

Frequency volume chart for the illiterate population: A simple solution

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ABSTRACT

Introduction: We aimed to assess the feasibility of a novel method of recording frequency volume chart (FVC) in adult patients who are either illiterate or are unable to make the required written record.

Materials and Methods: This prospective study included adult patients, in whom FVC was required as part of their urological evaluation, who were either illiterate or were not sufficiently literate to make the required written record. Three groups of people were involved in the study: (i) patient, (ii) nursing staff, and (iii) the investigator/coinvestigator. The investigator/coinvestigator briefed the patient and the nursing staff, separately, regarding their roles in detail. The patient-reported (investigator/coinvestigator interpreted) data were compared with the data recorded by the nursing staff to assess the feasibility of this novel method.

Results: A total of 30 patients were included in the study, with a mean age of 45.1 years and male: female ratio of 2:1. The patient-reported (investigator/coinvestigator interpreted) data including 24-h urine production, daytime urine volume, nocturnal urine volume, daytime urinary frequency, nocturia, average voided volume, and maximum voided volume were similar to the data reported by the nursing staff, with no significant differences. All patients completed the FVC satisfactorily, except one patient who failed to report the night time voids.


Conclusions: Our novel method of recording FVC is feasible, reliable, and clinically as informative/applicable as the written FVC in patients who are illiterate/insufficiently literate to make a written record of FVC.

INTRODUCTION

While a bladder diary provides the most comprehensive information regarding the intake and the voiding habits of an individual, it is also somewhat cumbersome to make. Alternatives to a bladder diary include the frequency volume chart (FVC) and the micturition time chart. FVC is a chart that records the time of each micturition along with the voided volume. Recording the FVC for one-day has been recommended as a reasonable tool to gain insights into the voiding habits of an individual during normal daily routine.^[1] One of the limitations of such a written record is that it

requires an educated patient/caregiver to complete it. The lower the education/literacy level, the more is the chance that a patient will provide incorrect information if written screening tools are used, leading to misclassification of symptoms, which then may limit their access to appropriate care.^[2] While FVCs have been studied and used successfully in educated populations all over the world, little efforts have been made to devise a way to record FVC in those who are either illiterate or insufficiently literate to make a record themselves.

In this prospective cohort study, we assess the feasibility of a novel method to record FVC data in adult patients

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who are either illiterate or insufficiently literate to make a written record.

MATERIALS AND METHODS

This was a prospective cohort study, approved by the Institutional Ethics Committee (IEC). Consecutive adult patients (≥ 18 years of age) attending the urology outpatient department (between February and March 2018), who as part of their evaluation were required to make a FVC (those with predominant storage symptoms) but were illiterate or not sufficiently literate (as per assessment of the investigator/coinvestigator) to make the written record themselves, were included in the study. Patients with (a) moderate-to-severe cognitive dysfunction whom the investigator felt may not be able to follow the instructions and (b) from whom an informed consent could not be obtained were excluded. Informed consent was obtained in IEC-approved pro forma in the presence of an adult literate witness known to patient after explaining the procedure in detail. Eligible patients were admitted for 1½ days starting the evening prior to the day when the 24-h FVC was to be made. On admission, the patient received (a) two measuring jars (one smaller (1 L) and one larger (5 L)), (b) a box of pebbles, (c) two small cloth pouches (one yellow colored and the other black colored), and (d) a black marking pen [Figure 1].

Three groups of people were involved in the study: (i) patient, (ii) nursing staff, and (iii) the investigator/coinvestigator, each of their roles were clearly defined. The investigator/coinvestigator briefed the patient and the nursing staff about their roles.

Role of patient

The patient was told that he/she has to discard the first morning sample of urine. Thereafter, every time the patient voids till the next morning (first sample of the next morning to be included), he/she will void into the smaller measuring jar. The patient will put a horizontal mark indicating the

upper limit of the level of urine in the smaller measuring jar after the first void. He/she will again mark the upper limit of the level of urine on the smaller measuring jar, if the level is higher than the earlier marked level at any subsequent voids. Each time the patient voids, he/she will inform the nursing staff who will inspect the smaller measuring jar containing the urine, and then leave. After the nursing staff leaves, the patient was told to transfer the urine from the smaller measuring jar into the larger measuring jar. The patient was instructed that each time he/she voids during the daytime, he/she will put one pebble from the box into the yellow pouch. Before going to bed at night, the patient will mark a horizontal line on the larger measuring jar at the level till which it is filled with urine and also inform the nursing staff that he is going to bed. The patient was instructed that after sleeping, each time patient gets up from the sleep to void, he/she shall continue to follow the protocol he/she had been following through the day except that for each of these voids, one pebble from the box will be put into the black cloth pouch instead of the yellow cloth pouch. For the first morning void of the following morning, he/she shall put the pebble in the yellow pouch. Once the first morning void was transferred to the larger measuring jar, the patient was instructed to mark a horizontal line indicating the level of urine in the larger measuring jar. In case the larger measuring jar got filled completely before the first morning void, a second large jar was provided to the patient. Thereafter, he/she was asked to empty the larger measuring jar and return the jars and the cloths to the investigator/coinvestigator [Figure 2].

Role of nursing staff

The nursing staff was instructed to note the time and volume of each of the voids. They were also instructed to note down the time the patient goes to sleep and the time he/she gets up in the morning. He/she would then compile FVC data, i.e. 24-h urine production, daytime urine volume, nocturnal



Figure 1: Items given to the patient at the start



Figure 2: Returned items showing black markings on the jars and pebbles in respective pouches

urine volume, daytime urinary frequency, nocturia episodes, average voided volume, and maximum voided volume as per ICS standardization of terminology document (2002 document reference) and hand it over to the investigator/coinvestigator.

Role of investigator/coinvestigator

- i. To brief the nursing staff and patients separately about their roles
- ii. Once the jars and cloths were returned, the investigator/coinvestigator calculated
 - a. 24-h urine production (the higher horizontal mark on the larger measuring jar would correspond to the 24-h urine output)
 - b. Daytime urine volume (the lower horizontal mark on the larger measuring jar would correspond to the daytime urine output)
 - c. Nocturnal urine volume (a-b)
 - d. Daytime urinary frequency (the number of pebbles in the yellow pouch would correspond to the daytime frequency)
 - e. Nocturia (the number of pebbles in the black pouch would correspond to nocturia episodes)
 - f. Average voided volume ($a/[d + e]$)
 - g. Maximum voided volume (the highest horizontal mark on the smaller measuring jar would correspond to the maximum voided volume).

These patient-reported and investigator/coinvestigator-interpreted FVC data were compared with the FVC data recorded by the nursing staff to assess the reliability of the aforementioned method of extracting information.

All collected data were entered into Microsoft Excel spreadsheet (Microsoft, Seattle, WA USA) and analyzed by SPSS version 21.0 (SPSS Inc., Chicago, IL, USA) software package. The collected data were subjected to the Kolmogorov–Smirnov normality test. All the data passed normality test with $P > 0.10$ except data for nocturia which passed the normality test with $P = 0.08$. t -test was used to compare voiding diary data. $P < 0.05$ was considered as statistically significant.

RESULTS

A total of 30 patients were included in the study, with a mean age of 45.1 years and male: female ratio of 2:1. Results are summarized in Table 1. All the patients, except one, followed the instructions and executed their role satisfactorily. One patient did not inform the nursing staff at night and also did not put pebbles in the black pouch, although he voided in the containers as instructed. All the variables of patient-reported and investigator/coinvestigator-interpreted data were similar to that of the nursing staff-reported data with no significant differences.

Table 1: Frequency volume chart variables

FVC variables	Patient-reported I/Co-I interpreted (n=30)	Nursing staff reported (n=30)	P**
24-h urine production (ml)	3413.1±1649.5	3557.5±2125.7	0.77
Daytime urine volume (ml)	2772.3±1506.4	2959.6±1981.5	0.68
Nocturnal urine volume (ml)	637.9±540.4*	585.5±526.8*	0.70
Daytime urinary frequency	10.3±4.2	10.8±4.2	0.67
Nocturia	2.9±3.2*	2.4±2.9*	0.47
Average voided volume (ml)	296.6±157.1*	306±175.8*	0.83
Maximum voided volume (ml)	437.1±209.9	442.5±217.1	0.92

* $n=29$, ** t -test. I=Investigator, Co-I=Coinvestigator

DISCUSSION

Illiteracy continues to be a significant problem, especially in the developing world. As per an UNESCO report, global literacy rate was 86% in 2016, with about 49% of the illiterate population residing in Southern Asia, 27% in Sub-Saharan Africa, 10% in Eastern and Southeastern Asia, 9% in Northern Africa and Western Asia, 4% in Latin America and Caribbean, and <2% in rest of the world.^[3] As per the last national census, 26% of the population aged 7 years and above in India is illiterate. Caregivers working in areas where the illiteracy rates are high commonly face difficulty in obtaining an accurate FVC.^[4,5] Till date, very few attempts have been made to address this problem.

Wagg *et al.* devised a way to record the urinary diary among illiterate elderly women, wherein patients were given three paired ribbons, red and yellow, secured to a string that were to be tied around the waist. One pair of ribbon was to be used each day. Patients had to tie a knot in the yellow ribbon for a micturition episode and a knot in the red ribbon for an incontinence episode. They also completed the Sandvik Severity Index (SSI) and Urinary Distress Inventory (UDI) version 6 Short Form with verbal assistance. Diary records and questionnaire results were compared at baseline and after a continence intervention. At the baseline, in the 98 women who had completed all the questionnaires, 3-day total urgency incontinence episodes from the continence record correlated with UDI ($r = 0.41$, $P < 0.001$) and SSI ($r = 0.26$, $P < 0.01$). The authors found it to be sensitive to change and reported that at the end of the study, the total diary UI episodes from the continence record correlated with UDI and SSI.^[6]

In our cohort study, we describe a novel method to record FVC data for the illiterate patients. While the ideal duration of recording the FVC is debatable, we restricted our data collection to 1 day since the intention was only to assess the feasibility and reliability of the method described. This study was performed in hospital settings under close observation

to establish reliability of the data that the investigator interpreted from the method described. We observed no significant difference in the FVC parameters, including 24-h urine production, daytime urine volume, nocturnal urine volume, daytime urinary frequency, nocturia, average voided volume, and maximum voided volume, recorded in standard fashion by an educated nursing staff, with that recorded by an illiterate patient (investigator interpreted), implying that the new method described is reliable. All except one patient completed the FVC satisfactorily, implying that the explanation and method is simple enough to follow and use. We now routinely ask our illiterate patients to follow this "FVC recording methodology" at home, and interpret it at their next follow-up in the outpatient department.

The cost of all consumables used (jars/pebbles/pouches/pen) totaled to approximately 3 US dollars (200 Indian rupees) per patient which to our understanding is affordable even in developing countries.

The limitations of this study are as follows: (a) small sample size, (b) a level of understanding would be required for the method to be described to the patient and hence this may not be applicable to those with low mentation and those with cognitive dysfunction, and (c) while the maximum and mean voids were recorded, the minimum and the most common void volume were not estimated by this method. One way to record the minimum and the most common voided volume could be by asking the patient to mark each void on the small jar. Although, we would obtain additional information, but marking each void would make the method cumbersome.

CONCLUSIONS

This is a novel and, to our knowledge, the first attempt to try and capture FVC data in patients who are illiterate/

not sufficiently literate to make a written record of FVC. The method described is feasible, reliable, and clinically as informative/applicable as a written FVC.

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