

# Factors Associated With Efficacy of Nurse-led Bowel Training of Patients With Chronic Constipation



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**BACKGROUND & AIMS:** It is not clear whether nurse-led bowel training (NBT), an individually tailored biofeedback strategy designed to improve the physiological process of defecation by operant conditioning and trial and error learning, is effective for patients with chronic constipation. We assessed the ability of NBT to reduce symptoms and increase quality of life in patients with constipation at a large tertiary medical center.

**METHODS:** We performed a retrospective analysis of data from 347 patients (median age, 50 years) who underwent a median 3 sessions of NBT for chronic constipation from January 2011 through December 2013 at St Marks Hospital in the United Kingdom. The NBT comprised a combination of sensory retraining, pelvic floor conditioning, and advice on diet and toileting behavior. Data on patient demographics (age, sex, type of constipation) were collected alongside their assessments of constipation, which were based on Patient Assessment of Constipation Quality of Life (PAC-QoL) and patient satisfaction scores. We performed binary logistic regression analysis. Each variable was tested first at the univariate level; those with significance ( $P < .10$ ) were included in a multivariate model.

**RESULTS:** At the end of NBT, 62.5% of the patients (217/347) reported reduced symptoms, and 40.2% of the patients (41/102) reported a reduction of at least 1 point on the PAC-QoL score. The mean PAC-QoL scores before and after NBT were 2.42 and 1.41, respectively ( $P = .001$ ). Multivariate analysis demonstrated that increasing age (odds ratio [OR], 1.71; 95% confidence interval [CI], 1.02–2.87;  $P = .042$ ), greater number of sessions (OR, 4.14; 95% CI, 2.09–8.20;  $P < .001$ ), and non-irrigation (OR, 4.39; 95% CI, 1.89–10.19;  $P = .001$ ) were independent predictors of patient satisfaction.

**CONCLUSIONS:** Data collected immediately after patients with chronic constipation received NBT indicate that it is an effective treatment for most patients. Older patients with dyssynergic defecation benefit most from at least 4 sessions.

*Keywords:* Biofeedback; Nurse-led; Constipation; Outcomes.

Chronic constipation is defined by the Rome III criteria as the presence of at least 2 symptoms for a minimum of 6 months in at least one-fourth of bowel movements. This includes a defecation frequency of less than 3 times a week, prolonged straining, passage of hard lumpy stools, incomplete emptying, sense of anal blockage, and manual digitation of the perineum including vaginal digitation to aid defecation.<sup>1</sup> Most people experience constipation at some stage in their life, but between 2% and 30% of patients endure persistent or episodic symptoms.<sup>2</sup> Functional constipation is the most common, accounting for 75% of all cases, and is diagnosed once all secondary causes for constipation have been excluded. It can be divided into 4 categories including impaired

colonic propulsion, pelvic floor dysfunction (PFD), a combination of the 2 problems, and normal transit constipation.<sup>3</sup> PFD can itself be functional or a result of a mechanical defect.<sup>4</sup> Examples include pelvic floor dyssynergia known alternatively as anismus, megarectum disorders, rectocele, and intussusception.

*Abbreviations used in this paper:* CI, confidence interval; NBT, nurse-led bowel training; OR, odds ratio; PAC-QoL, Patient Assessment of Constipation Quality of Life; PFD, pelvic floor dysfunction.

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Chronic constipation is defined by persistence of symptoms for more than 6 months.<sup>1</sup> Many treatments are available, although these are seldom curative in the majority of patients. Lifestyle changes such as increasing liquid intake,<sup>5,6</sup> reducing non-soluble fiber foods, and regular exercise are offered first. If these fail, simple laxatives or suppositories may be used. In the United Kingdom when these fail, patients may be offered prucalopride,<sup>7</sup> a prokinetic selective 5-hydroxytryptamine 4 receptor agonist. Between 30% and 39% of patients will fail medical treatment. These may be offered biofeedback.<sup>8-10</sup>

Biofeedback is an individually tailored therapy with many interventions. It aims to improve the physiological process of defecation by means of operant conditioning through trial and error learning.<sup>11</sup> Typically it is a nurse-led service offered within secondary and tertiary care.<sup>12</sup> Nurse-led bowel training (NBT) uses many of the principles of biofeedback but does not involve direct recordings of anal pressures or rectal sensitivity during sessions.

A recent Cochrane review investigated the effectiveness of biofeedback for constipation.<sup>12</sup> It suggested there was insufficient evidence to support its use for constipation in adults and called for more clinical trials. We aimed to assess the effectiveness of the NBT service for constipation at our institution, with a view of benchmarking it against other centers.

## Methods

### *Nurse-led Bowel Training Intervention*

NBT has been offered at St Mark's Hospital since 1990. The St Mark's bowel retraining unit comprises 7 therapists. These include 5 specialist nurses, a clinical psychologist, and a pelvic floor physiotherapist. New referrals are discussed in a weekly pelvic floor multidisciplinary team meeting that includes a pelvic floor surgeon, a gastroenterologist, a radiologist, and 2 gastrointestinal physiologists. Many patients exhibit chronic bowel symptoms and are referred from secondary care where they have already failed behavioral and medical therapies.

The unit takes a holistic approach to NBT with an individualized package of care that commences with a comprehensive bowel assessment. This evaluation encompasses the patient's symptoms, concerns, and anxieties. Each session may incorporate patient education, dietary advice, pelvic and abdominal muscle retraining, behavioral therapy relating to toileting, and psychological support. Results from defecating proctography, anorectal manometry, and colonic transit studies are used to tailor therapy when available. In those with slow transit constipation, therapies are aimed at normalizing colonic transit through cessation of oral laxatives, increasing soluble fiber intake, decreasing insoluble fibers, and establishing a normal bowel habit through behavioral

toileting and on-toilet abdominal exercises. Patients with dyssynergic defecation are taught pelvic floor relaxation techniques. This approach is standardized for all patients undergoing NBT. Patients are seen for up to 5 sessions at an average interval of 6–8 weeks, usually with the same therapist. The initial appointment is for approximately 60 minutes, with subsequent follow-up appointments of 30- to 40-minute duration.

A prospectively maintained database of patients undergoing NBT for chronic constipation between January 2011 and December 2013 was reviewed retrospectively. Chronic functional constipation as defined by Rome III was confirmed in all patients by using self-reported symptoms, radiologic studies, and anorectal manometry. Those with secondary causes of constipation including constipation predominant irritable bowel syndrome were excluded (presence of loose stools except when on laxatives and abdominal pain). The following variables were recorded: age, gender, type of constipation, use of transanal rectal irrigation, enema use, prucalopride use, number of laxatives before NBT, perineal digitation (which included intra-anal, perianal, vaginal digitation, and perineal splinting), parity, history of mental health problems, and history of sexual abuse.

Patients with evacuatory dysfunction, confirmed on anorectal manometry (negative rectoanal inhibitory reflex or increased evacuatory opening pressures) and proctography (failure to relax the pelvic floor), or significant intussusception or rectoceles (at least 50% contrast trapping) confirmed on proctography were categorized into PFD. Patients were categorized into slow transit constipation if delayed transit was confirmed on a standardized transit study by using the 3 radiopaque markers technique. Where data were not available, patients were categorized into "unknown." Patient quality of life was recorded before and after NBT by using the Patient Assessment of Constipation Quality of Life questionnaire (PAC-QoL).<sup>13</sup> A change of 1 point or more was considered significant clinically. Patient satisfaction was recorded immediately at treatment completion by using the specifically designed and validated St Mark's Biofeedback satisfaction scale. The scale asked patients to rank their NBT response as cured, improved a lot, improved a little, the same, or worse.

### *Statistical Analysis*

Continuous variables were expressed as mean  $\pm$  standard deviation for parametric distribution, or median and range for non-parametric distribution. The  $\chi^2$  and Kruskal-Wallis tests were used to assess statistical significance between groups. Binary logistic regression analyses were carried out to determine which variables were predictive of changes in patient satisfaction and PAC-QoL score. These were assessed first by univariate analysis. Those that demonstrated a statistical significance of  $P < .10$  were included in a multivariate model. For this, a  $P$  value  $< .05$  was considered statistically

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