

## ORIGINAL RESEARCH

# Faecal incontinence in rural and regional northern Queensland community-dwelling adults

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*Submitted: 4 March 2013; Revised: 8 May 2013; Accepted: 30 May 2013; Published: 22 November 2013*

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*Rural and Remote Health 13: 2563. (Online) 2013*

**Available: <http://www.rrh.org.au>**

## A B S T R A C T

**Introduction:** In Australia, faecal incontinence, the involuntary loss of liquid or solid stool with or without a person's awareness, has been reported in 8% of the South Australian and 11% of the urban New South Wales community-dwelling populations. Studies conducted in 2004 and 2005 reported faecal incontinence in more than 20% of colorectal and urogynaecological clinic patients at Townsville Hospital (a referral centre serving rural North Queensland). This prompted concern regarding the level of faecal incontinence in the community. The aim of this study was to investigate the prevalence of faecal incontinence in the North and Far North Queensland urban and rural communities.

**Methods:** The sample size was based on the New South Wales postal surveys (11% prevalence). Higher rates were expected in North/Far North Queensland, so prevalence there was estimated at 12.1% (confidence interval  $\pm 2\%$ , ie the true level to be between 10.1% and 14.1%). The sample for each of the Townsville, Cairns (in Far North Queensland) and rural/remote settings was calculated at 1022. The database for the present study was compiled using a systematic randomised process selecting two private names from each column on each page of the Cairns and Townsville White Pages® (Cairns: 1112 urban, 481 rural, 226 remote; Townsville: 1049 urban, 432 rural, 320 remote). The questionnaire covered personal demographics, health/risk factors, bowel habits, nutrition (fibre and fluid intake) and physical activity. Faecal incontinence was defined as accidental leakage of solid or liquid stool in the past 12 months that was not caused by a virus, medication or contaminated food. To improve the response rate a participation incentive of a chance to win a \$250 voucher or one of ten \$50 vouchers was offered in the initial mail-out. The initial survey was mailed out in July 2007; two follow-up surveys were mailed out to non-responders in September 2007 and January 2008. One hundred randomly selected non-responders were telephoned in February 2008.

**Results:** A total of 1523 responses provided a 48.1% response rate. Faecal incontinence prevalence was 12.7% (174/1366) with no gender or locality differences. Prevalence increased significantly with age in men ( $p=0.034$ ), but not in women. Only 10 respondents with faecal incontinence consulted their doctor in the previous year for this reason. Incontinent respondents had



significantly more medical conditions including urinary incontinence, coeliac disease, irritable bowel syndrome, injury to the anus, bowel cancer, spinal cord disease, neurological disease and psychiatric problems (all,  $p < 0.05$ ). Stool-related accidental bowel leakage including faecal incontinence (defined), soiling with flatus or urgency, was 18.2%. An additional 3% were possibly incontinent, having disclosed leakage of mucus, bothersome or passive staining. Of the remaining respondents, 16.2% reported incontinent episodes due to an acute illness, 22.9% could not always differentiate between flatus and stool, and only 35.2% reported neither concerns with nor accidental bowel leakage.

**Conclusions:** There is a high level of untreated faecal incontinence in North/Far North Queensland communities. Demand for treatment will increase because of the ageing population and the expectations of younger, more assertive cohorts.

**Key words:** faecal incontinence, adult, community, demographic and age distribution, diet, disclosure, postal survey, prevalence, regional, severity, systemised random allocation.

## Introduction

Accidental bowel leakage is rarely disclosed<sup>1</sup>. It can range from occasional loss of flatus, through staining of underwear with mucus or stool, to faecal incontinence, which the International Continence Society defines as the involuntary loss of liquid or solid stool that is a social or hygienic problem<sup>2</sup>. The impact of faecal incontinence on quality of life can be debilitating and embarrassing. Stringent coping strategies often alienate the sufferer from friends and family<sup>3</sup>. There is little awareness of it in the general community. Even sufferers confuse it with diarrhoea, faecal urgency, irritable bowel syndrome or inflammatory bowel disease<sup>4</sup>.

Risk factors resulting in the development of faecal incontinence include congenital anorectal abnormalities; neurological or spinal damage; obstetric or anal trauma; anal or rectal cancers; inflammatory bowel disease; reconstructive bowel surgery; psychological problems; abdominal/pelvic irradiation; infections; reactions to medications, drugs or diet; rectal prolapse, anal fistula or haemorrhoids; immobility; increasing age; chronic constipation; obesity and poor management of diarrhoea or loose stool; and idiopathic causes<sup>5-7</sup>.

Internationally, the prevalence of faecal incontinence in community-dwelling adults ranges from 0% to 15.2%<sup>8</sup>. Australian studies have estimated prevalence between 8%<sup>9</sup> and 11%<sup>10,11</sup> in community-dwelling adults, with telephone

interviews being used in a South Australian study<sup>9</sup> and two postal surveys being conducted in Sydney, New South Wales<sup>10,11</sup>. Studies undertaken at the Townsville Hospital urogynaecology and colorectal outpatient clinics reported up to 26% of patients having the condition, with a considerable effect on their quality of life<sup>3,12,13</sup>.

Currently up to 72% of nursing home residents suffer with faecal incontinence<sup>14</sup>. The proportion of Australians over the age of 65 is expected to increase from 13.4% of the population in 2007 to 25.3% of the population by 2047 and the percentage of those over the age of 85 will likely rise from 1.7% to 5.6%<sup>15</sup>. Many Australians wish to age in their homes rather than move into specialised care<sup>16</sup>. Increased demand for community-based incontinence services will be due to not only the ageing population<sup>15</sup> but also the fact that younger cohorts (baby boomers, X and Y generations) are more assertive and expect to have their needs satisfied<sup>17</sup>. World War II (age 85–90 in 2012) and post-war cohorts (67–84) are known as the silent generation and are stoic and reserved, respect clinicians and are more likely to comply with their recommendations. This general attitude may be reflected in their reticence to disclose embarrassing issues such as faecal incontinence and reluctance to seek treatment for this condition.

Baby boomers (47–66) are sceptical, questioning and expect pharmacological solutions to their age-related problems<sup>17</sup>.



They are more likely to try novel treatments such as anal implants<sup>18</sup>, sacral nerve or percutaneous tibial nerve stimulation<sup>19</sup> for their faecal incontinence, with the hope of finding a 'magic pill' or panacea<sup>17</sup>. With compulsory superannuation they are prepared to pay for healthcare services into their old age<sup>15</sup>. Generation X (36–46) treasure independence, are focused on their quality of life and work to fund their more balanced lifestyle. Their choice of health service providers are likely to be an economic decision and they will require more personalised support, shared decision-making and greater self-management<sup>20</sup>. The Y generation (18–36) are tolerant team players who value mentorship and have grown up with the internet and frequent technological change. They value excitement and instant gratification through email, messaging and social media and may adopt healthcare services via social media<sup>17</sup>; they may prefer self-management of faecal incontinence using telephone and tablet applications. For this and other age-related health problems the Ottawa Charter action areas of building healthy public policy, creating supportive environments, strengthening community action, developing personal skills and reorienting health services provide a useful framework to develop prevention, early intervention and treatment protocols<sup>21</sup>.

This study was undertaken to investigate personal demographics, health/risk factors, bowel habits, nutrition intake (fibre and fluid) and physical activity in relation to faecal incontinence. Here the authors report the prevalence of faecal incontinence in community-dwelling adults and assess disclosure of accidental bowel leakage in regional and rural areas of North/Far North Queensland, Australia.

## Methods

A sample of 3620 subjects was compiled from the 2006–2007 Cairns and Townsville White Pages® telephone directories (Cairns: 1112 urban, 481 rural, 226 remote; Townsville: 1049 urban, 432 rural, 320 remote) using systematic random sampling. The first non-business name and address was selected from each column between 90–100 mm and 190–200 mm from the top of the page. The sample addresses were updated from the 2007–2008 printed and online White

Pages® directory prior to distribution. Where a subject no longer appeared in the directory the next alphabetically listed private address was chosen as a replacement.

The self-administered questionnaire (Appendix 1), a study information sheet, an incentive leaflet (return of the completed survey provided an opportunity to win a \$250 or \$50 voucher), an opaque incentive response envelope, and a reply-paid envelope were mailed to everyone on the database. The survey contained 62 questions in five sections including personal demographics (11) with additional questions about female obstetric history (8), health/risk factors (6), bowel habits (32), nutrition (fibre and fluid intake) (2) and physical activity (3).

Demographic questions included those related to age, gender, cohabitation, residence type, postcode, education level, country of birth, height, weight and indigenous status. Female obstetric history questions included menopausal status, number of natural and caesarean births, use of forceps/vacuum, episiotomy, post-tear stitches, hysterectomy and hormone replacement therapy. Health or risk factor questions included participant-perceived general health as well as factors, previously identified, as potentially causal for this condition<sup>5-7</sup> (Appendix 1).

Participants were asked for information about year and results of a colonoscopy. Questions about bowel habits included those related to frequency of defecation; stool type<sup>22</sup>; urgency; difficulty in emptying bowels; constipation and straining; accidental anal leakage and its effect on quality of life; and coping strategies used. Nutrition questions related to fluid and fibre intake. Activity questions related to normal daily activity, exercise and pelvic floor exercises.

The initial survey was mailed out in July 2007, followed by two follow-up surveys mailed to non-responders in September 2007 and January 2008. One hundred random non-responders were invited to answer the survey by phone in February 2008. All mail-outs contained reply-paid envelopes and covering letters explaining the purpose of the study. The follow-up mail-outs included a non-response/remove me from the database tool



seeking reasons for non-response. Anonymity of replies was maintained. Core faecal incontinence questions were adapted from the Cleveland Clinic Florida Fecal Incontinence Score (Wexner) which correlates well with clinical presentation of faecal incontinence and has been referred to as 'a tool of choice' for assessing faecal incontinence in community-dwelling older adults<sup>23</sup>.

In this study, faecal incontinence was defined as accidental leakage of solid or liquid stool in the previous 12 months that was not caused by a virus, medication or contaminated food.

## Statistics

Community prevalence and 95% confidence intervals (CI) of faecal incontinence and accidental bowel leakage were determined. Numerical data are given as mean value and standard deviation or median value and interquartile range (IQR), depending on the distribution. Comparisons between characteristics were conducted using  $\chi^2$  tests and  $\chi^2$  tests for trend, nonparametric Wilcoxon tests, and student's *t*-tests. Statistical analyses were conducted using Statistical Package for the Social Sciences Windows v17 (SPSS Inc., <http://www.spss.com>). Throughout the analysis  $p < 0.05$  was considered statistically significant. The sample size calculation was based on the Sydney, New South Wales community postal surveys (faecal incontinence prevalence = 11%)<sup>10,11</sup>. The authors expected the North/Far North Queensland prevalence to be greater. Choosing 12.1% (10% higher) with a confidence level of  $\pm 2\%$  (ie true level to be between 10.1% and 14.1%), the sample size calculation for each of the Townsville, Cairns and rural settings was 1022. Systematic random sampling generated 3620 private names for the database.

## Ethics approval

James Cook University Human Research Ethics Committee granted ethical approval (H2630).

## Results

Of the 3620 surveys mailed out, 432 were returned to sender as 'no longer at this address' (18 of these were reported

deceased); nine completed surveys were invalid (one under-age, two nursing home residents, six living outside North/Far North Queensland). Fourteen of the 100 random numbers telephoned were inactive phone numbers. Of the remaining 3165 potential participants, 95 gave reasons for not wishing to participate; 1523 questionnaires were returned giving a response rate of 48.1%.

Valid responses were from 628 (41.0%) men and 891 (58.5%) women. Male respondents were older than female respondents (mean age: 57.3 (95% CI: 56.2–58.5) vs 52.3 (51.3–53.4) years,  $p < 0.001$ ) and had a marginally higher mean body mass index (27.6 (27.3–28.0) vs 26.7 (26.3–27.1),  $p = 0.001$ ). Although more women (11.3%) than men (7.8%) resided alone ( $p < 0.001$ ), there were no significant differences between the genders with regard to type or location of residence, level of education, occupation type, country of birth or indigenous status.

The prevalence (95% CI) of faecal incontinence was 12.7% (10.9–14.5%, Table 1). Overall, there was no significant difference between genders (men 12.6%, women 12.8%) or residence (regional centre or rurally). Prevalence increased significantly with age in men (18–39: 3/65, 4.6% (0.0–9.9%); 40–59: 31/251, 12.4% (8.3–16.4%]; >60: 38/252, 15.1% (10.6–19.5%],  $p = 0.034$ ) but not in women, although it was similar for both genders over 40 years of age (Fig1).

Of those with faecal incontinence, 54 (34.8%) reported urge incontinence, 19 (12.3%) passive incontinence and 44 (28.4%) both passive and urge incontinence. Only 28.1% of incontinent participants could always differentiate between flatus and stool compared with 53.5% of continent respondents ( $p < 0.001$ , Table 2). Nocturnal bowel leakage was a problem for 41 (26.3%) of incontinent respondents. While 59 (36.6%) incontinent respondents had problems modifying their diet to control their bowel, 49 (32.7%) did not know which medications would control their bowels and 56 (34.1%) felt they had no control over their bowels; only 11 (7.1%) had sought treatment for this condition. More than 38% (64) of respondents with faecal incontinence reported having first degree relatives with 'bowel problems'.



Most incontinent participants (130/174, 74.7%) reported incontinent episodes occurring less than once per month, 32 (18.4%) more than once a month, 10 (5.7%) more than once a week, and 2 (1.1%) at least once per day (Table 3, Fig2). More than half the incontinent respondents (91, 53.2%) and 245 (18.6%) of continent respondents reported bowel leakage due to an acute illness. There were no statistically significant gender, age or rurality differences for acute illness-related accidental bowel leakage.

A comparison of respondents with and without incontinence showed that more with incontinence reported poor or very poor general health; more frequent, irregular, incomplete/fragmented defecation, and looser stools; inability to delay by 15 minutes or requiring aids to defecate; alternating diarrhoea and constipation; a history of constipation; and pad-wearing (all  $p < 0.001$ , Table 2). In addition, more incontinent respondents reported that their bowel function negatively affected their daily activities such as work, sports, housework/gardening, social activities, travel, relationships and sex life (all  $p < 0.001$ ). More than half the incontinent respondents (82/162) reported difficulty finding public toilets.

Embedded within the survey were a number of questions relating to accidental bowel leakage in addition to the Wexner score<sup>5</sup>. Table 1 presents the disclosure of accidental bowel leakage with the most severe element counted for each respondent. Those who did not report faecal incontinence, but disclosed accidental bowel leakage due to an acute illness, are reported separately in Table 1 ( $n=245$ , 97 male) even if they also reported other accidental bowel leakage items. Stool-related accidental bowel leakage (18.2%) included faecal incontinence, soiling with flatus (not including possible mucus-related soiling with flatus,  $n=3$ , one male), and soiling with urgency. This was not statistically different for gender or location/rurality of respondents' residences but was significantly higher for the over-40 age groups ( $p=0.040$ ). Possible stool-related accidental bowel leakage (3.0%) included leakage of mucus; staining underwear, if it was considered a problem in the month prior to completing the survey; accidental bowel leakage that was found bothersome;

and passive accidental bowel leakage. Of the remaining 1109/1513 respondents who completed these questions 346 (22.9%) reported they could not always differentiate between flatus and stool, 69 (4.6%) reported accidental leakage of flatus and only 532 (35.2%) respondents reported no concerns about accidental bowel leakage, and no accidental bowel leakage.

Types of accidental anal leakage are presented in Table 4 and did not differ across regions. Leakage rates of solid and liquid stool, mucus and accidental flatus were similar for both genders although staining of underwear was significantly higher in men (26.8%) than in women (17.3%,  $p < 0.001$ ) and for older respondents (<39: 15.9%; 40–59: 28.8%; >60: 33.7%,  $p < 0.001$ ).

## Discussion

The main finding of this study was that 12.7% of adult North/Far North Queensland community members reported faecal incontinence in the previous 12 months that was not due to an acute illness. This rate increased with age for men although, in total, there were no gender or locality differences. When soiling with flatus and urgency were included, stool-related accidental bowel leakage was substantially higher, at 18.2%.

The prevalence of faecal incontinence is highly dependent on the definition applied<sup>10,24</sup>. This study's focused definition – 'accidental loss of solid and/or liquid stool in the previous twelve months, not due to a virus, medication or contaminated food' – has not, to the authors' knowledge, been used previously. Despite using this refined definition the rate of faecal incontinence in this study is higher than the two earlier Australian postal surveys<sup>10,11</sup> although the severity (type and frequency) was similar. Using a broader definition of accidental stool leakage that did not exclude faecal incontinence resulting from an acute illness, the prevalence was much higher, at 28.1% (Table 3). Thus previous concerns of high levels of faecal incontinence in the North/Far North Queensland community are warranted<sup>3,12,13</sup>.



**Table 1: Respondents' disclosure of accidental bowel leakage**

Accidental bowel leakage <sup>†</sup>	Total <sup>‡</sup>	
	n	%
Faecal incontinence prevalence <sup>§</sup>	174	12.7
Soils with flatus <sup>‡</sup>	80	5.3
Soils with urgency	22	1.5
Stool-related	276	18.2
Leakage of mucus	10	0.7
Stains underwear <sup>  </sup>	18	1.2
Finds accidental bowel leakage bothersome	11	0.7
Passive accidental bowel leakage	6	0.4
Possibly stool-related	45	3.0
Cannot always differentiate between flatus and stool	346	22.9
Flatus	69	4.6
Acute illness-related <sup>#</sup>	245	16.2
No accidental bowel leakage/concerns	532	35.2
Total	1513	

<sup>†</sup> In past 12 months not due to virus, medication or contaminated food (except acute illness related accidental bowel leakage – see note #).

<sup>‡</sup> Each respondent is counted once only (worst severity noted). Ten missing – respondents did not answer any of the questions about disclosure of accidental bowel leakage.

<sup>§</sup> Faecal incontinence (accidental solid and/or liquid leakage) in past 12 months not due to an acute illness; prevalence (95% confidence interval=12.7% (10.9–14.5%)) was based on response to Cleveland Clinic Florida-Fecal Incontinence Score (Wexner) questions only (n=1366, 572 men, 794 women).

<sup>‡</sup> Does not include possible mucus-related soiling with flatus (three: one man, two women).

<sup>||</sup> In participants who have not disclosed faecal loss (solid/liquid/mucus) but whose staining of underwear was a problem in the month prior to survey completion.

<sup>#</sup> Participants who did not report faecal incontinence but reported accidental bowel leakage due to virus, medication or contaminated food included here whether or not they also reported any of the other stool, possible stool or flatus-related items.

**Table 2: Comparison of bowel habits and health in respondents with and without faecal incontinence**

Bowel habits and health	Faecal incontinence <sup>†</sup>		No faecal Incontinence <sup>†</sup>	
	n	%	n	%
Bowel movement at regular time	81/172	47.1	762/1243	61.3
Can always differentiate between flatus and stool	48/171	28.1	654/1222	53.5
Can delay bowel motion for 15 minutes	65/171	38.0	812/1222	66.4
Bowels open ≥2 times per day	72/171	42.1	312/1247	25.0
Difficulty completely emptying bowels	30/173	17.3	84/1240	6.8
Often/always repeats defecation within 1 hour	26/171	15.2	47/1225	3.8
Requires aids to defecate	48/164	29.3	96/1163	8.3
Mean stool type (range 1–7) <sup>‡</sup>	157	4.1	1199	3.8
Alternating diarrhoea/constipation	106/171	62.0	482/1225	39.3
Minutes spent defecating per day (5–60 max)	103/171	60.2	534/1240	43.1
Straining				
Frequency whilst defecating: often/always	23/171	13.5	64/1243	5.1
Strength: somewhat/very hard	55/170	32.4	239/1240	19.3
Duration: ≤ 1 minute	106/170	62.4	952/1237	77.0
No pain with bowel movement	74/172	43.0	781/1250	62.5
History of constipation	58/170	34.1	168/1314	12.8
Uses pad for protection (day and/or night)	30/155	19.4	14/1170	1.2
Poor/very poor general health	17/173	9.8	29/1245	2.3

<sup>†</sup>  $p < 0.001$ . Classic  $\chi^2$  except for Mean Bristol Stool Form Scale (student's  $t$ -test).

<sup>‡</sup> Bristol Stool Form Scale; respondents who reported multiple or varied types of stool passed were removed (11 with, 25 without faecal incontinence).



**Table 3: Frequency of accidental faecal leakage in respondents<sup>†</sup>**

Leakage disclosed	n	%	95%CI (%)
Faecal incontinence <sup>‡</sup>			
Always (≥ 1 per day)	2/1369	0.1	0.0–0.3
Usually (≥1 per week and <1 per day)	10/1369	0.7	0.3–1.2
Sometimes (≥1 per month and <1 per week)	32/1369	2.3	1.5–3.1
Rarely (less than once per month)	130/1369	9.5	7.9–11.1
Total	174/1369		
Accidental soiling with acute illness <sup>§,‡</sup>	336/1482	22.7	20.5–24.8
>5 times annually <sup>  </sup>	8/1311	0.6	0.2–1.0
3–5 times annually <sup>  </sup>	15/1311	1.1	0.6–1.7
1–2 times annually <sup>  </sup>	222/1311	16.9	14.9–19.0
Faecal incontinence, or accidental soiling due to acute illness	419/1493	28.1	25.8–30.4
No faecal leakage	1074/1493	71.9	69.7–74.2

<sup>†</sup> Greatest severity reported.

<sup>‡</sup> Faecal incontinence (accidental solid and/or liquid leakage) in past 12 months not due to a virus, medication or spoiled food.

<sup>§</sup> Accidental loss of solid and/or liquid stool in the previous 12 months, due to a virus, medication or contaminated food.

<sup>‡</sup> Includes those who did and did not disclose faecal incontinence.

<sup>||</sup> Includes only those who did not disclose faecal incontinence.

**Table 4: Accidental anal leakage in respondents<sup>†</sup>**

Type of leakage	n	% <sup>‡</sup>	95%CI (%)
Solid <sup>§</sup>	47/1320	3.6	2.6–4.6
Liquid <sup>§</sup>	147/1345	10.9	9.2–12.6
Mucus	63/1301	4.8	3.7–6.0
Staining <sup>‡</sup>	273/1286	21.2	18.9–23.4
Any above	467/1487	31.4	29.0–33.7
Flatus <sup>§</sup>	347/1348	25.7	23.4–28.0

<sup>†</sup> Anal leakage in 12 months prior to survey.

<sup>‡</sup> Prevalence and 95% confidence interval.

<sup>§</sup> Cleveland Clinic Florida – Fecal Incontinence Score.

<sup>‡</sup> In participants who have not disclosed faecal loss (solid/liquid/mucus) but who currently soil clothing while passing wind and/or where staining of underwear was a problem in the month prior to survey completion.

One strength of this survey was that it enabled respondents to disclose any type of accidental bowel leakage, whether they termed it faecal incontinence or not. In a recent New Zealand study, researchers combined three different measures – a bowel control problem, quality of life impairment and faecal incontinence ≥1/month – to better determine faecal incontinence prevalence in the community<sup>25</sup>. While the researchers reported 12.4% of respondents leaked solid or liquid stool at least once per month and 26.8% had impaired quality of life due to accidental bowel leakage, they calculated community prevalence at 13.2% using the overlap of at least two of three measures to redefine faecal incontinence. The

aim of the present study too was to provide a more accurate estimate of those suffering with faecal incontinence. In this study, issues such as flatus and mucus were excluded. The New Zealand survey tool may have included these in the quality of life component<sup>26</sup>, thereby overstating the prevalence. Up to 50% of studies previously reviewed<sup>8,24</sup> calculated prevalence using faecal incontinence occurring in the previous 12 months as done in the present study. As in those studies, the rate in this study may be higher than that of the New Zealand study and others using incontinence reported over shorter time frames.

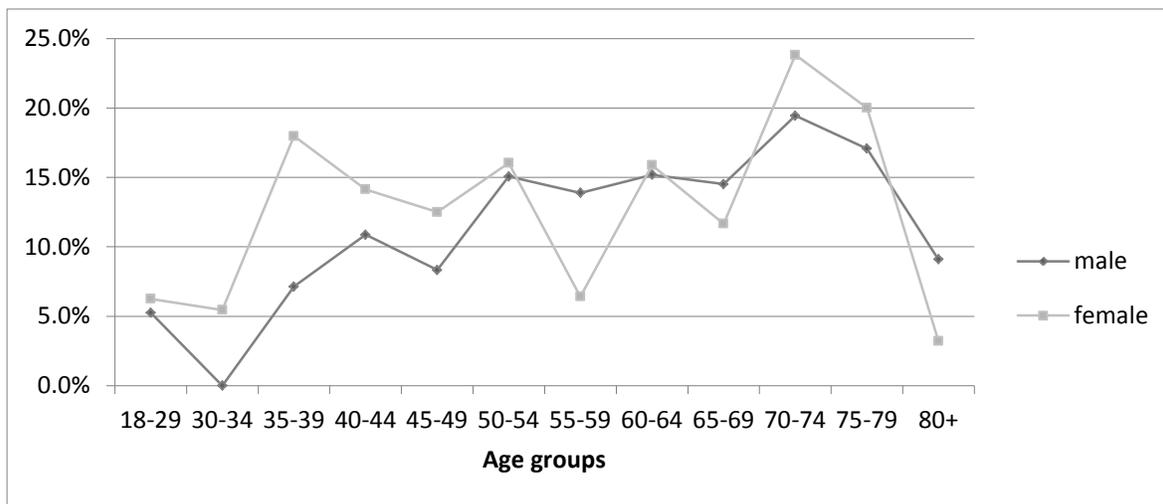
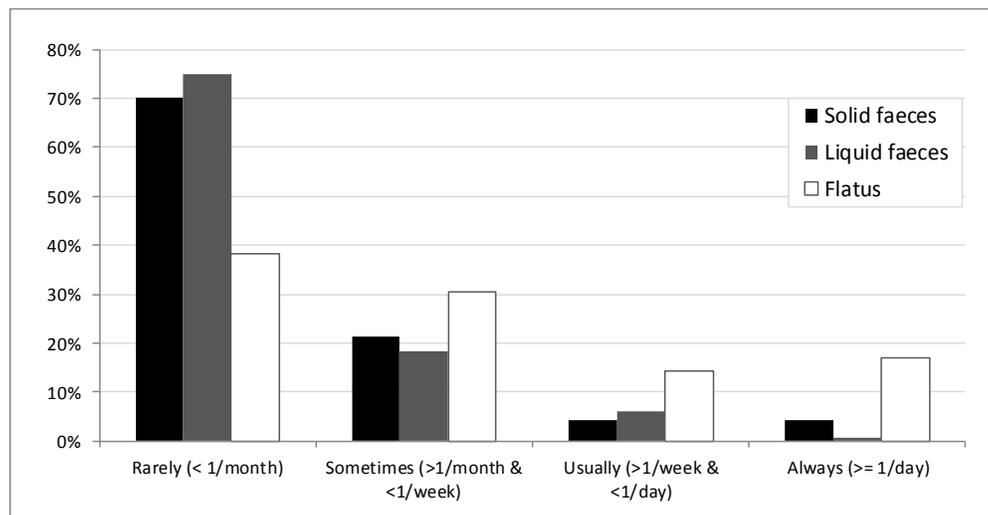


Figure 1: Proportion of respondents with faecal incontinence.



† Anal incontinence (accidental solid, liquid or flatus leakage) in past 12 months not due to virus/medication/contaminated food, from data collected in Cleveland Clinic Florida Fecal Incontinence questions.

Figure 2: Frequency of anal leakage<sup>†</sup> in respondents with faecal incontinence

A troubling result is that only 35% of the respondents had no bowel concerns. Further, many respondents with faecal incontinence felt they had no control over their bowels and didn't know how to manage their diet or which medications

to take to mitigate the problem. As only 7% actually sought medical advice, fear, embarrassment and the stigma associated with faecal incontinence continues to hamper disclosure as previously identified<sup>27</sup>.



As more people age ‘in place’<sup>16</sup> the prevalence of faecal incontinence in the community is likely to increase toward that of aged-care facilities. Younger cohorts, which are less stoic, are unlikely to tolerate this condition and will demand treatment<sup>17,20</sup>. Ageing populations increase healthcare costs<sup>15</sup>, and increased demand for faecal incontinence treatment will further escalate these costs. The concepts of the Ottawa Charter for Health Promotion<sup>21</sup> can be used to help reduce this added financial burden by encouraging prevention of constipation and obstetric damage, and ensuring benign clinical diagnoses are managed with conservative programs (potentially self-managed) including dietary management, pelvic floor exercises, defecation and relaxation techniques, and home biofeedback<sup>28</sup>.

Limitations of this study include a low response rate of 48.1% despite mailing two follow-up questionnaires. The average age of survey respondents was 54 years, 9 years older than the North/Far North Queensland adult population (45 years), which is marginally younger than the state (46 years) and national (46.5 years) averages<sup>29</sup>. Reasons for the low response rate could include lack of interest in the subject matter, particularly among younger survey recipients. Furthermore, younger people may be under-represented, not only because they may have chosen not to respond to the questionnaire, but also because they are more likely to only have a mobile telephone and thus not have received a survey because they were not listed in the telephone directory<sup>30</sup>. Older respondents may have self-selected due to a particular interest in the topic or because of a personal bowel issue<sup>24</sup>. Townsville, the largest city in North Queensland, has a highly mobile population with a 35% net transient population measure<sup>31</sup>. Of the sample of 100 non-respondents telephoned in an attempt to further increase the response rate, 14 telephones had been disconnected. If this were representative of the population, it could also partially explain the low response rate. However, using the alternative data collection method of telephone interviews may have yielded an even lower response rate based on experience from the South Australian study<sup>9</sup>. Similar response rates using this or analogous study enrolment methods were found in a cross-sectional study investigating accidents and injuries in

North Queensland<sup>32</sup> and a New Zealand faecal incontinence prevalence study using a random selection from the Canterbury electoral roll<sup>33</sup>. Thus the response rate may be a limitation of the method used to elicit information about a topic that is either ‘sensitive’ or does not interest a particular segment of the population.

## Conclusions

There is a high level of untreated faecal incontinence in the North/Far North Queensland community which degrades the quality of life of those with this ailment. With a burgeoning ageing-in-place population the prevalence in this and other communities is likely to increase. Lifestyle education to prevent chronic constipation and encourage the development and maintenance of strong pelvic floor muscles among young people could reduce the prevalence of this condition. Faecal incontinence, its prevalence, prevention and treatments should be widely discussed to raise community awareness reducing the incidence and the destructive effect it has on the quality of so many lives. Eliminating the stigma of faecal incontinence should encourage those with the condition to overcome their embarrassment and seek early treatment. Where appropriate, conservative self-managed care is economically rational and can improve quality of life for all, not just those with access to the few specialist biofeedback clinics.

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## Appendix 1: North Queensland Bowel Habit Project Survey

**SECTION 1: PERSONAL DETAILS** → → .....2007 NQ Bowel Habit Project

Firstly we would like to ask you some questions about your background:

1. How old are you? -- ..... Years

2. Are you?  Male →  Female

3. Do you live with anyone?

→  No, alone

→  Yes, with

→  Spouse/Partner  Parents

→  Children →  Other family

→  Other: .....

4. What type of residence do you live in?

→  House →  Apartment/Unit

→  Caravan →  Retirement village

→  Other: .....

5. What is your postcode? -- .....

6. What is your highest education level?

→  Primary School

→  Secondary School

→  Trade Certificate

→  College Diploma

→  University degree

→  Postgraduate degree

→  Other: .....

7. What is your current occupation?

→  Student →  Unemployed

→  Labourer →  Tradesperson

→  Homemaker  Clerical

→  Professional  Retired

→  Other: .....

8. What is your country or region of birth?

→  Australia

→  ACT  NSW  VIC  QLD  SA  WA  TAS  NT

→  United Kingdom  Europe

→  Asia →  Pacific Region

→  USA/Canada →  Africa

→  Other: .....

9. What is your height?

→ .....metres..... or .....feet.....inches

10. What is your weight?

→ .....kg..... or .....st.....lbs

Please continue with question 11 → ↑

11. Are you of Aboriginal, Torres Strait or South Sea Islander descent?

→  No →  Yes

→  Aboriginal  Torres Strait Islander

→  South Sea Islander

**If you are female, please also answer questions 12--19 below:**

**If male, please continue with question 20**

12. Are you?

→  Pre-menopausal

→  Menopausal

→  Post-menopausal

→  I am not sure

13. How many children have you given birth to? → ..... → .....

14. How many of these children were by caesarean section? → .....

15. Have you given birth to a baby requiring?

Forceps delivery  Not applicable

Vacuum extraction

→ →

16. During delivery of a baby have you had an episiotomy (Deliberate incision made by a doctor)?

→  Yes →  No →  Not applicable

17. After delivery of a baby have you had stitches for a large tear? (Not including an episiotomy)

→  Yes →  No →  Not applicable

18. Have you had a hysterectomy (removal of the uterus/womb)?

→  Yes →  No

19. Are you taking Hormone Replacement Therapy (HRT/oral estrogen)?

→  Yes →  No →

→  I used to but stopped ..... years ago

..... Section Break (Continuous) .....



## Appendix 1: North Queensland Bowel Habit Project Survey: cont'd

**SECTION 2: HEALTH FACTORS** → .....2007 NQ Bowel Habit Project

The questions in this section are about your current and past health conditions. ¶

**20. Have you been diagnosed with any of the following medical conditions? (Tick if yes) ¶**

<input type="checkbox"/> Diabetes ¶	<input type="checkbox"/> Colon disease ¶
→ <input type="checkbox"/> Type 1 (insulin dependent) ¶	Diagnosis? - _____ ¶
→ <input type="checkbox"/> Type 2 (Non-insulin dependent) ¶	<input type="checkbox"/> Spinal cord disease ¶
<input type="checkbox"/> Thyroid disease ¶	Diagnosis? - _____ ¶
<input type="checkbox"/> Crohns disease/ulcerative colitis ¶	<input type="checkbox"/> Neurological disease ¶
<input type="checkbox"/> Coeliac disease ¶	Diagnosis? - _____ ¶
<input type="checkbox"/> Irritable bowel syndrome ¶	<input type="checkbox"/> Cancer → Type? - _____ ¶
<input type="checkbox"/> Inflammatory bowel disease ¶	Pelvic organ prolapse ¶
<input type="checkbox"/> Diverticulitis ¶	<input type="checkbox"/> Uterus → <input type="checkbox"/> Vagina ¶
<input type="checkbox"/> Traumatic injury to the anus ¶	<input type="checkbox"/> Rectum → <input type="checkbox"/> Bladder ¶
Haemorrhoids in the past 12 months ¶	<input type="checkbox"/> Psychiatric problems requiring medication ¶
<input type="checkbox"/> Rarely → <input type="checkbox"/> Sometimes → <input type="checkbox"/> Often ¶	Diagnosis - _____ ¶

→  I HAVE NOT HAD ANY OF THE ABOVE CONDITIONS ¶

**21. Have you had any of the following operations? (Please tick) ¶**

<b>Prolapse repair surgery ¶</b>	<b>Bowel Surgery? ¶</b>
→ <input type="checkbox"/> Yes → <input type="checkbox"/> No ¶	→ Colectomy (Colon) → <input type="checkbox"/> Yes <input type="checkbox"/> No ¶
<b>If yes was it for? ¶</b>	<b>Other surgery for anal conditions? ¶</b>
<input type="checkbox"/> Cystocele (Bladder) <input type="checkbox"/> Uterine (Uterus) ¶	Haemorrhoids (ever) → <input type="checkbox"/> Yes <input type="checkbox"/> No ¶
<input type="checkbox"/> Vaginal → <input type="checkbox"/> Rectocele (rectum) ¶	Anal fissures (split/tear) → <input type="checkbox"/> Yes <input type="checkbox"/> No ¶
<b>Abdominal or pelvic surgery ¶</b>	Anal fistulas (skin opening) <input type="checkbox"/> Yes <input type="checkbox"/> No ¶
Appendectomy (Appendix) → <input type="checkbox"/> Yes → <input type="checkbox"/> No ¶	<b>Spinal surgery? → <input type="checkbox"/> Yes <input type="checkbox"/> No ¶</b>
Cholecystectomy (Gallbladder) <input type="checkbox"/> Yes → <input type="checkbox"/> No ¶	

→  I HAVE NOT HAD ANY OF THE ABOVE OPERATION S ¶

**22. During the last 12 months have you leaked urine? (Please tick) ¶**

→ <input type="checkbox"/> Yes → <input type="checkbox"/> No (go to question 23) ¶	<b>How often do you accidentally leak urine? ¶</b>
<input type="checkbox"/> → When I cough, sneeze or laugh or do physical exercise ¶	<input type="checkbox"/> Daily <input type="checkbox"/> Weekly <input type="checkbox"/> Monthly <input type="checkbox"/> Less often ¶
<input type="checkbox"/> → When I get a sudden need to urinate and I can't hang on long enough ¶	<b>How much urine do you leak? (Tick one) ¶</b>
	→ <input type="checkbox"/> Few drops (no need to change underwear) → ¶
	→ <input type="checkbox"/> Small amount (need to change underwear) ¶
	→ <input type="checkbox"/> Moderate amount (change more clothes) ¶
	→ <input type="checkbox"/> Large amount (change clothes/mop floor) ¶

**23. Have you ever had a colonoscopy? (A test to look in to the rectum and colon) ¶**

<input type="checkbox"/> No ¶	<b>Were the results normal? → <input type="checkbox"/> Yes → <input type="checkbox"/> No ¶</b>
→ <input type="checkbox"/> Yes, what year? _____ ¶	<b>Was a polyp(s) removed? → <input type="checkbox"/> Yes → <input type="checkbox"/> No ¶</b>

**24. Do you take any of the following medications/supplements? (Please tick) ¶**

→ <input type="checkbox"/> Metamucil → <input type="checkbox"/> Citrucel → <input type="checkbox"/> Konsyl → <input type="checkbox"/> Lomotil → <input type="checkbox"/> Psyllium husk ¶
→ <input type="checkbox"/> Imodium → <input type="checkbox"/> Codeine → <input type="checkbox"/> Laxatives → <input type="checkbox"/> mineral oil ¶
→ <input type="checkbox"/> NONE OF THESE ¶

**25. How would you describe your overall health at present? (Please tick one) ¶**

→  Very poor →  Poor →  Fair →  Good →  Very good ¶

2 ¶



## Appendix 1: North Queensland Bowel Habit Project Survey: cont'd

**SECTION 3: BOWEL HABITS** → → ...2007 NQ Bowel Habit Project

**In this section we would like to know about your bowel habits and how they affect you.**

26. In the past month, how often did you usually open your bowels? (Tick one)

Twice per week or less

3-4 times per week

Once per day

2-3 times per day

More than 4 times per day

27. Do you have a bowel movement at a regular hour? (Tick one)

Always irregular

I tend to be irregular

50/50 regular/irregular

I tend to be regular

Regular

28. From the Bristol stool form scale below, what type are your stools/- bowel motions usually? (Type \_\_\_\_\_)

**The Bristol Stool Form Scale\***

Type 1		Separate hard lumps, like nuts (hard to pass)
Type 2		Sausage-shaped, but lumpy
Type 3		Like a sausage but with cracks on the surface
Type 4		Like a sausage or snake, smooth and soft
Type 5		Soft blobs with clear-cut edges (passed easily)
Type 6		Fluffy pieces with ragged edges, a mushy stool
Type 7		Watery, no solid pieces, ENTIRELY LIQUID

\*First published by Lewis J, Heaton KW (1997) Stool form scale as a guide to normal transit time. Scandinavian Journal of Gastroenterology 32: 920-924

29. When you feel the need to have a bowel motion, how long can you wait before going? (Tick one)

I need to go immediately

A few minutes only

For at least 15 minutes

30. Do you ever have a bowel motion within 1 hour of a previous motion? (Tick one)

Never →  Occasionally

Half the time →  Often →  Always

31. Do you have difficulty emptying your bowels completely? (Tick one)

Never →  Occasionally

Half the time →  Often →  Always

32. Can you feel the difference between gas and solid stool before you pass it? (Tick one)

Never →  Occasionally

Half the time →  Often →  Always

33. Do your bowel movements alternate between diarrhoea and constipation? (Tick one)

Never →  Occasionally

Half the time →  Often →  Always

34. How much time do you spend at the toilet for your bowels each day? (Tick one)

Less than 5 minutes

5-15 minutes

15-30 minutes

30 minutes to 1 hour

More than 1 hour

35. Do you read while on the toilet?

No →  Yes

If yes, why? \_\_\_\_\_

36. How often do you have to strain when having a bowel motion? (Tick one)

Never →  Occasionally

Half the time →  Often →  Always

37. How strongly must you strain to have a bowel motion? (Tick one)

Not at all →  A little

Somewhat →  Very hard

38. How long do you strain in order to have a bowel motion? (Tick one)

Do not strain

Less than 1 minute

→  1-2 minutes →  2-5 minutes

→  5-10 minutes →  More than 10 minutes

39. Do you get a pain in the abdomen when having a bowel movement? (Tick one)

Never →  Occasionally

Half the time →  Often →  Always

Please continue with question 31 → ↑

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## Appendix 1: North Queensland Bowel Habit Project Survey: cont'd

40. Do you have a history of constipation?  No →  Yes; if yes, for how long?  Less than 1 year →  1-5 years  5-10 years →  10-20 years  More than 20 years

41. How many times in the past 12 months have you visited a doctor for problems with your bowels?  times for constipation  times for bowel leakage  times for other?

42. Have you **ever** been hospitalized for colon (large bowel) blockage from constipation (disimpaction of stool)?  No  Yes: How many times?

43. Can you break wind without soiling your underclothes? (Tick one)  No, never →  Yes, sometimes  Yes, often →  Yes, always

Please continue with question 44 →

44. How often does soiling happen when you break wind involuntarily? (Tick one)  Never →  Less than once a month  Between once a month and once a week  Between once a week and once a day  More than once a day

45. Please indicate (circle), for the past 12 months, how your bowel function affected each of the following activities:

Activity	Amount affected			
	Not at all	Mildly	Moderately	Severely
Sports/Recreation	1	2	3	4
House/Garden work	1	2	3	4
Social/Entertainment	1	2	3	4
Family relationships	1	2	3	4
Travel	1	2	3	4
Sexual life	1	2	3	4
Work (Occupations)	1	2	3	4
Daily Living	1	2	3	4

46. In the past 12 months have you ever soiled your clothes or underwear through bowel leakage due to a reaction to a virus, medication or bad food? (Tick one)  Never →  Once or twice →  3-5 times →  More than 5 times

47. In the past 12 months and **not** due to a reaction to a virus, medication or bad food, please tick how often you have had accidental bowel leakage and what type?

Type of accidental bowel leakage	Frequency				
	Never	Rarely	Sometimes	Usually	Always
SOLID	<input type="checkbox"/>				
LIQUID	<input type="checkbox"/>				
MUCUS	<input type="checkbox"/>				
GAS (WIND)	<input type="checkbox"/>				
Please tick how often you wear a pad to protect your clothes against bowel leakage					
During the day	<input type="checkbox"/>				
At night	<input type="checkbox"/>				
Please tick how often you make adjustments to your lifestyle because of:					
Bowel leakage	<input type="checkbox"/>				

If you have answered **never** to every section in the above table please go to question 55.

48. How many months/years ago did the bowel leakage begin? -  years  months

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## Appendix 1: North Queensland Bowel Habit Project Survey: cont'd

49. Are you bothered about the bowel leakage?  Not at all →  Slightly →  Moderately →  Greatly

50. How often do you have accidental bowel leakage without being aware of it at first?  Never →  Sometimes →  Always

51. How often do you have accidental bowel leakage after you feel the urge to go to the toilet?  Never →  Sometimes →  Always

52. Do you ever have any bowel leakage at night?  Never →  Sometimes →  Always

53. Have you had treatment for bowel leakage? →  No →  Yes  
→ If no, why not? \_\_\_\_\_

54. Which local non-surgical bowel leakage health care provider would you prefer to use?  GP  Physiotherapist  Community Health  Home-based program managed by a specialist bowel clinic

55. Have any of the following conditions been a problem for you in the past month?

Conditions	Not at all	A little	Quite a bit	Very much	Can't recall
Pain in or around the back passage (anal/canal/anus)	<input type="checkbox"/>				
Bleeding from back passage (anus)	<input type="checkbox"/>				
Knowing what to eat to control your bowel	<input type="checkbox"/>				
Knowing what medicines to take to control your bowel	<input type="checkbox"/>				
Being able to find toilets, away from home	<input type="checkbox"/>				
Being worried whether you smell (due to your bowel)	<input type="checkbox"/>				
Feeling you have no control over your bowel	<input type="checkbox"/>				
Staining of your underwear	<input type="checkbox"/>				

56. To assist with toileted bowel motions or control of accidental bowel leakage, do you use:

Anti-diarrhoeal medication →  Laxatives (at least three times per week)

Enemas or suppositories (at least three times per week)

A continence aid inserted in the anus, or use pressure or a finger in the anus/vagina

Other, please specify: \_\_\_\_\_

None used →

57. Do you have first degree relatives (Mother, father, brothers, sisters, or adult children) who have problems with their bowels?

No →  Yes: → Relation to you? \_\_\_\_\_

What is the problem? →  Constipation →  Diarrhoea →  Faecal incontinence

Abdominal pain →  Other: \_\_\_\_\_

**SECTION 4: NUTRITION --- FIBRE AND FLUID INTAKE** → 2007 NQ Bowel Habit Project

**In this section we would like to know how much fibre and fluid you consume.**

58. Please indicate what drinks and water and the amount you drink on an average day:

(1 can = 0.33 litres, 1 cup = 0.25 litres, 1 mug = 0.3 litre, medium glass = 0.2 litres)

Volume of water	Caffeinated drinks	Volume	Non-Caffeinated drinks	Volume
litres	→ Coffee → <input type="checkbox"/>	litres	Decaff. Tea/Coffee → <input type="checkbox"/>	litres
	→ Tea → <input type="checkbox"/>	litres	Fruit juice → <input type="checkbox"/>	litres
	→ Cola → <input type="checkbox"/>	litres	Sugared soft drink → <input type="checkbox"/>	litres
	→ Diet Cola → <input type="checkbox"/>	litres	Diet soft drink → <input type="checkbox"/>	litres
	→ Other → <input type="checkbox"/>	litres	Other (Beer/wine etc) <input type="checkbox"/>	litres

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## Appendix 1: North Queensland Bowel Habit Project Survey: cont'd

59. Please pick the foods you eat at home and circle your score.

FIBRE SCORE	1	2	3	Circle your score
<b>Breakfast Cereal</b> (3+ times per week)	Rarely or never eat, or eat sugar-coated cereals	Corn flakes, puffed rice	Bran flakes, oats, whole-wheat flakes, muesli	1.....2.....3
<b>Bread</b> (3+ times per week)	Rarely or never eat	White	Wholemeal/Grain	1.....2.....3
<b>Potatoes, Pasta, Rice</b>	Rarely or never eat	Eat potatoes, white rice or pasta most days	Eat potatoes in jackets, brown rice or pasta most days	1.....2.....3
<b>Nuts &amp; Pulses</b> (Peas / Beans / Lentils)	Rarely or never eat	Once a week or less	Three times a week or more	1.....2.....3
<b>Vegetables</b> (all kinds other than pulses & potatoes)	Less than once a week	1-3 times per week	Daily	1.....2.....3
<b>Fruit</b> (all kinds)	Less than once a week	1-3 times per week	Daily	1.....2.....3
<b>Fibre supplements</b>	Rarely or never take	1-3 times per week	Daily	1.....2.....3

**SECTION 5: PHYSICAL ACTIVITY LEVEL** → 2007 NQ Bowel Habit Project

We are interested in the physical activities you do as part of your everyday life.

60. What does your work or daily activity mainly involve? (Tick one)

Sitting →  Standing →  Walking or other physical activity  
 Heavy labour (e.g. heavy lifting or digging) →  Other: \_\_\_\_\_

61. Outside of your normal work or daily activities, how often do you exercise for 30 minutes or more, such as walking, cycling, running or swimming? (Tick one)

Seldom or never →  Less than once a week →  1-2 times a week  
 3-5 times a week →  6 or more times a week

62. Finally we would like to know if you perform pelvic floor muscle exercises.

No  
 Yes: number per day? \_\_\_\_\_, and on: 1---2---3---4---5---6---7 days per week? (circle)  
 I do not know how to perform this exercise

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

THANK YOU VERY MUCH FOR TAKING THE TIME TO COMPLETE THIS QUESTIONNAIRE AND MAKING A VALUABLE CONTRIBUTION TO OUR RESEARCH.

**Please place the completed questionnaire and entry form in the stamped addressed envelope provided and mail to us at:**

2007 Bowel Habit Project, Anton Breijn Centre,  
 School of Public Health, Tropical Medicine & Rehabilitation Sciences,  
 Reply Paid 109, James Cook University, Townsville, QLD 4811

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