

The need for voiding diaries in the evaluation of men with nocturia

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In a study to assess the need for voiding diaries in the evaluation of men with nocturia, 337 consecutive male patients were asked to estimate their number of voiding episodes per night. Patients were placed into seven separate groups based on the number of estimated number of voiding episodes. These patients used a voiding diary to track their voiding habits for 1 week. The mean number of voiding episodes recorded in the diaries were then compared with the subjects' original estimations. The estimated number of voiding episodes correlated with the mean number of diary-recorded voiding episodes 48% of the time. Correlation was highest for patients reporting few episodes per evening and lowest for those reporting five or six episodes per night. The study findings suggest that voiding diaries are essential in helping to determine the actual number of voiding episodes per night and that the need for a voiding diary becomes more important as the perceived amount of nocturia increases.

(Key words: voiding diary, nocturia, benign prostatic hyperplasia)

Nocturia is a common complaint that causes many patients to seek urologic consultation. This symptom can be the result of many conditions, but commonly, it is the result of benign prostatic glandular enlargement that is often associated with benign prostatic hyperplasia (BPH). Benign prostatic hyperplasia is one of the most common disease processes affecting the aging male.¹ It can be expected in 1 of 10 men in their 40s and 7 of 10 men in their 60s.²⁻⁴ The American Urological Association (AUA) Symptom Index is recommended in the workup of all men with BPH and complaints of nocturia.^{5,6} This questionnaire provides the physician with a quantitative value that can be used to determine the severity of the patient's initial symptoms and to monitor results of treatment. Donovan et al⁷ demonstrated that the International Continence Society (ICS) male questionnaire developed for the ICS-BPH study had high levels

of validity and reliability when used to assess men with lower urinary tract symptoms (LUTS). One of the difficulties with these questionnaires in the evaluation of an individual with nocturia is that its usefulness is dependent on the patient's recollection of the actual number of episodes of nocturia per evening. This estimate is biased with recall errors such as memory lapse (forgetting an event entirely) and telescoping (remembering an event but forgetting the exact timing of the event).⁸

For many years, voiding diaries have been used to quantify incontinence and monitor results of treatment in all age groups with voiding difficulties secondary to neurologic, anatomic, and surgical dysfunctions.⁹⁻¹¹ We are unaware of any research evaluating the usefulness of voiding diaries in men with complaints of nocturia. We designed a prospective randomized study to assess the need for voiding diaries in the evaluation of men with nocturia. Our goal was to determine whether a voiding diary is a useful tool in the evaluation of men with complaints of nocturia.

Materials and methods

A total of 337 consecutive men with LUTS were asked to estimate their number of voiding episodes per night, which was defined as a need to urinate that awakened the individual from sleep. These men were then placed into one of seven groups (groups 0 through 6) based on their response. The number designation of each group corresponded with the patient's estimated number of episodes of nocturia per night. For example, an individual with an estimated nocturnal voiding frequency of 1 was placed into group 1. When a group contained 20 individuals, the group was considered filled and no more patients were entered into that study group. The total study group consisted of 140 patients who were equally assigned to the seven groups as previously described. All men signed informed consents that gave permission to use the information from the voiding diaries for academic research. The study was approved by the institutional review board.

The 140 members of the study group were then given a voiding diary and asked to record their number of nocturnal voiding episodes, quantity voided, amount of fluid consumed, time they went to bed, and how many hours they slept each evening. The men all completed the voiding diaries for 1 week. The remainder of the 337 patients were not included because each of the seven groups in the study group already contained 20 patients.

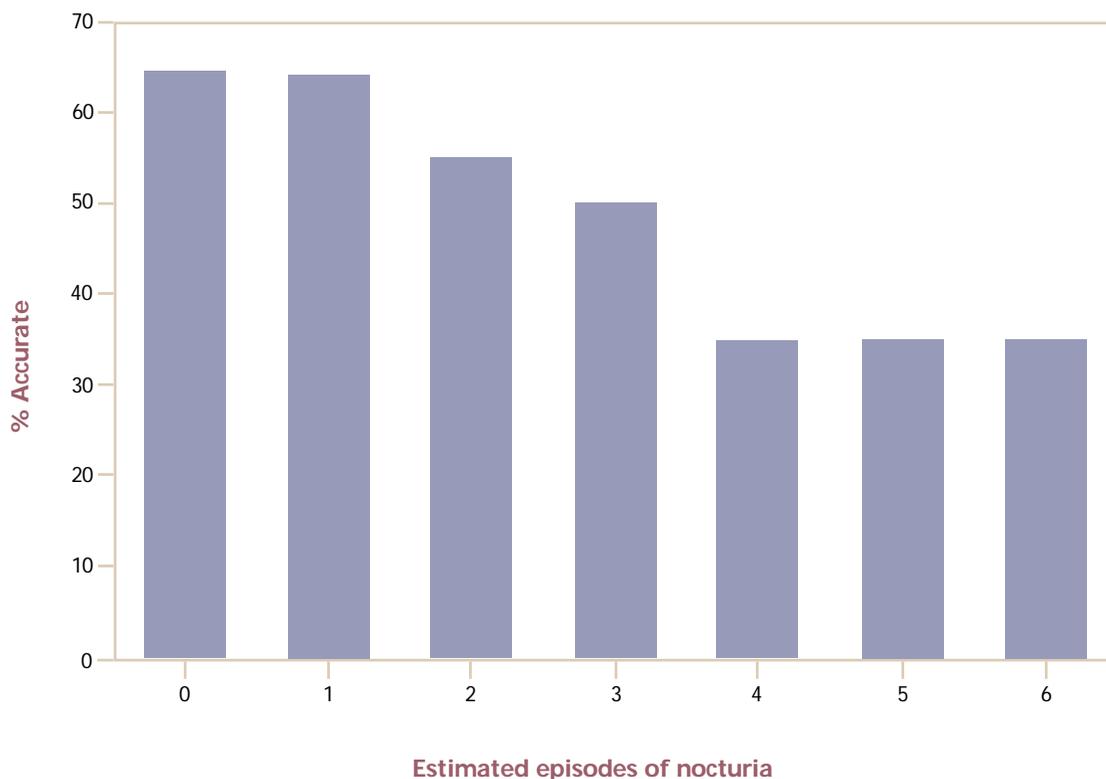
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ORIGINAL CONTRIBUTION

Figure 1. Accuracy results of estimates of number of voiding episodes.



The voiding diaries were all returned after 1 week to be analyzed. The mean number of voiding episodes recorded in the voiding diaries was determined by adding all the episodes of nocturia for the week, dividing it by 7 days, and then rounding the value to the nearest whole number. The mean number of voiding episodes from the voiding diaries was then compared with the subjects' original estimations of nocturia.

Results

All 140 patients enrolled in the study returned a completed voiding diary. When the mean number of voiding episodes recorded in the diaries was compared with the subjects' original estimates, the overall accuracy for the entire study group was 68 (48.6%) of 140. The accuracy of each group decreased as the estimated number of episodes of nocturia per evening increased. The accuracy for groups 0 and 1 was 13 (65%) of 20, 11 (55%) of 20 for group 2, 10 (55%) of 20 for group 3, and 7 (35%) of 20 for groups 4, 5, and 6 (Figure 1).

The number of patients who overestimated and underestimated on their initial estimation of frequency of nocturia per evening was analyzed. As the group number increased, the percentage of patients who overestimated increased whereas the percentage of individuals who underestimated decreased. The overestimation in groups 0 through 6 was 0 (0%) of 20 for group 0; 3 (15%) of 20, group 1; 5 (25%) of 20, group 2; 6 (30%) of 20, group 3; 9 (45%) of 20, group 4; 10 (50%) of 20, group 5;

and 10 (50%) of 20, group 6. The underestimation in group 0 was 7 (35%) of 20; 4 (20%) of 20 in groups 1, 2, 3, and 4; and 3 (15%) of 20 in groups 5 and 6 (Figure 2).

The mean voiding diary-recorded episode ranges that were observed in each group increased as the original estimation of the frequency of nocturia increased (Figure 3). The range for those who estimated 0 episodes of nocturia was 0 to 2 (R3) compared with those in groups 5 and 6 whose estimates had a range of 2 to 7 and 3 to 8 (R6), respectively. Patients in groups 2, 3, and 4 had a range of 5 that was intermediate when compared with that in groups 0 and 6.

Discussion

Our data show that most (51.5%) of the subjects were inaccurate in their estimation of the number of episodes of nocturia per night. The accuracy was highest for those patients reporting few episodes of nocturia and lowest for those reporting 5 or 6 episodes per evening. Many authors have reported on voiding diaries as being more accurate than information collected by history alone.^{8,12-15} Voiding diaries also have been shown to reduce the recall error that is commonly found in retrospective interviews.¹⁶⁻¹⁸

Abrams et al¹⁹ suggest that patients tend to exaggerate their urinary symptoms while being asked a history. However, our study shows that even those patients with no LUTS (deny any episodes of nocturia), who were expected to be the most accurate, were only accurate 65% of the time. We also found

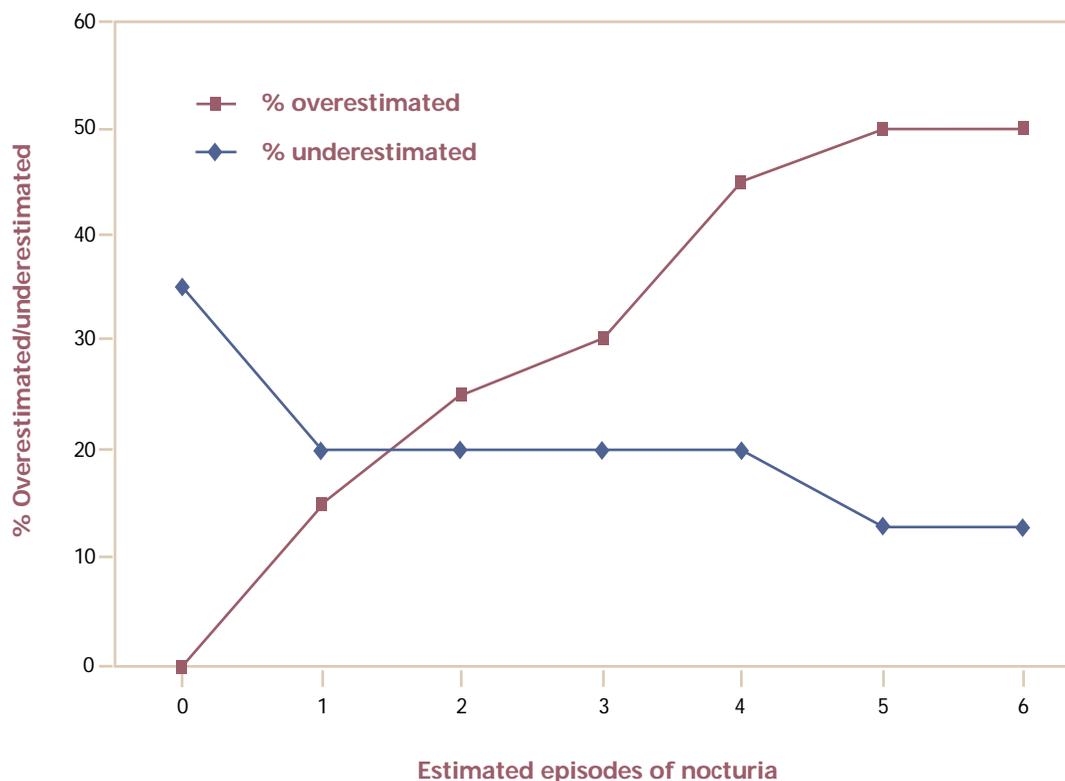


Figure 2. Comparison of overestimation versus underestimation of number of voiding episodes.

that men who perceived their nocturia as more severe (higher original estimation) tended to overestimate their nocturnal voiding frequency, whereas those men who claimed not to have as severe nocturia (lower original estimation) tended to underestimate. The degree of underestimation and overestimation may have a direct correlation with the quality-of-life question on the AUA symptom-score questionnaire.

A problem that seems to arise universally in all studies concerning any form of health diaries is compliance. In our particular study, the compliance rate was 140 (100%) of 140 patients in the study group. Verbrugge⁸ reports that agreement to fill out health diaries is high and attrition during the diary period is low. However, in a study by Fantl et al,²⁰ only 32% of patients recorded details relevant to their symptoms in their written diaries. Reported causes of noncompliance in completing the voiding diaries are survey fatigue, poor motivation from staff members, and inconvenience.^{8,21} Other studies have shown that nonwhite patients and those patients seen for treatment of pelvic organ prolapse (no urinary symptoms) were less likely to complete their diaries.²² In other attempts to raise compliance rates, computerized voiding diaries have been developed. Studies have shown that computerized voiding diaries lead to an increased volume of data and greater patient compliance in reporting bladder symptoms compared with the standard written voiding diary.^{21,23} We believe that our high compliance rate can be attributed to easily understandable written instructions, dedicated office nurses, and our request

to maintain the voiding diaries for only 1 week.

The variability and reproducibility of voiding diaries are also an area of interest when analyzing their usefulness in the management of patients with urinary disorders. In our study, we are assuming that the mean number of diary-recorded voiding episodes is an accurate assessment of the individual's long-term frequency of nocturia. Multiple studies have shown that frequency of diurnal micturition, frequency of nocturnal micturition, and the number of incontinent episodes are highly reproducible from one week to the next with the use of a diary.^{12,17}

A point of confusion in the analysis of our data is the overall average of the mean number of diary-recorded voiding episodes for each group. It could be argued that a voiding diary in the workup of an individual with nocturia is not necessary when comparing the actual number of nocturnal voiding episodes of each group versus the ideal number of voiding episodes (frequency of nocturia that would have been observed if the patients were 100% accurate) for each group (*Figure 4*). Clearly, the two plots look very similar, which is misleading as the overall accuracy for the study group was only 48.6%. The similarity in the observed average of the mean number of nocturnal diary-recorded voiding episodes versus the ideal mean number of diary-recorded voiding episodes was observed for a few reasons. A wide range of mean number of diary-recorded voiding episodes can be seen within each of the seven subject groups. Within the broad ranges that were observed in this

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Figure 3. Range of numbers of actual episodes of nocturia.

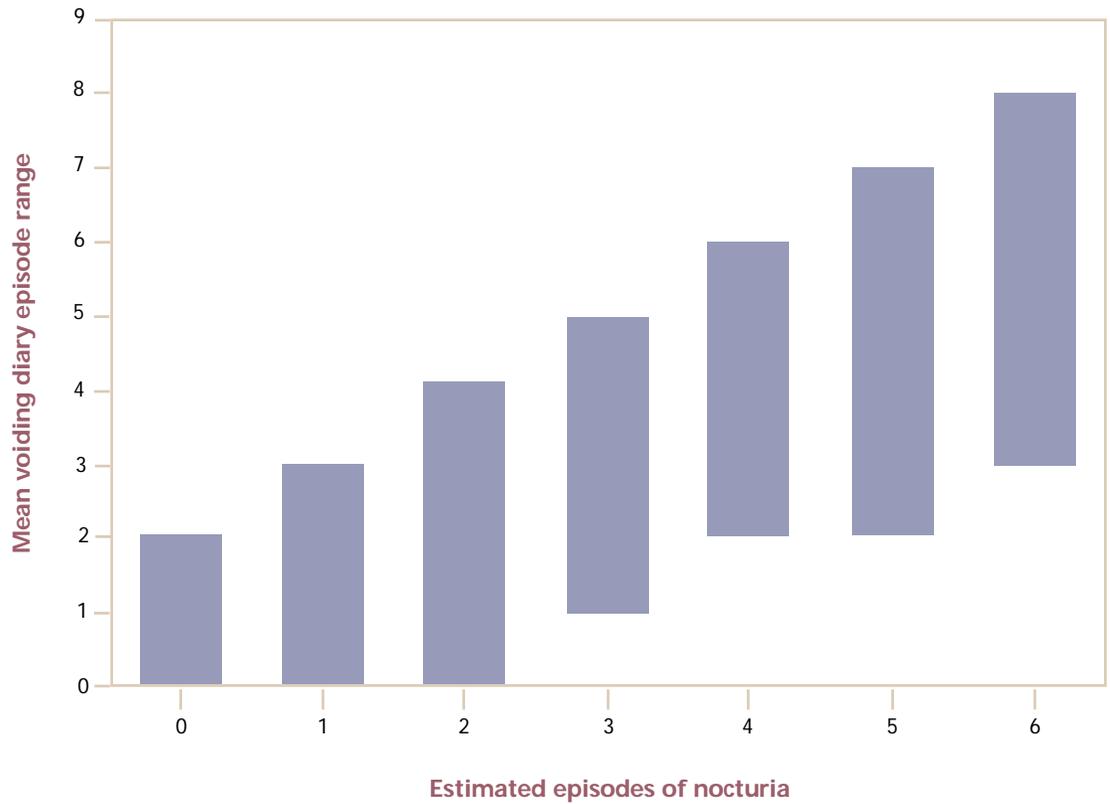
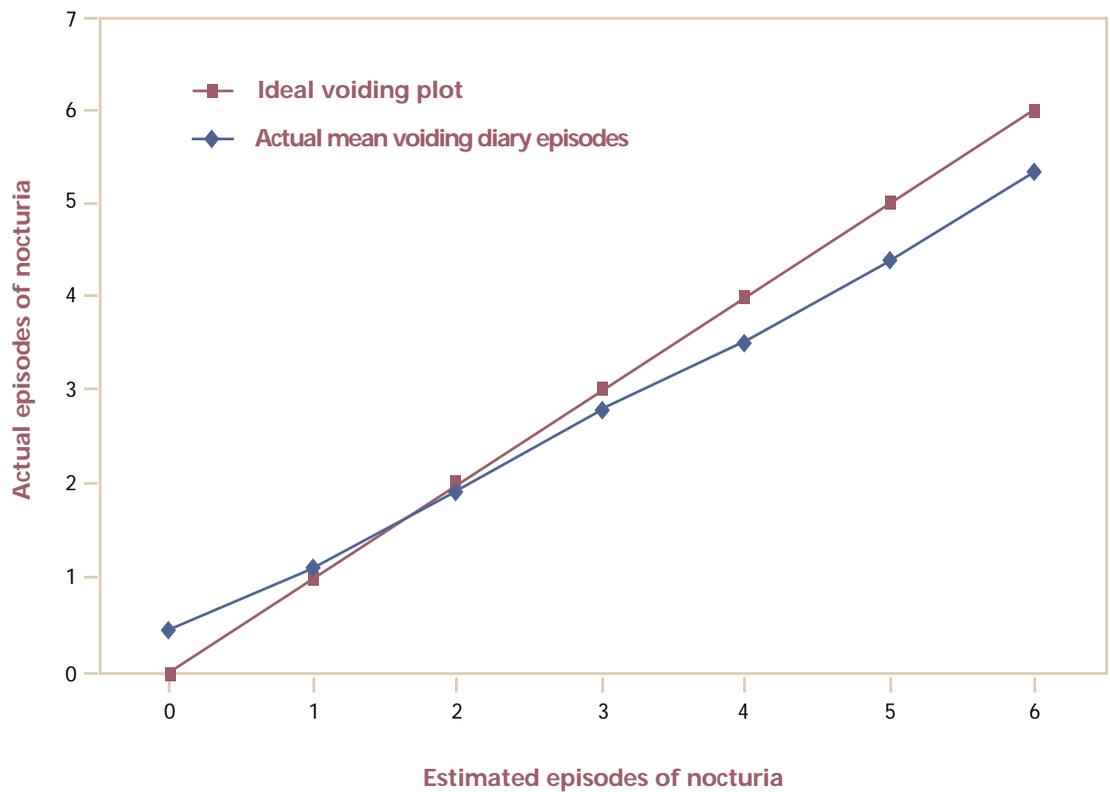


Figure 4. Comparison of average of the mean number of diary-recorded voiding episodes versus ideal voiding plot.



study, the mode of each group was still equal to the estimated frequency of nocturia. For example, within each observed range, the most frequently occurring or repetitive value observed was equal to the estimated frequency of nocturia. Also, in groups 1, 2, and 3, there was an almost equal number of men who underestimated and overestimated on their initial estimation, thereby leading to an average of the mean number of diary-recorded voiding episodes almost equal to the estimated frequency of nocturia. As the result, the average of the mean number of diary-recorded voiding episodes creates the illusion that the subjects' original estimations were more accurate than reported.

Conclusion

Many patients with voiding dysfunction often have their initial treatment decisions guided by symptom-score questionnaires. One of the seven questions on the AUA symptom-score questionnaire is about the number of voiding episodes per night. These questionnaires give quantitative data but weigh heavily on the patient's memory. Knowing the actual number of episodes of nocturia would allow the physician to treat the patient more appropriately by avoiding both undertreatment and overtreatment. For instance, a man who has nocturia eight times per night is perceived to have more serious disease than a man with nocturia three times per night regardless of the patient's perception of the problem. Voiding diaries also allow the physician to accurately monitor the individual's response to treatment. In other words, knowing a patient's frequency of nocturia may be helpful in determining whether a treatment plan is actually working and whether his medication dose needs further adjustment. Our study suggests that voiding diaries are essential in helping to determine the actual number of voiding episodes per evening. We have also shown that the need for a voiding diary becomes increasingly important as the perceived frequency of nocturia increases.

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