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Abstract

Aims and objectives: To investigate patients' bowel symptom experiences and self-care strategies following sphincter-saving surgery for rectal cancer and the relationship between bowel symptom experiences and the self-care strategies used.

Background: Earlier diagnosis of rectal cancer allows for less invasive surgical treatments such as sphincter-saving procedures to be performed. Although a permanent stoma is generally not required, patients experience changes in bowel function following this surgery. However, limited research exists on patients' bowel symptom experiences and the self-care strategies used to manage symptoms following sphincter-saving surgery of rectal cancer.

Design: Quantitative descriptive correlational.

Methods: A convenience sample of 143 patients aged 30 to over 70 years was used. Data were collected (April 2010-December 2010) using the Illness Perception Questionnaires, the Difficulties of Life Scale and a researcher developed Self-care Strategy Measure. The research was underpinned by the Symptom Management Theory.

Findings: Relating to the four most effective self-care strategies used respondents reporting more bowel symptom were more likely to use the self-care strategy proximity/knowing the location of a toilet at all times. Females, respondents with high timeline cyclical scores and respondents with high physiological responses scores were more likely to use protective clothing. Respondents reporting more bowel symptom and with high social responses scores were more likely to use bowel medication. Females were more likely to wear incontinence pads.

Conclusion: This research provides insights into the daily bowel symptom experiences of patients following sphincter-saving surgery for rectal cancer. It demonstrates the range of self-care strategies that individuals use to manage their bowel symptoms and the self-care-strategies that were most effective for them.

Relevance to clinical practice: Patients should be encouraged to report on-going bowel problems following sphincter-saving surgery for rectal cancer. Supportive care for patients should be comprehensive and tailored to meet individual needs.

Key Words: Colo-rectal cancer, sphincter-saving surgery, bowel symptoms, self-care strategies, Symptom Management Theory.

INTRODUCTION

Carcinomas of the colon and rectum are amongst the leading causes of morbidity and mortality globally (Jemal *et al.* 2011). The latest international evidence shows that the incidence of colo-rectal cancer is higher in males than in females (Jemal *et al.* 2011). In Ireland, a total of 2,270 new cases of colo-rectal were diagnosed between 2007 and 2009 (The National Cancer Registry Ireland: NCRI, 2011). This report showed that between the years 2007-2009, the annual average number diagnosed with rectal cancer was 399 for males and 196 for females (NCRI, 2011). It is now known that early surgical intervention is having a considerable effect on the number of patients surviving colo-rectal cancer in Ireland (NicAmhlaoidh *et al.* 2004). Globally, a move to minimally invasive approaches in the surgical management of colo-rectal cancer has taken place over the last two decades (Holder-Murray & Dozols 2011). Sphincter-saving surgery is the preferred treatment of choice when possible for rectal cancer (Inoue & Kusunoki, 2010). However, due to a reduction in rectal capacity following this surgery, patients experience unpleasant bowel symptoms such as faecal incontinence, urgency and bowel irregularity postoperatively (Desnoo & Faithfull 2006, Guren *et al.* 2005, Nikoletti *et al.* 2008, Landers *et al.* 2012a). Yet, a lack of research exists on patients' bowel symptom experiences and the self-care strategies used to manage bowel symptoms following sphincter-saving surgery for rectal cancer and the relationship between patients' bowel symptom experiences and the self-care strategies used.

BACKGROUND

Drawing on the Symptom Management Theory (Larson, *et al.* 1994, Dodd *et al.* 2001, Humphreys *et al.* 2008) patients' symptom experiences can be understood in terms of symptom perception, symptom evaluation and symptom response (Larson, *et al.* 1994, Dodd *et al.* 2001, Humphreys *et al.* 2008 (Figure 1). Symptom perception is understood as the person's awareness of symptom occurrence response (Larson, *et al.* 1994, Dodd *et al.* 2001, Humphreys *et al.* 2008) in terms of identity (i.e. identifying the type of symptom) and its frequency. Symptom evaluation is viewed as the judgement made by patients about the significance of the symptom taking account of the cause, severity, effects, temporality and treatability (Larson, *et al.* 1994, Dodd *et al.* 2001, Humphreys *et al.* 2008). Symptom response is concerned with the psychological, social and physiological responses to the symptom experienced (Larson, *et al.* 1994, Dodd *et al.* 2001, Humphreys *et al.* 2008).

The types of symptoms experienced by patients following sphincter-saving surgery for rectal cancer have been reported by previous researchers (Camilleri-Brennan & Steele 2001, Grumann *et al.* 2001, Schmidt *et al.* 2005). These include faecal incontinence, urgency and bowel irregularity among others. Qualitative perspectives on patients' perceptions of bowel symptoms illustrate the subjective nature of their awareness of symptoms such as: constant 'discomfort in anal area' and soreness during bowel motions (Desnoo and Faithful 2006, Landers *et al.* 2012a). Symptom occurrence can vary among patients, for example, diarrhoea may be most problematic for some whereas constipation may be most problematic for others (Landers *et al.* 2012a).

Studies relating to evaluation revealed that patients were uncertain about the cause of their bowel symptoms following sphincter-saving surgery and wondered if their bowel symptoms were a normal consequence their surgery (Beaver *et al.* 2010, Landers *et al*. 2012a). There is also evidence to support the view that some patients perceive their bowel symptoms to be severe (Landers *et al.* 2012a), and may be worried that these may be associated with recurrent disease (Desnoo & Faithfull 2006). Patients also make judgements about the effects of colo-rectal surgery on their lives. Hubbard *et al*. (2010) found that patients within a year of diagnosis had difficulty in carrying out their daily activities following surgery for colo-rectal cancer.

The temporal nature (i.e. duration/cyclical nature) of bowel symptom following sphincter-saving surgery especially diarrhoea, has been described by patients as unpredictable and uncontrollable which can leave them experiencing a lack of personal control (Desnoo & Faithfull, 2006, Beaver *et al.* 2010. In addition to symptom evaluations on cause, severity and temporality, these studies showed that patients make judgements about their ability to achieve control and if their symptoms can be cured (Hubbard, *et al.* 2010, Mizuno *et al.* 2007, Kidd *et al.* 2009, Beaver *et al.* 2010).

Symptom response is concerned with the psychological, social and physiological responses to the symptoms experienced (Larson, *et al.* 1994, Dodd *et al.* 2001, Humphreys *et al.* 2008). For each of these respective response categories, patients with bowel symptoms following colo-rectal surgery have reported experiencing fear and embarrassment, and needing to prepare for social events such as being acquainted with the proximity of toilets when away from home (Desnoo and Faithfull 2006,

Simpson & Whyte, 2006). Physiologically, patients have been found to experience fatigue six months following treatment for colo-rectal cancer (Mizuno *et al.* 2007). Previous studies measuring quality of life following sphincter-saving surgery Grumann *et al.* 2001, Schmidt *et al.* 2005, Vironen et al. 2006) provide insights into the specific bowel symptoms experienced at a given point in time. However, this research offers limited insight into the day to day bowel symptom experiences of patients. To date there has been no comprehensive effort to obtain an understanding of patients' bowel symptom experiences in their day to day lives. Although qualitative studies offer some insights (Desnoo & Faithfull 2006, Mizuno *et al.* 2007, Kidd *et al.* 2009, Beaver *et al.* 2010, Hubbard *et al*. 2010), samples sizes were small and few were exclusive to sphincter-saving surgery. Furthermore, there has been little attempt to examine symptom experience from a theoretical perspective such as using the Symptom Management Theory. This theory focuses on symptom perception, evaluation and responses and the relationship between these components Theory (Larson, *et al.* 1994, Dodd *et al.* 2001, Humphreys *et al.* 2008).

Given the unpredictable and embarrassing nature of patients' bowel symptom experiences following sphincter-saving surgery for rectal cancer (Desnoo & Faithfull 2006, Landers *et al.* 2012a), it can be expected that patients rely on a number of self-care strategies to manage their symptoms. To date, there has been little attempt to investigate the self-care strategies of patients following sphincter-saving surgery for rectal cancer. In addition no framework was identified to guide a presentation of the range of self-care strategies used. Based on findings on bowel symptom management from studies relating to patients diagnosed with chronic bowel problems (Jarret et al. 2001, Annels & Koch 2002, Collings & Norton 2004, Bliss et al. 2005 & Hall 2007)

other than following surgery for rectal cancer, the following self-care categories were adopted: (1) functional self-care strategies (e.g. medication), (2) activity related self-care strategies (e.g. proximity/knowing the location of a toilet and (3) alternative self-care strategies (e.g. complementary therapies) (Landers *et al.* 2011). It could be expected that self-care strategies relate to the bowel symptoms experienced by patients. However, little is known about these relationships to date.

METHODS

Aims

To investigate patients' bowel symptom experiences and self- care strategies following sphincter-saving surgery for rectal cancer and the relationship between bowel symptom experiences and the self-care strategies used.

Design

A quantitative correlational design was used.

Sample

A convenience sample of patients (male and female) diagnosed with rectal cancer, aged 35 to 80 years who were between six weeks and forty months following sphincter-saving surgery for rectal cancer were invited to participate in the study. Respondents were omitted from the study if they had a stoma in situ, were undergoing palliative care, or had experienced a return of their cancer. An a priori sample size calculation specified that a sample of 85 patients was necessary to detect a moderate correlation (correlation = 0.3), with a power of 80% and a level of significance of 0.05.

Data Collection

Data were collected (April-December 2010) using a multi-itemed questionnaire focusing firstly on demographic data and characteristics relating to treatment for rectal cancer (time since surgery, perception of current physical condition and adjunct therapies). Patients' bowel symptom experiences were measured using modified versions of two Likert subscales from the Illness Perception Questionnaire (IPQ) (Weinman *et al.* 1996), four Likert subscales from the Revised illness Perception Questionnaire (IPQ-R) (Moss-Morris *et al.* 2002) and the Difficulties of Life Scale ordinal scale (Tanaka *et al.* 2003).

An adapted version of the identity scale (Weinman *et al.* 1996) was used to measure symptom identity. This scale assessed the frequency of bowel symptoms experienced postoperatively. Respondents rate frequency of symptoms "from all of the time to never', according to how often each symptom is experienced" (Weinman *et al*, 1996, p.432). However, responses only allow for a score based on whether patients experience the symptom or not (Weinman *et al*, 1996). In this regard, a score of one

was allocated when patients experienced the symptom (whether it was experienced all the time, frequently, or occasionally (Weinman *et al*, 1996).

The IPQ also investigated patients' evaluation of the causes of their bowel symptoms in terms of internal causes (5 items) and external causes (5 items). Three scales from the IPQ-R (Moss-Morris *et al.* 2002) were adapted to measure symptom evaluation. The consequence subscale (6 items) measured respondents' evaluation of the severity (I item) and the effects of bowel symptoms on their daily lives (5 items). The timeline subscales consisted of 10 items and were a measure of patients' evaluation of bowel symptom duration (acute/chronic subscale: 6 items) and their evaluation of variability in bowel symptoms occurrence (cyclical subscale, 4 items). The control subscales measured symptom treatability and consisted of 11 items which focused on patients' evaluation of their own ability to control their symptoms (personal control, 6 items) and their views on how effective treatment was in managing symptoms (treatment control, 5 items).

In addition, the emotional representation subscale measured patients' psychological responses to the bowel symptoms (7 items). The scores across the subscales (causes, consequences, timeline, treatment control and emotional representation) ranged from strongly disagree (1) to strongly agree (5). Item scores for all subscales were obtained by adding up all the items "and dividing by the number of items" (Weinman *et al*. p.432). High scores on the these subscales (consequences, timeline, control and emotional representation) indicated that patients strongly believed that bowel symptoms had consequences on their daily lives, that bowel symptoms were acute/chronic and/or cyclical in nature, that they had personal/treatment control over

their bowel symptoms and that their bowel symptoms resulted in strong emotional responses for patients, respectively.

The Difficulties of life Scale (an 18–item ordinal scale, Tanaka et al. (2003) consists of three subscales: (1) difficulties of life in society, (2) difficulties concerned with bowel movement and (3) decline of vitality and vigour. However, for clarity and ease of readability, the Likert format adopted in the Illness Perception Questionnaires was also used for the Difficulties of Life Scales. This meant that scores across the three subscales ranged from strongly disagree (1) to strongly agree (5). The difficulties of life in society scale (Tanaka et al. 2003) measured the social responses to bowel symptoms experiences (9 items). The difficulties concerned with bowel movement subscale (Tanaka et al. 2003) measured the physiological responses to the bowel symptoms experiences (7 items). The decline of vitality or vigour subscale (Tanaka et al. 2003) measured additional physical responses to bowel symptom experiences (2 items). High scores indicated that bowel symptoms resulted in more negative social responses, more difficulties relating to bowel movement and greater deterioration in vitality and vigour, respectively.

Self-care strategies used were measured using a researcher-developed (16 item) dichotomous measure. Scale items emerged from a review of the literature on the self-care strategies patients use to manage bowel symptoms. Self-care strategies used were grouped under the following categories functional strategies (9 items) social activity-related strategies (4 items) and alternative strategies (3 items). For the strategies used, a score of 0 was allocated if the person did not use a particular strategy and a score of 1 if they used the strategy. The average effectiveness for each

strategy was also calculated. The pilot study was carried out using a sample of four patients who met the study criteria. While the questionnaire proved to be feasible and relevant to the study group, minor modifications were made, based on patients' preferences.

Ethical considerations

Ethical approval was obtained from the relevant Research Ethical Boards. Disparities in requirements across ethical boards resulted in some challenges and delays in gaining access to patients; these are reported elsewhere (Landers *et al.* 2012b). Communication to participants included a brief explanation of the study, a consent form and the research questionnaire. Participants were given a guarantee that their anonymity and confidentiality would be maintained.

Reliability and validity

Relating to the IPQ, the Cronbach's alpha for internal and external causes was 0.61 and 0.48 respectively. The Cronbach's alpha for the IPQ-R scales (consequences, timeline (acute/chronic, cyclical), and treatability (treatment, personal control) and emotional responses ranged from 0.73-0.89 indicating good reliability across scales. The Cronbach's alpha for the Difficulties of life Scale ranged from 0.83-0.95 indicating very good reliability across scales. A panel of eight experts judged the content of the questionnaire package to be relevant.

Data analysis

All statistical analyses were performed using SPSS (version 18) and STATA (version 9.2). Patients were excluded from the analysis if >30% of data were missing from the questionnaire. Continuous variables were described using the mean and standard deviation (sd) or in the case of skewed data, the median and interquartile range (IQR). Categorical variables were described using both numbers and percentages.

Multiple logistic regressions were used to measure the relationship between the independent variables and the use of specific self-care strategies. As the number of self-care strategies (n=16) was large relative to sample size, only self-care strategies with a mean level of effectiveness of at least 3.5 were investigated. Thus, only 4 of the 16 self-care strategies were included in this analysis (namely proximity/knowing the location of a toilet at all times, wore protective clothing, took bowel medication and wore incontinence pads).

As the number of independent variables was large relative to the sample size, preliminary analyses were performed to reduce the number of independent variables included in the final model. For each dependent variable, three initial logistic regression analyses were performed. The first regression included the independent variables associated with demographic characteristics and characteristics related to treatment for rectal cancer, the second included the IPQ and IPQ-R subscales and the third included the Difficulties of Life Subscales. Only independent variables with a p-value <0.1 in the preliminary analyses were selected for inclusion in the final model.

Standard methods were used to test model assumptions regarding regression analyses. Where the assumption of linearity was violated, the continuous independent variable

was replaced by a categorical variable. This involved splitting the continuous variable into three categories (tertiles) with approximately equal numbers of patients in each category. The variance inflation factor (VIF) was used to test for the degree of collinearity between the independent variables. All tests were two-sided and statistical significance was set at $p<0.05$.

RESULTS

Data were gleaned from 143 patients across 10 clinical sites involving 5 geographical areas in Ireland. A total of 326 participants were contacted; 199 returned questionnaires. Prior to the identification of missing data, a total of 45 patients were excluded as they still had a stoma in position, which became apparent on examination of returned questionnaires. This resulted in a sample of 154 patients. An analysis of missing data was conducted within SPSS and data were deemed missing if >30% of data were absent from a questionnaire. Therefore, to be included a respondent should have answered at least 15 of 22 questions. From this analysis, a further 11 participants (6 males and 5 females) were removed due to excessive missing data.

Table 1 presents the demographic details of the respondents. They ranged in age from 30 to 70 years and over. The majority of respondents were male (n=88, 62%), aged 50 years or over (n=59, 41%) and were married (n=106, 74%). A little over half had retired (n=76, 53%) and most respondents had attained secondary level education (n=58, 41%) or third level education (n=39, 27%).

Table 2 presents the characteristics relating to treatment, including length of time since surgery, physical condition and adjunct therapies. Self-evaluation of physical condition was assessed using a single item ordinal scale ranging from very poor to good (Tanaka *et al*. 2003). Most respondents (n=98, 69%) perceived their current physical condition to be good.

Symptom Experiences

Symptom experiences were considered with reference to bowel symptom perception (awareness of symptom occurrence), bowel symptom evaluation and bowel symptom responses. Relating to bowel symptom perception, respondents experienced an average of four bowel symptoms following sphincter- saving surgery (Mean 4.06, SD 1.78). The majority of respondents (n=133, 93%) experienced frequent bowel movement, pain in the ano-rectal area (n=130, 91%), faecal incontinence (n=127, 89%) and bowel urgency (n=125, 87%). A similar number of respondents (n=123, 86%) experienced irregular bowel movement, diarrhoea and constipation. Figure 2 shows the frequency of patients' bowel symptoms experiences. Findings also showed that bowel symptoms were more common among respondents who previously had an ileostomy n=55 ($P<0.001$) and those who had undergone radiotherapy n=64 ($P<0.001$). Respondents who were 18 months and over following surgery (n=54, 38%) reported more bowel symptoms. Findings also indicted that a small number of respiondents (n=27, 18%) experienced bowel symptoms beyond the two year postoperative period.

Relating to bowel symptom evaluations, findings indicated that 50% (n=69) of respondents agreed that surgery caused their bowel symptoms followed by 37% (n=51) of respondents who believed that their bowel symptoms occurred by chance, 36% (n=48) of respondents who believed that diet played a role (n=48, 36%) and 24% (n=32) who agreed that stress was a factor in causing their bowel symptoms. Findings relating to consequences suggest that 50% or more of respondents did not evaluate their bowel symptoms to be serious (n=69, 50%) or as having major life consequences (n=76, 55%). A higher number of respondents were in agreement that bowel

symptoms would last a long time (n=62, 45%) would be permanent (n=61, 45%) compared to those who disagreed with these items and 55 respondents (41%) expected to have symptoms for the rest of their lives. However, a higher proportion of respondents (n=79, 58%) reported an expectation of bowel symptoms improving over time. In addition, just over 50% (n=71, 51%) agreed that they went through cycles in which their bowel symptoms got better or worse.

Relating to bowel symptom responses, findings indicate that relatively similar numbers of respondents disagreed or were in agreement in terms of embarrassment, (n=66, 47% vs. n=59, 42%), not being worried (n=58, 41% vs. n=63, 45%) and feeling anxious (n=62, 44% vs. n=59, 41%) about their bowel symptoms. Overall, findings indicate that over 50% of respondents were in agreement that they did not feel physically comfortable if there was not a toilet nearby (n=76, 54%) and 67 (47%) agreed that it was difficult for them to distinguish between gas and bowel movement In terms of other physiological responses over 50% disagreed that their sleep was disturbed because of altered bowel pattern (n=78, 56%) and that they felt the need to evacuate but no excretion occurred (n=73, 52%).

Self-care strategies used

Respondents used a range of self-care strategies. Within the functional category, exercise was used by most respondents (n=101, 72%). The next most commonly used strategy related to social activity, 72% (n=99) respondents needed to know the proximity/knowing the location of a toilet at all times. Almost half this number (n=47,35%) had to plan social events.

Within the alternative category, trial and error was the most commonly used strategy. The least number of respondents choose complementary therapies (n=14, 4%). The

four self-care strategies reported to be the most effective were proximity/knowing the location of a toilet at all times, bowel medication, protective clothing and incontinence pads (Table 3).

Proximity/ Knowing the location of a toilet at all times

As highlighted earlier, only independent variables with a p-value <0.1 in the preliminary analyses were selected for inclusion in the final model. These included: third level education completed; symptom identity; timeline acute /chronic; treatment control; social responses and physiological responses. However, two demographic variables (relationship status and employment status), and one variable relating to characteristics relating to treatment (adjunct therapy) were not included in this analysis due to the lack of variation in these data.

In the final model (Table 4), bowel symptom identity, timeline acute/chronic and treatment control were significantly associated with the self-care strategy proximity/knowing the location of a toilet at all times. Respondents with a high bowel symptom identity score (i.e. more bowel symptoms) were more likely to use this self-care strategy (OR=1.48, 95% CI: 1.04 to 2.11). However, respondents with a high timeline acute/chronic score were less likely to use this self-care strategy (OR=0.34, 95% CI: 0.16 to 0.73). Similarly, respondents with a high treatment control score were less likely to use this self-care strategy (OR=0.42, 95% CI: 0.18 to 0.96). While not significant, respondents in the higher education category (P=0.057) and those with higher physiological responses scores (P=0.076) tended to use this self-care strategy.

Wore protective clothing

The independent variables gender, timeline cyclical and physiological responses were significantly associated with the use of protective clothing as a self-care strategy (Table 4). Women were more than seven times as likely to use this self-care strategy compared to men (OR=7.13, 95% CI: 2.56 to 19.89). Respondents with a high timeline cyclical score were more likely to use this self-care strategy (OR=1.73, 95% CI: 1.03 to 2.92). It was also found that respondents with a high physiological response score were almost 12 times as likely to use this self-care strategy compared to those with a low physiological response score (OR=11.91, 95% CI: 3.30 to 42.96).

Took bowel medication

Findings highlighted that the independent variables bowel symptom identity, external causes and social responses were statistically significantly associated with the self-care strategy took bowel medication (Table 4). Patients with a high bowel symptom identity score were more likely to use this self-care strategy (OR=1.40, 95% CI: 1.07 to 1.83). However, respondents with higher external causes scores were less likely to use this self-care strategy (OR=0.26, 95% CI: 0.09 to 0.79).Finally, respondents with high social responses society scores were more likely to use this self-care strategy (OR=1.87, 95% CI: 1.11 to 3.14).

Wore incontinence pads

Lastly, gender and causes-internal were statistically significantly associated with wore incontinence pads as a self-care strategy (Table 4). Women were more than three times as likely to use this self-care strategy compared to men (OR=3.55, 95% CI: 1.48

to 8.52). However, patients with higher internal causes scores were less likely to use this self-care strategy (OR=0.32, 95% CI: 0.16 to 0.63).

DISCUSSION

Few studies to date have investigated the relationship between patients' bowel symptom experiences and self-care strategies following sphincter-saving surgery for rectal cancer. Consistent with earlier research (Desnoo & Faithfull 2006, Nikoletti *et al.* 2008), this study showed that bowel medication was a common strategy used. Additionally significant relationships were found between bowel symptom identity (P=0.013), external causes (P=0.042) social responses (P=0.018) and use of bowel medication. A possible explanation for this finding might be that respondents viewed bowel medication as a means of curing a number of related bowel symptoms such as frequency, urgency and faecal incontinence as opposed to just managing them. Although there was a significant relationship between external causes and the use of bowel medication, this result needs to be interpreted with caution due to the low reliability score achieved for this subscale. It is possible that the use of bowel medication lead to a greater sense of confidence when out socially. In light of the improper use of bowel medications, it is essential that patients are educated on their potential complications (Nikoletti *et al*. 2008).

Within the social-related self-care strategy category, the majority of respondents needed to know the location of a toilet at all times. It was noted that this strategy was used by more males than females. Regarding the relationship between the use of proximity/knowing the location of a toilet at all times, significant relationships were found between bowel symptom identity (P=0.029), timeline-acute/chronic (P=0.005)

and treatment control (P=0.039). Given the number and type of bowel symptoms reported and the acute/ chronic nature of these symptoms, it was evident that the proximity of a toilet, or knowing its location was an important self- care strategy for patients. In order for respondents to maintain control over their bowel symptoms, it was not surprising that there was a significant relationship between treatment control and proximity/knowing the location of a toilet at all times. Similarly, the position and accessibility of a toilet was also a major issue for women who had difficulty preventing or controlling chronic faecal incontinence in Peden-McAlpine *et al.'s* (2008) study.

Other social activity-related strategies used by respondents, included the wearing of protective clothing and the use of incontinence pads. A significant relationship was found between gender (P<0.001), timeline-cyclical (P=0.038), physiological responses (P=0.001) and the wearing of protective clothing as a self-care strategy. To the best of the researcher's knowledge, the current study is the first to measure the relationship between gender and the number of self-care strategies used following sphincter-saving surgery for rectal cancer. Thus, this research is important as it advances current knowledge specific to managing bowel symptoms following this surgery.

Findings showed a significant relationship between timeline-cyclical and the wearing of protective clothing. In addition, women were more than seven times likely to wear protective clothing as a self-care strategy compared to men. It could be argued that the use of protective clothing is considered more acceptable for women than for men. Women are traditionally more accustomed to wearing protective clothing for example, following childbirth. Similarly, Collings & Norton (2004) reported that women experiencing chronic faecal incontinence took a spare set of clothes with them when out socially.

In keeping with the unpredictable nature of bowel symptoms, a significant relationship was found between physiological responses to bowel symptoms and the wearing of protective clothing as a self-care strategy. Dodd *et al.* (2001) highlighted earlier that physiological responses to symptoms can include a person's response to a perceived threat associated with alterations in functioning (e.g. faecal soiling or feeling physical uncomfortable if not near a toilet). The need to wear protective clothing can be explained by respondents' fear of faecal soiling, particularly when out socially.

A significant relationship was found between gender and the use of incontinence pads (P=0.005). Consistent with qualitative findings (Desnoo & Faithfull 2006, Simpson & Whyte 2006, Nikoletti *et al.* 2008, Landers *et al.* 2012a) unpredictable bowel movement necessitated the wearing of incontinence pads. Nikoletti *et al*. (2008) reported that 20% of their sample (n=101) occasionally needed to wear incontinence pads to manage incontinence. A significant relationship was found between internal causes and the use of incontinence pads as a self-care strategy (P=0.001). However, this finding needs to be interpreted with caution due to the low reliability score of this subscale (Cronbach alpha=0.61).

Findings showed that women were also more than three times as likely to use this self-care strategy compared to men. Consistent with Bliss *et al.'s* (2005) study, more women than men used incontinence pads to manage faecal incontinence. As already highlighted, women are more familiar with wearing pads during menstruation and following child birth. Another possible explanation for this finding might be that women may opt for solution based self-care strategies such as the wearing of incontinence pads and protective clothing. Whereas men choose solution based strategies such as knowing /proximity of a toilet at all times or took bowel medication. These findings are important because they offer insights into gender differences in the selection of self-care strategies. Supportive care for patients following sphincter-saving surgery should be tailored to take account of both gender and individual preferences.

Study limitations

In the current study an established instrument was not employed to assess the self-care strategies used by patients to manage bowel symptoms. In this regard, qualitative research is required to obtain a clearer understanding of the dimensions of the construct self-care strategies. Notwithstanding the fact that a small convenience sample was used, the sample was representative of the total population of patients who underwent sphincter-saving surgery for rectal cancer. Longitudinal studies using larger samples are now necessary to assess patients' bowel symptom experiences at six months intervals for up to three years postoperatively.

CONCLUSION

Few studies to date have investigated patients' bowel symptom experiences and self-care strategies following sphincter-saving surgery for rectal cancer. The current study was necessary to provide a comprehensive understanding of patients' bowel symptom experiences and of the self-care strategies used to manage symptoms following sphincter-saving surgery for rectal cancer. In particular, it provided data on the range of self-care strategies that were effective for patients in managing their symptoms. The study was underpinned by the Symptom Management Theory which grounded the study in disciplinary nursing knowledge. Thus, this study advances conceptual and theoretical understandings since there has been little research to date examining bowel symptom experiences and self-care strategies from a theoretical perspective.

Prior to this investigation, there have been no attempts to examine the relationships between bowel symptom experiences and self-care strategies. Testing the relationships between the dimensions of the Symptom Management Theory and their components is an important feature of the study. To conclude, the researcher is confident that the findings from this study add to the development of nursing knowledge regarding patients' bowel symptom experiences and the self-care strategies following sphincter-saving surgery for rectal cancer..

RELEVANCE TO CLINICAL PRACTICE

Findings from this study demonstrated the importance of encouraging patients to report on-going alterations in bowel pattern following sphincter-saving surgery. An understanding of the daily bowel symptom experiences of patients is vital to the development of interventions tailored to meet patients' needs. The potential effectiveness of a range of self-care strategies to manage these symptoms (as identified in the current study) should also be explored with patients to help them chose strategies that are both practical and realistic in managing symptoms.

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Table 1. Demographic Characteristics (n=143).

Gender	
Male	88 (61.5)
Female	55 (38.5)
Age group (years)	
30-39	2 (1.4)
40-49	9 (6.3)
50-59	29 (20.3)
60-69	59 (41.3)
70+	44 (30.8)
Relationship status	
Single	14 (9.8)
Married/Living with Partner	106 (74.1)
Separated	4 (2.8)
Divorced	1 (0.7)
Widowed	18 (12.6)
Employment status	
Employed	41 (28.7)
Unemployed	8 (5.6)
Housewife /Househusband	18 (12.6)
Retired	76 (53.1)
Highest level of education completed	
None	2 (1.4)
Primary School	44 (30.8)
Secondary School	58 (40.6)
Third Level University/College	39 (27.3)

Table 2. Characteristics relating to treatment for rectal cancer (n=143)

	n (%)
Length of time since bowel surgery	
6 weeks-3 months	5 (3.5)
4-6 months	5 (3.5)
7-12 months	36 (25.2)
13-18 months	43 (30.1)
18+ months	54 (37.8)
Physical condition*	
Good	98 (69.0)
Fair	28 (19.7)
Moderate	11 (7.7)
Poor	4 (2.8)
Very poor	1 (0.7)
Adjunct Therapies	
Chemotherapy	
Currently receiving**	11 (7.9)
Received before operation**	44 (31.7)
Received after operation***	69 (49.3)
Radiotherapy	
Currently receiving***	2 (1.4)
Received before operation***	56 (40.0)
Received after operation***	6 (4.3)

*n=142; **n=139; ***n=140

Table 3 Effectiveness of self-care strategies used

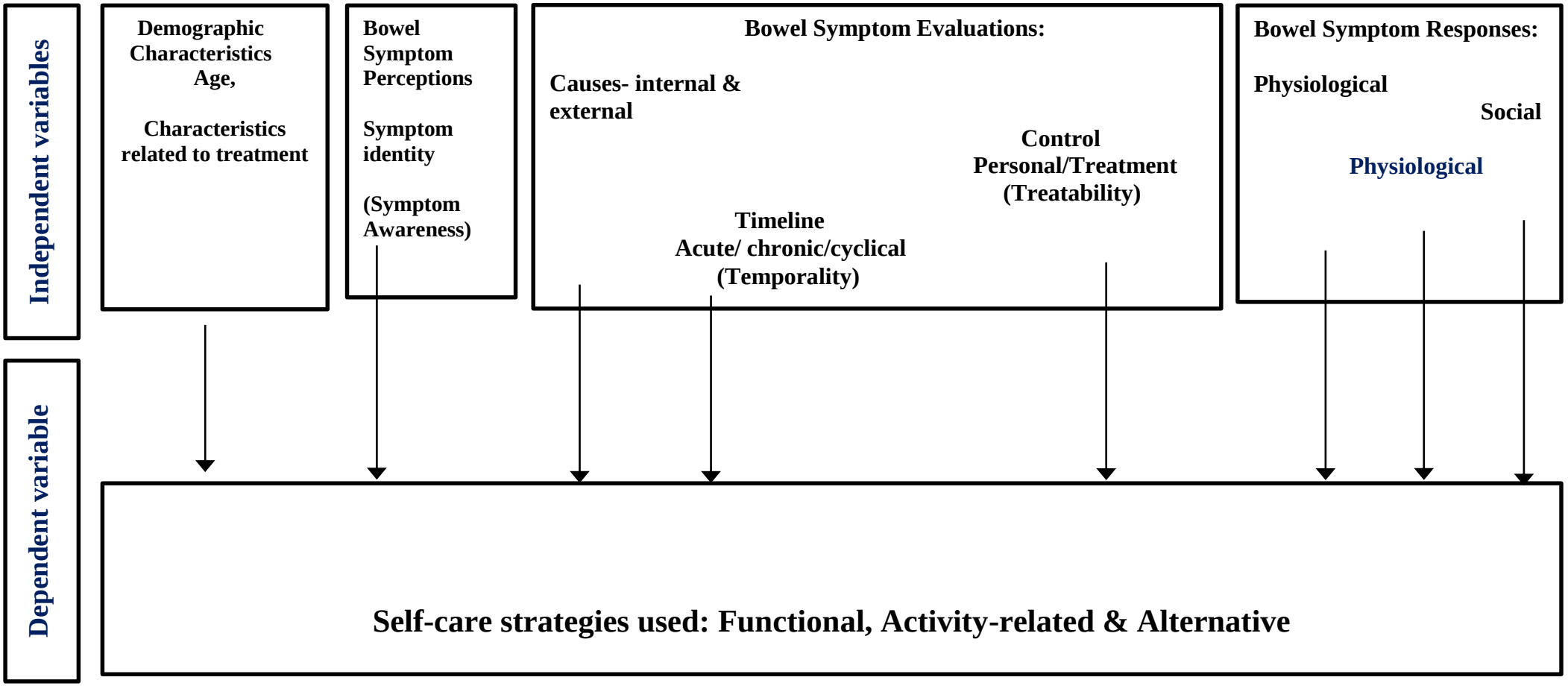
Strategy	Total number of responses	Level of relief achieved (%)					Mean (SD)
		No relief	A little	Some	Quite a bit	Complete relief	
Functional							
Took exercise	89	8	17	28	35	12	3.27 (1.13)
Took extra fluids	79	6	20	39	22	13	3.14 (1.08)
Took bowel medication	78	1	14	31	35	19	3.56 (1.00)
Avoided high fibre gas-forming foods	51	6	24	27	27	16	3.24 (1.16)
Increased fibre	62	13	19	26	31	11	3.08 (1.22)
Used skin protection (e.g. cream)	50	2	22	22	40	14	3.42 (1.05)
Took pain relieving medication	29	7	10	38	31	14	3.34 (1.08)
Changing meal times	15	0	7	67	13	13	3.33 (0.82)
Performed manual removal of faeces	19	16	16	16	32	21	3.26 (1.41)
Social Activity-Related							
Proximity/Knew the location of a toilet at all times	85	5	7	21	33	34	3.85 (1.12)
Wore protective clothing (e.g. underwear)	49	8	8	24	35	24	3.59 (1.19)
Wore incontinence pads	36	3	14	31	36	17	3.50 (1.03)
Planned social events (to prevent incontinence)	44	7	20	30	20	23	3.32 (1.23)
Alternative							
Used trial and error	65	9	12	35	28	15	3.28 (1.15)
Used spirituality (e.g. religion)	54	7	17	26	24	26	3.44 (1.25)
Used complimentary therapy	17	6	41	12	24	18	3.06 (1.30)

Table 4. Final multivariate logistic regression analyses for predictors of individual self-care strategies

Dependent variables	Independent variables	Odds ratio (95% CI)	p-value
Knowing the location of a toilet at all times[1]			
	Third level education completed (Reference = no)	4.15 (0.96 to 17.90)	0.057
	Identity	1.48 (1.04 to 2.11)	0.029
	Timeline acute/chronic	0.34 (0.16 to 0.73)	0.005
	Treatment control	0.42 (0.18 to 0.96)	0.039
	Difficulties of life in society	1.45 (0.65 to 3.24)	0.369
	Difficulties concerned with bowel movements	2.45 (0.91 to 6.62)	0.076
Wore protective clothing[2]			
	Gender (Reference = male)	7.13 (2.56 to 19.89)	<0.001
	Physical condition (Reference = good)	0.93 (0.34 to 2.53)	0.891
	Timeline cyclical	1.73 (1.03 to 2.92)	0.038
	Difficulties concerned with bowel movements (Reference = low score)		<0.001
	Medium score (2.5-3.3)	1.03 (0.31 to 3.41)	
	High score (3.4-5.0)	11.91 (3.30 to 42.96)	
Took bowel medication[3]			
	Physical condition (Reference = good)	1.23 (0.48 to 3.12)	0.670
	Identity	1.40 (1.07 to 1.83)	0.013
	Causes - external (Reference = low score)		0.042
	Medium score (2.3-2.6)	0.88 (0.34 to 2.27)	
	High score (2.7-4.0)	0.26 (0.09 to 0.79)	
	Difficulties of life in society	1.87 (1.11 to 3.14)	0.018
Wore incontinence pads[4]			
	Gender (Reference = male)	3.55 (1.48 to 8.52)	0.005
	Age group (Reference = 30-59 years)		0.218
	60-69	2.34 (0.79 to 6.90)	
	70+	2.54 (0.81 to 8.01)	
	Third level education completed (Reference = no)	1.24 (0.49 to 3.13)	0.649
	Causes - internal	0.32 (0.16 to 0.63)	0.001

[1] n=114, [2] n=128; [3] n=117; [4] n=130

Figure 1. Conceptual Framework based on concepts from the Symptom Management Theory: symptom awareness, cause, severity, effects, temporality and treatability (Humphrey *et al.* 2008), components from the Common-Sense Model of Self-Regulation (Leventhal et al. 1984, Leventhal & Diefenbach, 1991 & Leventhal *et al.* 2001) for the operationalisation of concepts.



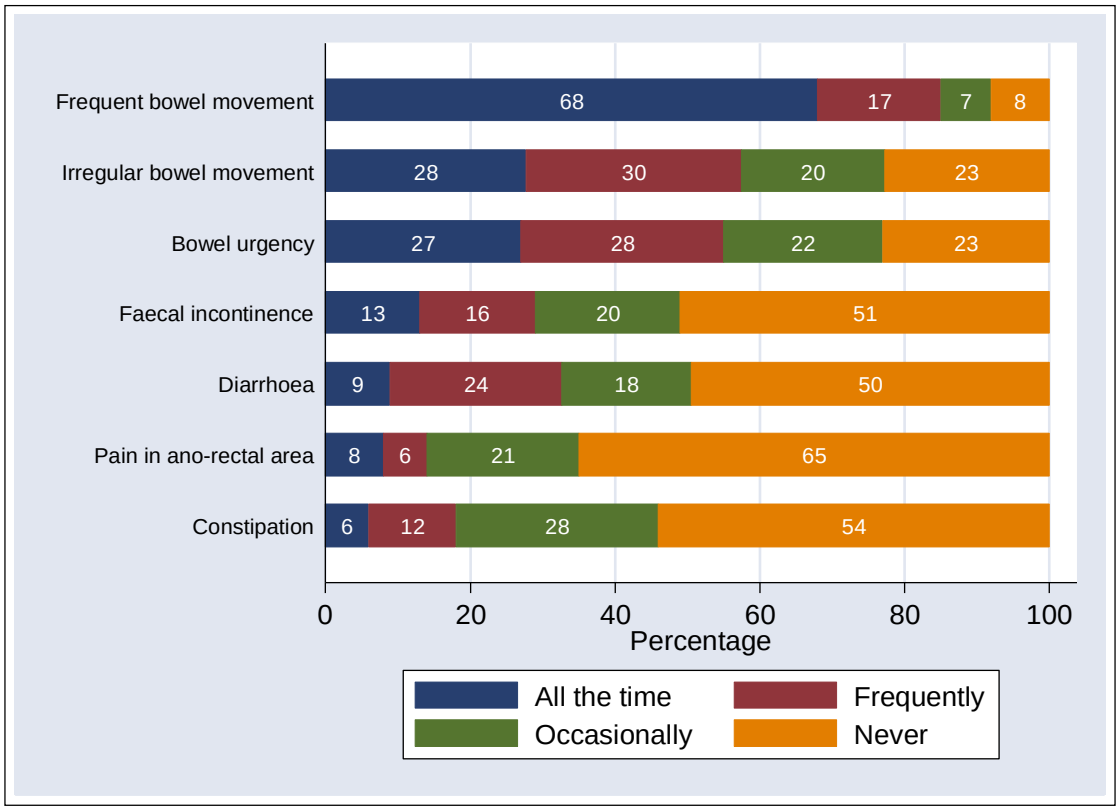


Figure 2 Stacked Bar chart describing findings relating to the frequency of bowel symptom experiences