studies is that a longer duration of measurement will provide more useful information but that patient compliance will decrease as the level of effort required to complete the diary increases [16]. This was indeed shown to be true in a prospective study involving 109 patients comparing 24, 48, and 72 h diaries. The researchers found that test reliability increased with increasing duration of diary but that overall patient compliance declined as the test interval lengthened [17]. A 2006 study from the *British Journal of Urology* reviewed all 13 studies published to date evaluating the effect of duration on the reliability of bladder diaries; they found no clear consensus on the ideal length of diary duration, but recommended 3 to 7 days as a good length of recording to achieve reliable data [16, 18].

## Discussion

Revisiting our initial questions in light of these findings shows that bladder diaries serve several purposes in the management of overactive bladder. Since symptomatic management is the end goal of most overactive bladder treatments, it is important for providers to have accurate measurements of patients' symptoms. As the study by Stav et al. clearly shows, the use of bladder diaries provides for a more objective assessment of symptoms than patient recollection alone. The additional data that comes from completing a bladder diary does not pose a large imposition on patients and can provide them with additional insight and ownership into the management of their bladder symptoms. The acquisition of clinical information gained by completion of a bladder diary poses no risk to patients when compared with other diagnostic tools. Other than the brief amount of time required for clinic staff to instruct

patients in how to complete the diary, its use requires minimal resources and has virtually no cost for patients or providers [19].

While the natural assumption is that a prospective bladder diary would be more accurate than a patient's on-the-spot recollection of their symptoms during a clinic visit, some critics of bladder diaries would challenge this notion by pointing to the lack of external validation of bladder diaries as a scientific instrument. This critique is much less grounded in light of the recent papers by Bright et al. [15•] and Jimenez-Cidre et al. [7•] clearly describing and validating the methods used to develop their bladder diaries. The scientific rigor of bladder diaries has also historically been tested by several studies looking at the ideal length of diary recording to optimize data collection and patient compliance. Although these questions have not been studied using either of the recently validated instruments discussed previously, a diary length of 3 to 7 days was widely agreed upon as the best duration for data collection.

Aside from the usefulness of bladder diaries in the clinical management of overactive bladder, they are also helpful in differentiating the urge incontinence that can result from overactive bladder from stress incontinence or mixed (stress and urge) incontinence. The differences between the two forms are readily apparent in bladder diary patterns: while urge incontinence from overactive bladder will generally present with nocturnal incontinence with nocturia, urgency, and large volume incontinent voids, patients with stress incontinence will typically note less nocturia and urgency, smaller volumes of leakage, and activities associated with increased abdominal pressure as triggering factors for incontinent episodes [20, 21]. The reliability and reproducibility of bladder diaries as a tool for diagnosing stress incontinence was validated in a retrospective study by Nygaard and Holcomb in which they evaluated 280 voiding diaries of women with pure stress incontinence that had been formally diagnosed on urodynamic studies; they found that both 3 and 7 day voiding diaries were reproducible outcome measures for evaluating stress incontinence [22]. Since the medical and surgical managements of urge incontinence and stress incontinence vary significantly, the bladder diary is a very useful and important tool in distinguishing between the two disease processes [23••].

## Conclusion

In conclusion, the 3- to 7-day bladder diary is a useful tool for both clinicians and patients in the management of overactive bladder. For patients, recording their voiding habits in a bladder diary provides insight into their urinary habits and symptom triggers. It allows them to contribute in the treatment decision process in a meaningful way and also empowers them to identify ways in which to control their symptoms.

For providers, the bladder diary serves as an objective, prospective tool to assess the severity of patients' symptoms as well as the effectiveness of various interventions. Compared to other diagnostic tools, it provides this data while remaining virtually cost free and harmless to the patient. Bladder diaries also assist providers in differentiating between urge incontinence caused by overactive bladder and stress incontinence of separate etiology, allowing for correct tailoring of treatment regimens. As the scientific rigor with which diaries are developed and validated continues to improve, bladder diaries will remain an important component in the management of overactive bladder.

#### Compliance with Ethical Standards

**Conflict of Interest** The authors declare that they have no conflict of interest.

**Human and Animal Rights and Informed Consent** This article does not contain any studies with human or animal subjects performed by any of the authors.

#### References

Papers of particular interest, published recently, have been highlighted as:

- Of importance
- Of major importance

1. Tubaro A. Defining overactive bladder: epidemiology and burden of disease. *J Urol*. 2004;64(6 suppl 1):2–6.
2. Gormley EA et al. Diagnosis and treatment of overactive bladder (non-neurogenic) in adults: AUA/SUFU guideline. *J Urol*. 2012;188(6 Suppl):2455–63.
3. Lucas MG et al. EAU guidelines on assessment and nonsurgical management of urinary incontinence. *Eur Urol*. 2012;62(6):1130–42.
4. Clearinghouse, N.K.a.U.D.I., What i need to know about bladder control for women, N.I.o. Health, Editor. Bethesda; 2007
5. Brown JS et al. Measurement characteristics of a voiding diary for use by men and women with overactive bladder. *Urology*. 2003;61(4):802–9.
6. Homma Y et al. Assessment of overactive bladder symptoms: comparison of 3-day bladder diary and the overactive bladder symptoms score. *Urology*. 2011;77(1):60–4.
7. • Jimenez-Cidre MA et al. The 3-day bladder diary is a feasible, reliable and valid tool to evaluate the lower urinary tract symptoms in women. *Neurourol Urodynamics*. 2015;34(2):128–32. **This paper details the validation of the 3 day bladder diary (3dBD) as a scientific tool. It also describes research into its feasibility and reliability as a data collection instrument.**
8. Abrams P. et al. Electronic bladder diaries of differing duration versus a paper diary for data collection in overactive bladder. *Neurourol Urodyn*. 2015.
9. Vella M et al. The bladder diary: do women perceive it as a useful investigation? *Eur J Obstet Gynecol Reprod Biol*. 2012;162(2):221–3.
10. Kenton K, Fitzgerald MP, Brubaker L. What is a clinician to do-believe the patient or her urinary diary? *J Urol*. 2006;176(2):633–5. discussion 635.
11. Stav K, Dwyer PL, Rosamilia A. Women overestimate daytime urinary frequency: the importance of the bladder diary. *J Urol*. 2009;181(5):2176–80.
12. McCormack M, Infante-Rivard C, Schick E. Agreement between clinical methods of measurement of urinary frequency and functional bladder capacity. *Br J Urol*. 1992;69(1):17–21.
13. Al Afraa T et al. Normal lower urinary tract assessment in women: I. Uroflowmetry and post-void residual, pad tests, and bladder diaries. *Int Urogynecol J*. 2012;23(6):681–5.
14. Bright E, Drake MJ, Abrams P. Urinary diaries: evidence for the development and validation of diary content, format, and duration. *Neurourol Urodyn*. 2011;30(3):348–52.
15. • Bright E et al. Developing and validating the international consultation on incontinence questionnaire bladder diary. *Eur Urol*. 2014;66(2):294–300. **This paper details the development and validation process of the ICIQ bladder diary in a population of 264 patients with lower urinary symptoms.**
16. Yap TL, Cromwell DC, Emberton M. A systematic review of the reliability of frequency-volume charts in urological research and its implications for the optimum chart duration. *BJU Int*. 2007;99(1):9–16.
17. Groutz A et al. Noninvasive outcome measures of urinary incontinence and lower urinary tract symptoms: a multicenter study of micturition diary and pad tests. *J Urol*. 2000;164(3 Pt 1):698–701.
18. Ku JH et al. Voiding diary for the evaluation of urinary incontinence and lower urinary tract symptoms: prospective assessment of patient compliance and burden. *Neurourol Urodyn*. 2004;23(4):331–5.
19. Robinson D et al. Comparison between urinary diaries completed with and without intensive patient instructions. *Neurourol Urodyn*. 1996;15(2):143–8.
20. Fink D et al. The role of the frequency-volume chart in the differential diagnostic of female urinary incontinence. *Acta Obstet Gynecol Scand*. 1999;78(3):254–7.
21. Wyman JF et al. The urinary diary in evaluation of incontinent women: a test-retest analysis. *Obstet Gynecol*. 1988;71(6 Pt 1):812–7.
22. Nygaard I, Holcomb R. Reproducibility of the seven-day voiding diary in women with stress urinary incontinence. *Int Urogynecol J Pelvic Floor Dysfunct*. 2000;11(1):15–7.
23. •• Kim SH et al. Voiding diary might serve as a useful tool to understand differences between bladder pain syndrome/interstitial cystitis and overactive bladder. *Int J Urol*. 2014;21(2):179–83. **This paper details how voiding diaries can be used in the management of both overactive bladder and interstitial cystitis. It also describes typical bladder diary findings in both groups and how the bladder diary can be used as a diagnostic tool to distinguish between different bladder pathologies.**