

## Original Research Article

# Role of frequency volume chart for the assessment of urinary incontinence in men

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### ABSTRACT

**Background:** This study was conducted to evaluate the role of FVC (frequency volume chart) in the male patient with urinary incontinence. That will definitely help to evaluate patient's objective lower urinary tract symptoms including incontinence and guide to manage those symptoms. But there are less number of reported studies showing role of FVC in men with urinary incontinence.

**Methods:** Male patient (19-60 years) presenting with incontinence symptoms from 1st February 2018 to 30th July 2018, were enrolled in the study. They were asked to record the time and volume of each oral fluid intake, voided volume for 3 consecutive days and put tick in the column of incontinence in the FVC if present.

**Results:** Total 205 male patients presented with incontinence symptoms were evaluated, they were divided into 3 age groups (19-32, 33-46 and 47-60 years). Mean incontinence were found 2.65 (19-32 years), 2.99 (33-46 years) and 3.13 (47-60 years). In 47-60 years group total oral fluid intake is positively correlated with frequency ( $p < 0.05$ ) but not in other groups. Correlation of Nocturia with incontinence ( $p > 0.05$ ) and frequency with incontinence ( $p > 0.05$ ) were not statistically significant in any age groups.

**Conclusions:** The FVC is the registration of voiding parameters by patient in his own environment. Assessment of lower urinary tract symptoms based on a history alone is not accurate, value of FVC are found to be consistent and accurate, so it will guide us to initiate management in male with urinary incontinence and also help to assess treatment responsiveness.

**Keywords:** Frequency volume chart, Incontinence, Lower urinary tract symptoms, Nocturia

### INTRODUCTION

About 12.7% men reported with symptoms of UI. Of which symptoms of urge urinary incontinence (UUI), stress urinary incontinence (SUI), mixed urinary incontinence (MUI) symptoms, and other types of urinary incontinence (OUI) symptoms, were reported by 44.6%, 24.5%, 18.8%, and 12.3%, respectively. Among those UUI and MUI symptoms increases with age while SUI symptoms decrease.<sup>1</sup> Timely recording of voiding parameters gives information regarding urinary frequency

and voided volumes nocturnal, incontinence episodes etc. There may be recall bias, Patients emotion may affect proper evaluation by History alone. So FVC is very useful.<sup>2</sup>

The assessment of lower urinary tract problems including incontinence based on questionnaire alone is not accurate, because it depends on the clinician's assessment of the patient's symptoms.<sup>3</sup> The parameters recorded on a frequency/volume chart (FVC) for 3 or more consecutive days was found to be accurate.<sup>4,5</sup> Therefore FVC is

recommended so that the data obtained corroborate well with a patient's symptoms. An FVC is also useful in the initial evaluation of the incontinent patient's outcome during and after treatment. Twenty four hour frequency is the most common parameter measured. The amount of fluid intake by the patient over a specified time may related to number frequency episodes and incontinence.<sup>6,7</sup> The first charts was introduced in the late 1970s. Later on, it was modified by asking the patient to document fluid intake (type and volume), the volumes of voided urine, the number of episodes of urgency, incontinence and the use of incontinence aids such as pads.<sup>8</sup>

FV chart is a simple chart measuring the total number of voids, fluid intake, frequency, total output, number of incontinence episodes/day, etc. FV charts also vary in the time period over which the patient is required to fill in the chart; initially it was over a 7-day period but now a days 3 days chart is commonly used and it has been proved that 3 days chart is equally effective as longer 7 days chart. Patients once suitably counselled can easily fill these charts accurately.<sup>9</sup>

In different studies it was proved that 25% of older men suffer from severe nocturia (>3 episodes /night) and also produce larger volumes (nocturnal polyuria) compared to men who do not have such nocturia. A 3-day FV chart is sufficient to detect this nocturnal polyuria so it is very important for evaluation in patients with LUTS. Without the use of FV charts to assess lower urinary problems are practically impossible.<sup>9,10</sup>

Though there are few studies regarding the use of FVC in the assessment of female incontinence but there are gaps in our knowledge for the assessment in male incontinence, as less number of studies done.

## METHODS

This hospital-based Prospective Observational study was carried out over a period of 6 months from 1<sup>st</sup> February 2018 to 30<sup>th</sup> July 2018. Ethical approval was sought and obtained from the ethical committee of the hospital (Memo no-Inst/IEC/2018/490).

### Exclusion criteria

- Patients who did not give their consent to the study or with UTI, CKD, DM, Urological malignancy, Genitourinary TB
- Urethral stricture disease, Post- operative patient with urogenital surgery.

All the male patients of 19 to 60 years of age, were asked to measure and record the time and volume of each oral fluid intake, voided volume for at least 3 consecutive days and put tick in the column of incontinence if it is present. There was no change in any treatment during FVC recording. FVC was divided into 24 hours periods

so that the mean voided volume and 24 hours frequency could be calculated.

### Statistical analysis

Variation of the mean voided volume for each 24 hours period, within the diary was calculated using the one-way ANOVA test. Linear Correlation was assessed using Pearson correlation coefficient. Number of leak episodes also calculated in 24 hours period. Statistical analysis done with SPSS system.

The FVC given to patient for self -filling in time to time and after 3 days they should hand over this to the investigator for statistical analysis of data.

## RESULTS

Between from 1<sup>st</sup> February 2018 to 30<sup>th</sup> July 2018 total 221 patients were enrolled in this study. All the male patients of 19 to 60 years of age, those presenting in OPD with incontinence symptoms, were asked to measure and record the time and volume of each oral fluid intake, voided volume for at least 3 consecutive days and put tick in the column of incontinence if it is present. Of these 221 enrolled patients, included in the study were 205 (92.76%), whereas 7 patients (3.17%) refused to record FVC as advised and 9 (4.07%) patients were excluded as they did not have any incontinence on FVC, though they have given history of incontinence episodes. The ages of the 221 participating patients ranged from 19 to 60 years (mean 44.49 years, 46 median years).

### General characteristic

Total 221 patients were enrolled had no history of UTI, CKD, DM, Urological malignancy, Genitourinary TB. Urethral stricture disease or any genitourinary operation.

- Refused to Participate, N= 7; mean age = 38.43 years (28- 55yrs).
- Participated in the Study N = 214; mean age = 44.69 years, Median-47 years (19-60yrs).
- Excluded: N = 9; mean age = 34.78 years (19-53yrs).
- Included in the Study, N = 205; mean age = 45.13 years, median 48 years (19-60yrs).
- These 205 patients were divided into 3 age groups 19-32 years, 33-46 years, and 47-60 years.

Table 1 showing distribution of parameters in Day 1-Day 3 in different age groups. In 19-32 years group Day 1 mean intake and output was 2650. 57ml and 1853ml respectively, mean frequency was 9.73, mean nocturia was 2.12 and mean incontinence was 2.64, in D2 mean intake and output was 2646.36ml and 1913.33ml respectively, mean frequency was 9.72, mean nocturia was 2.03 and mean incontinence was 2.69, in D3 mean intake and output was 2594.84ml and 2020.45ml respectively, mean frequency was 9.79, mean nocturia was 2.06 and mean incontinence was 2.63.

In 33-46 years group Day 1 mean intake and output was 2686.80 ml and 1951.67 ml respectively, mean frequency was 10.12, mean nocturia was 2.80 and mean incontinence was 2.96, in D2 mean intake and output was 2711.69ml and 1985.46ml respectively, mean frequency

was 10.10, mean nocturia was 2.69 and mean incontinence was 3.01, in D3 mean intake and output was 2691.59ml and 1976.36ml respectively, mean frequency was 10.25, mean nocturia was 2.80 and mean incontinence was 3.02.

**Table 1: Distribution of different parameters (mean intake, mean output, mean frequency, mean nocturia and mean incontinence) in Day 1-3.**

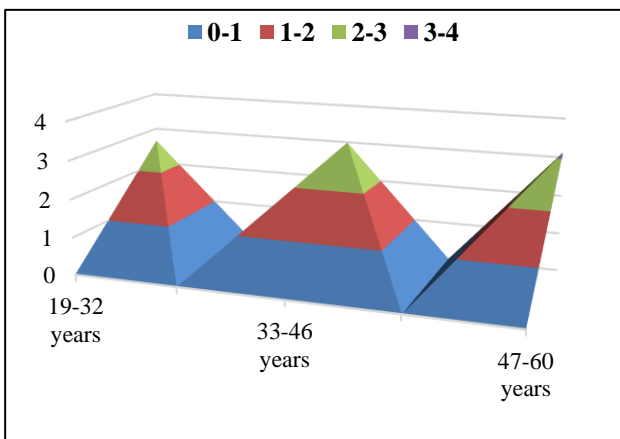
Age in years	19-32			33-46			47-60		
Day number	D1	D2	D3	D1	D2	D3	D1	D2	D3
Mean intake (ml)	2650.57	2646.36	2594.84	2686.80	2711.69	2691.59	2253.01	2271.21	2279.89
Mean output (ml)	1853	1913.33	2020.45	1951.67	1985.46	1976.36	1560.87	1588.04	1597.47
Mean frequency	9.73	9.72	9.79	10.12	10.10	10.25	10.03	9.90	10.08
Mean Nocturia	2.12	2.03	2.06	2.80	2.69	2.80	3.09	3.00	2.87
Mean incontinence	2.64	2.69	2.63	2.96	3.01	3.02	3.27	3.06	3.05

**Table 2: Correlation between total fluid intake and frequency in D1-D3.**

Age (Years)	Day 1		Day 2		Day 3	
19-32	R= 0.0826	P= 0.970	R= -0.134	P= 0.457	R= -0.0341	P= 0.851
33-46	R= 0.2231	P= 0.071	R= 0.2279	P= 0.065	R= 0.1927	P= 0.1211
47-60	R= 0.2804	P= 0.0035 P = <0.05	R= 0.239	P= 0.0136 P = <0.05	R= 0.235	P= 0.015 P = <0.05

**Table 3: Correlation of nocturia with incontinence, and frequency with incontinence.**

Age (years)	Nocturia/Incontinence		Frequency/Incontinence	
19-32	R= 0.0167	P= 0.926	R= 0.0709	P= 0.695
33-46	R= 0.0381	P= 0.761	R= 0.0441	P= 0.725
47-60	R= 0.0658	P= 0.502	R= 0.0823	P= 0.401



**Figure 1: Correlation between mean incontinence (vertical axis) with age groups (horizontal axis).**

In 47-60 years group Day 1 mean intake and output was 2253.01ml and 1560.87ml respectively, mean frequency was 10.03, mean nocturia was 3.09 and mean incontinence was 3.27, in D2 mean intake and output was 2271.21ml and 1588.04ml respectively, mean frequency was 9.90, mean nocturia was 3.00 and mean incontinence was 3.06, in D3 mean intake and output was 2279.89ml and 1597.47ml respectively, mean frequency was 10.08, mean nocturia was 2.87 and mean incontinence was 3.05. In this 205 patients correlation between total oral fluid intake and total frequency in each day not statistically significant in first two groups (19-32 and 33-46 years) (p >0.05) but for 47-60 years group it is statistically significant. (p <0.05) (Table 2).

Correlation between nocturia with incontinence are not significant in any age groups and frequency with

incontinence are also not significant as well in any age groups according to FVC ( $P > 0.05$ ) in Day 1-3 (Table 3).

Here in this 205 patients mean urinary incontinence are 2.65, 2.99 and 3.13 for age groups 19-32, 33-46 and 47-60 years respectively for D1-D3 as showing in Figure 1.

## DISCUSSION

In present study total incontinence episodes in male patients ranging from 1-8/Day in D1 to D3 (mean 2.65, 2.99 and 3.13 for age groups 19-32, 33-46 and 47-60 years respectively). Apart from 47-60 years group total intake per day is not statistically correlated with incontinence. Correlation between nocturia with incontinence and frequency with incontinence are also not statistically significant in any age groups in Day 1-Day 3.

The physiology of continence in men has not been fully understood till now. Urinary continence in men usually controlled by 5 main structures: the detrusor muscle, the internal sphincter, the ureterotrigonal muscles, the levator muscles, and the rhabdosphincter. The male urethral sphincter complex consists of a smooth muscle and skeletal muscle component. It is most important to maintain continence in men.<sup>11,12</sup>

There may be less bladder compliance, or overactive bladder, because of long-term obstruction due to prostatic enlargement. These may lead to man's LUTS including incontinence. Subjective questionnaires e.g. International Prostate Symptom Score (IPSS) is not accurate every time. so using FVC objective assessment required.<sup>13</sup>

Exact 24 h registration of FVC is not possible every time, as voiding times are generally distributed throughout the day, and rising from bed is also variable. The FVC recording period from 'rising' to 'rising' is influenced by working environment also. FVC is not used routinely in male patient with incontinence but in female patient with incontinence it is widely used. The purpose of a FV chart is to obtain objective information about a patient's urinary symptoms that would be difficult to elicit from the history alone.<sup>14,15</sup>

There is natural variation of 24 hours frequency between diaries that may invalidate apparently successful treatment outcomes. So, the recommendation is to use of the mean voided volume as part of the evaluation of new treatments in chronic voiding dysfunction and urinary incontinence.<sup>15</sup>

The comparison between two methods, patient questionnaire and examination vs. frequency-volume charts assessed for monitoring Lower urinary tract symptoms. The results showed that frequency-volume more superior. So FVC should be used more often in the investigation and follow-up of patients with micturition disorders.<sup>16</sup>

FV chart was recommended as a baseline tool particularly for patients in whom nocturia is predominant. According to experts any patient with nocturia would be beneficial from filling a frequency-volume chart over one or several 24 hours periods.<sup>17</sup>

Nygaard et al, have suggested that a 3-day length is appropriate for trials evaluating stress incontinence, while Brown et al. reported that, a patient suffering from urgency urinary incontinence, a 3-days diary is reliable in terms of daytime frequency, nocturia, urgency and incontinence episodes.<sup>18</sup>

In 2005, Dmochowski et al, analyzed, and compared two large-scale randomized phase III clinical trials. In both trials patient's symptoms were evaluated through voiding diaries with different durations. In trial A 520 patients documented their symptoms with a 7-day diary, while in trial B 361 patients documented their symptoms with a 3-day diary. Comparing the different durations, result showed that 3-day diary appears to be equally effective to the 7-day, increasing patient's compliance in different clinical trials.<sup>19</sup>

This study shows FV charts are easy-to-use method of assessing bladder function and objective assessment of patient's lower urinary symptoms including incontinence. Self-estimated history is generally unreliable, making the FVC a mandatory tool in the proper evaluation of lower urinary tract function despite the many advantages of FV charts they are not widely used in routine urological practice in the assessment and management of men with urinary incontinence.

## CONCLUSION

The frequency volume chart is very simple and inexpensive tool for recording voiding parameters, which is impossible to assess by history alone. So, for initial evaluation of a patient with Lower urinary tract symptoms with urinary incontinence an FVC is very useful. Though it has limited diagnostic capability, but it provides a base for initiation of treatment in male patients with lower urinary symptoms like incontinence.

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## REFERENCES

1. Diokno AC, Estanol MV, Ibrahim IA, Balasubramaniam M. Prevalence of urinary incontinence in community dwelling men: a cross sectional nationwide epidemiological survey. *Int Urol Nephrol.* 2007;39:129-36.
2. van Haarst EP. The evaluation of voiding patterns. An analysis of frequency-volume charts and

- symptom scores (Doctoral dissertation, Universiteit Utrecht). 2015;1:10-11.
3. McCormack M, Infante-Rivard CL, Schick E. Agreement between clinical methods of measurement of urinary frequency and functional bladder capacity. *Br J Urol.* 1992 Jan;69(1):17-21.
  4. Hansen P. The accuracy of the frequency-volume chart: comparison of self-reported and measured volumes. *Br J Urol.* 1998 May;81(5):709-11.
  5. Diokno AC, Wells TJ, Brink CA. Comparison of self-reported voided volume with cystometric bladder capacity. *J Urol.* 1987 Apr 1;137(4):698-700.
  6. Kassis A, Schick E. Frequency-volume chart pattern in a healthy female population. *Br J Urol.* 1993 Nov;72(5):708-10.
  7. Bryan NP, Chapple CR. Frequency volume charts in the assessment and evaluation of treatment: how should we use them?. *Eur Urol.* 2004 Nov 1;46(5):636-40.
  8. Abrams P, Klevmark B. Frequency volume charts: an indispensable part of lower urinary tract assessment. *Scand J Urol Nephrol. Supplementum.* 1996;179:47-53.
  9. Sooriakumaran P, Brown C, Emberton M. Frequency volume charts should be used in men with lower urinary tract symptoms. *Int J Surg.* 2005 Jan 1;3(2):147-50.
  10. Matthiesen TB, Rittig S, Mortensen JT, Djurhuus JC. Nocturia and polyuria in men referred with lower urinary tract symptoms, assessed using a 7-day frequency-volume chart. *BJU Int.* 1999 Jun;83(9):1017-22.
  11. Golomb J, Chertin B, Mor Y. Anatomy of urinary continence and neurogenic incontinence. *Therapy.* 2009 Mar 1;6(2):151-5.
  12. Koraitim MM. The male urethral sphincter complex revisited: an anatomical concept and its physiological correlate. *J Urol.* 2008 May 1;179(5):1683-9.
  13. Neilson D. The accuracy of the frequency-volume chart: comparison of self-reported and measured volumes. *Br J Urol.* 1998 Nov;82(5):776.
  14. Hinchliffe A. Utilising frequency volume charts. *Nursing Times.* 2003;99(1):52-3.
  15. Larsson G, Abrams P, Victor A. The frequency/volume chart in detrusor instability. *Neurourol Urodynamics.* 1991;10(6):533-43.
  16. Bryan NP, Chapple CR. Frequency volume charts in the assessment and evaluation of treatment: how should we use them?. *Eur Urol.* 2004 Nov 1;46(5):636-40.
  17. Roehrborn CG. Focus on lower urinary tract symptoms: nomenclature, diagnosis, and treatment options: highlights from the 5th international consultation on benign prostatic hyperplasia June 25–27, 2000, Paris, France. *Reviews Urol.* 2001;3(3):139.
  18. Nygaard I, Holcomb R. Reproducibility of the seven-day voiding diary in women with stress urinary incontinence. *International Urogynecol J.* 2000 Jan 1;11(1):15-7.
  19. Dmochowski RR, Sanders SW, Appell RA, Nitti VW, Davila GW. Bladder-health diaries: an assessment of 3-day vs 7-day entries. *BJU Int.* 2005 Nov;96(7):1049-54.

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