Use of a Novel Stool Scoring System for Assessing Bowel Habits and Laxatives use Amongst Older People-A Pilot Study in Kingston, Ontario

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Abstract

**Background:** Constipation is a common complaint in the care of elderly in long term care facility. The Bristol Stool Chart (BSC) has been the gold standard for describing the form and consistency of bowel motions but is limited as a descriptive qualitative tool.

**Objective:** To pilot the feasibility of a novel stool scoring system in quantitative analysis of bowel motions and their texture.

**Methods:** 100 medical records were randomly selected from a local long-term care facility to extract descriptions of bowel movements and stool textures in the previous 7 days. A novel numeric stool score of +3 to -3 for each documented bowel motion and a cumulative value was obtained. Such score was recorded against the total cost of treatment.

**Results:** In the period studied, there was no significant difference in the mean bowel motions, the cumulative stool score and costs of laxative treatment between the male and female population.

**Keywords:** Bowel motions; Stool scoring system

Introduction

**Problem of chronic constipation**

Chronic constipation is a common problem seen in the older people and long term care residents. The term constipation may be interpreted differently by patients as compared to physicians. While physicians often equate constipation with less than three bowel movements per week [1,2], patients would consider other factors like urge, straining, feelings of incomplete emptying and stool consistency [3,4]. Here in Kingston, Ontario, a therapeutic protocol for chronic constipation had been used in a long-term care facility amongst the residents. Each resident has a stool chart which documented the stool frequency and stool texture as per the Bristol Stool Chart (BSC), first described by Lewis and Heaton in 1997 [5]. In an attempt to evaluate the cost-effectiveness of the existing therapeutic protocol for chronic constipation, difficulty was confronted as the BSC classified stool texture in a qualitative way. Both the resident and care-providers could only arrive at a subjective consensus regarding overall efficacy of the treatment protocol. It would be logical to implement a numeric scoring system that define the stool texture which enables quantitative analysis both within the subjects and across subjects over a period of time.

**Objective**

To pilot test a numeric stool score for analyzing chronic constipation amongst the older people population and analyze the effectiveness of using different laxatives as per protocol in a selected long term care facility in Ontario.

Materials and Methods

**Design**

Cross-sectional retrospective study of recorded data regarding bowel motions and stool consistency of residents in a long-term care facility.

Study population and sampling methods

Prior to commencement of study, approval has been obtained from the Health Services Research Ethics Board (HSREB) of Queen’s Faculty of Health Sciences and the Director of the long term care facility (Providence Manor). 100 medical records of residents who are alive and living which contained documented treatment of chronic constipation were randomly selected for review. There are no exclusion criteria. The participants’ age and gender were recorded. In a retrospective cross-sectional manner, the stool charts of each medical record were reviewed for the seven days from 2011 Dec 22 to 2011 Dec 28.

Data collection

All records were anonymized at the Centre of Studies in Primary Care (CSPC), with an identity tracer kept confidentially at the Research Office repository. Data was extracted regarding the number of bowel movements and the stool consistency of each motion, which was already evaluated as per Bristol Stool Chart (BSC) [5]. The original BSC only categorizes stool consistency in a descriptive way from Types 1 (most constipated) to Type 7 (total diarrhea). A novel Stool Scoring System (SSS) is hence devised where a numeric value ranging from -3 to +3 is arbitrarily assigned to different types of stool formation (Figure 1). A stool score of +3 will correspond to BSC type 1 (rock-like stool), a stool score of -3 will correspond to BSC type 7 (total liquid diarrhea) and a stool score of 0 will refer to BSC type 4 (normal consistency).

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A numeric total, referred to as Cumulative Stool Score (CSS) is then obtained by summing the scores for all bowel motions within the seven days. This CSS score reflects the overall quality of bowel habit for each subject over the week. The stool chart of each subject is updated by the responsible charge nurse. Self-reported bowel movements that were not verified by the charge nurse were considered invalid, and any subject with one or more invalid bowel movements will not qualify for a cumulative stool score. Take for example, if the subject had 6 documented motions in the week which were all soft and elongated in one piece, CSS will be zero (6x0) which indicates normal consistency. In other words, a positive CSS will indicate passage of hard stools during the week while a negative CSS will indicate a diarrheal state with totally liquid stool (BSC type 7). (Diagram drawn by Arthur Leung).

**Results**

Results of the selected 100 records were included in the initial stage of analysis. The demographic characteristics are given in Table 1.

Of the 100 subjects initially surveyed, 26 were males and 74 were females. Mean age was 83.6 (SD = 10.9) with a difference in distribution which was found to be statistically significant. Overall (counting both reported and observed) mean bowel motions per week was 4.32 (SD=2.37) with no significant difference in the distribution between the male and female. 62% of subjects had laxatives ordered on a regular basis and 83% on “as required” basis. 78% of subjects received at least one laxative during the surveyed week. Senokot was the most frequently used laxative and the average subject consumed 1.37 units of Senokot during the surveyed week. Overall costs of laxatives per week per individual was 15.88 cents (SD=20.32), again with no statistically significant difference between the male and female group.

As 210 out of 432 (48.6%) bowel movements were not verified by the charge nurse, they were hence invalidated. As a result, only 50 subjects (13 male and 37 female) yielding 222 (51.4%) bowel movements qualified for the CSS scoring and further analysis (Tables 2 and 3). Mean age was 82.6 (SD=11.39) with a distribution which was found to be statistically significant between the male and female. Overall (counting both reported and observed) mean bowel motions per week was 4.44 (SD=2.76) with no significant difference in the distribution between the male and female. CSS was -2.5 (SD=5.37) for the whole female group which is significantly higher than the age in male group, according to the Mann-Whitney mean rankings, apart from the age in male and female group.

**Discussion**

The prevalence of constipation in North America varied widely from 1.9% to 27.2% [6,7] with 50% to 74% of the institutionalized elderly reporting daily use of laxatives [8,9]. Females are two to three times more likely than males to suffer from constipation in terms...
Conflict of Interests

None

Table 3: Summary showing conclusions regarding distribution of different variables between the female and male group.

<table>
<thead>
<tr>
<th>Null Hypothesis</th>
<th>Test</th>
<th>Sig</th>
<th>Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>The distribution of Age is the same across categories of Gender.</td>
<td>Independent- Samples Mann-Whitney U Test</td>
<td>.002</td>
<td>Reject the null hypothesis.</td>
</tr>
<tr>
<td>The distribution of BMI is the same across categories of Gender.</td>
<td>Independent- Samples Mann-Whitney U Test</td>
<td>.696</td>
<td>Retain the null hypothesis.</td>
</tr>
<tr>
<td>The distribution of CSS is the same across categories of Gender.</td>
<td>Independent- Samples Mann-Whitney U Test</td>
<td>.322</td>
<td>Retain the null hypothesis.</td>
</tr>
<tr>
<td>The distribution of Cost is the same across categories of Gender.</td>
<td>Independent- Samples Mann-Whitney U Test</td>
<td>.395</td>
<td>Retain the null hypothesis.</td>
</tr>
</tbody>
</table>

Hypothesis Test Summary
Asymptotic significances are displayed. The significance level is .05.

References


