

# Factors contributing to fecal incontinence in older people and outcome of routine management in home, hospital and nursing home settings

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**Objective:** Fecal loading, cognitive impairment, loose stools, functional disability, comorbidity and anorectal incontinence are recognized as factors contributing to loss of fecal continence in older adults. The objective of this project was to assess the relative distribution of these factors in a variety of settings along with the outcome of usual management.

**Methods:** One hundred and twenty adults aged 65 years and over with fecal incontinence recruited by convenience sampling from four different settings were studied. They were either living at home or in a nursing home or receiving care on an acute or rehabilitation elderly care ward. A structured questionnaire was used to elicit which factors associated with fecal incontinence were present from subjects who had given written informed consent or for whom assent for inclusion in the study had been obtained.

**Results:** Fecal loading (Homes 6 [20%]; Acute care wards 17 [57%]; Rehabilitation wards 19 [63%]; Nursing homes 21 [70%]) and functional disability (Homes 5 [17%]; Acute care wards 25 [83%]; Rehabilitation wards 25 [83%]; Nursing homes 20 [67%]) were significantly more prevalent in the hospital and nursing home settings than in those living at home ( $P < 0.01$ ). Loose stools were more prevalent in the hospital setting than in the other settings (Homes 11 [37%]; Acute care wards 20 [67%]; Rehabilitation wards 17 [57%]; Nursing homes 6 [20%]) ( $P < 0.01$ ). Cognitive impairment was significantly more common in the nursing home than in the other settings (Nursing homes 26 [87%], Homes 5 [17%], Acute care wards 13 [43%], Rehabilitation wards 14 [47%]) ( $P < 0.01$ ). Loose stools were the most prevalent factor present at baseline in 13 of the 19 (68%) subjects whose fecal incontinence had resolved at 3 months.

**Conclusion:** The distribution of the factors contributing to fecal incontinence in older people living at home differs from those cared for in nursing home and hospital wards settings. These differences need to be borne in mind when assessing people in different settings. Management appears to result in a cure for those who are not significantly disabled with loose stools as a cause for their fecal incontinence, but this would need to be confirmed by further research.

**Keywords:** Older adults, fecal incontinence, risk factors, care settings, digital rectal examination, mortality

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## Introduction

Fecal incontinence (FI) is defined as the involuntary loss of liquid or solid stool that is a social or hygiene problem (Department of Health 2002; Norton et al 2002). Others exist (Kok et al 1992; Groutz et al 1999; Cooper and Rose 2000), but they are not as robust. In addition this is the definition agreed by the International Continence Society which reflects a consensus amongst the experts in this field. There appear to be no gender differences in its prevalence in older adults (O'Keefe et al 1995; Nakanishi et al 1997). The prevalence of FI ranges from 3% to 29% in the community (Thomas et al 1984; Campbell et al 1985; O'Keefe et al 1995; Peet et al 1995; Nakanishi et al 1997; Prosser and Dobbs 1997; Edwards et al 2001) with much higher figures in care homes (Brocklehurst et al

1999; Chassagne et al 1999). The range is wide due to FI being defined differently in the various studies.

Several contributory factors are associated with FI in the older adult. These factors are fecal loading, loose stools, ano-rectal incontinence, comorbidity, impaired physical function, and impaired cognitive function (Barrett 2002).

Having an idea of which contributory factors are more common in a particular setting will allow resources to be deployed in a way that is cost effective and also increase the likelihood of resolving the condition. It would also encourage further work as to why certain factors are more prevalent in a particular setting and following on that measures could be adopted to try and lessen the impact of the identified factors.

The objective of this study was to determine whether the distribution of the contributing factors to FI differed between elderly people in different care settings and to assess the usual outcome from management of the FI at three months post inclusion.

## Methods

This cross sectional observational study was carried out on the Wirral Peninsula, Merseyside, UK between November 2002 and October 2003. Older adults aged 65 years and over with FI were recruited from the four settings used for this study: living at home (H); living in a nursing home (N); receiving care on acute (A) or rehabilitation (R) elderly care wards. All seven elderly care wards in the two local district general hospitals were involved. FI was defined as the involuntary or inappropriate passage of stool of whatever consistency on at least one occasion in the four weeks prior to giving consent.

The ethical approval granted by the local research ethics committee included the provision for obtaining assent for subjects who were unable to give consent themselves.

The questionnaire used for the study was modified after a pilot study to ensure reliability and validity.

The hospital or nursing home staff caring for the potential subjects in the participating hospital wards or nursing homes referred them to the study. These older adults with FI had the nature and purpose of the study explained to them and they were invited to participate. Subjects who gave both verbal and written informed consent were recruited. For those unable to give informed consent, relative assent was sought from their next of kin after the study was explained to them.

Potential subjects living in their own homes were identified through a database held by the continence specialist

nurses. The continence specialist nurse wrote to these subjects explaining the nature and purpose of the study and inviting them to participate in it. Those who indicated their willingness to participate were then sent a patient information leaflet. After the principal investigator received a signed consent letter, a mutually convenient time was arranged for the interview. A letter was then sent to the general practitioner of each person recruited into the study informing them of their patient's participation.

A recruitment target of 30 subjects in each group was set after a pilot study to allow comparisons to be made between the settings. The pilot study had indicated that recruitment would not be easy due to the sensitive nature of the topic being investigated. This also led to convenience sampling being utilized and therefore anyone who accepted an invitation to participate was recruited while those that did not were not asked why they declined. Also comparisons could not be made between those who accepted and declined as the principal investigator only had ethical approval to approach those who accepted to participate. The interventions in this study were the interviews and physical assessments.

Routine management here refers to whatever management strategies were utilized by the staff in the various settings to treat FI. This study did not look into this.

The study assessments were performed by Asangaedem Akpan (AA) and were based on a structured questionnaire to elicit which contributory factors for FI were present. The information collected also included: demographic information; previous medical and surgical history; Barthel Activities of Daily Living (ADL) score (Mahoney and Barthel 1965); Mini-Mental State Examination (MMSE) score (Folstein et al 1975).

A physical examination limited to the abdomen and rectum was performed when specific consent was obtained.

The outcome of each subject's FI was assessed three months after his or her first interview. Outcome here refers to whether the person was deceased or their FI had resolved or not if they were still alive.

## Statistical analysis

The data was analysed using SPSS version 11 (SPSS Inc, Chicago, IL, USA). Descriptive statistics were used to summarize the results. The Chi-squared test was used to test categorical data for associations. If the overall Chi-squared test produced a significant result, paired comparisons were made by way of  $2 \times 2$  tables with Yates correction. To allow for multiple comparisons, a Bonferroni correction was used (Tabachnick and Fidell 1996).

For continuous data with a normal distribution, a one-way analysis of variance (ANOVA) was utilized for comparing the various settings and in those with significant differences. Post-hoc multiple comparisons utilizing the Scheffe test was performed to determine where the differences existed. The Kruskal-Wallis test was utilized for continuous data that was not normally distributed (Pallant 2001).

The level of significance was a P value less than 0.05.

## Results

Two hundred and thirty-nine older adults with FI were referred to the study. Recruitment was discontinued for each subgroup when the target sample size for that subgroup was reached. The participation rates (see Figure 1) were lowest in those living in their own homes (40%) and highest in those from the participating nursing homes (79%) though only three of the 52 nursing homes on the Wirral peninsula invited to participate in the study referred patients. The reasons why so many did not participate were not looked at, but this would have been an interesting area to explore in more detail.

Thirty patients were assessed in each of the settings. The subjects who were living at home were significantly younger and less disabled than those in the other settings and were more likely to have had anorectal or urogenital surgery (see Table 1).

Subjects in the nursing home setting had a significantly lower median MMSE score (N, 24) than in the other settings (H, 30; A, 27; R, 27) and were more likely to have cognitive impairment (N, 26 [87%]) identified as a factor contributing towards FI (see Table 2). In the hospital settings just under half of those studied with FI had cognitive impairment (H, 5 [17%]; A, 13 [43%]; R, 14 [47%]).

Functional disability was the main factor contributing to FI in the acute (25 [83%]) and rehabilitation ward settings

(25 [83%]) and was common in the nursing home subjects (20 [67%]) but significantly less prevalent in the subjects living at home (5 [17%]). Although fecal loading was slightly less prevalent as a factor, the pattern was similar to that for functional disability (H, 6 [20%]; A, 17 [57%]; R, 19 [63%], N, 21 [70%]) (Table 2).

Loose stool was the most prevalent factor found to contribute to FI in subjects living at home (H, 11 [37%]), but it was found significantly more often in the acute and rehabilitation ward subjects (A, 20 [67%]; R, 17 [57%]), but was significantly less prevalent in the nursing home subjects (N, 6 [20%]) (Table 2).

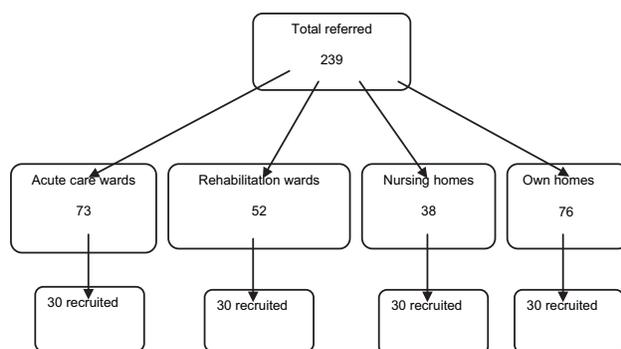
There was considerable comorbidity in the study subjects, but this did not differ between the settings and was slightly more prevalent in the rehabilitation ward patients (H, 11 [37%]; A, 11 [37%]; R, 20 [67%]; N, 14 [47%]).

There was insufficient data collected on anorectal incontinence for reliable comment as the number of rectal examinations performed was low and many that were performed did not have sufficient detail recorded for evaluation. Of the 60 older adults seen in hospital for the study 21 (35%) had a rectal examination of which only 8 out of the 21 (38%) had sufficient details recorded regarding the examination (these were the ones performed by AA as part of the study). Thirty-nine out of the 60 (43%) hospital patients or their carer declined a rectal examination. Rectal examinations were not planned for those in nursing homes or living in their own homes. Their medical records were reviewed for any documented examination. Six (20%) of those living at home had documented evidence of a rectal examination being done while 4 (13%) of those in nursing homes had documented evidence of a rectal examination (Table 1). No patient had anorectal physiology tests.

## Outcome at 3 months

At the three-month review FI was still an ongoing problem in 79 (66%) subjects included in the study (Table 3). It had resolved in 19 (16%) subjects who had a significantly higher median Barthel index at baseline (13 [interquartile range (IQR) 7–17]) than in the subjects in which the FI persisted (6 [IQR 2–12]) or had died (1 [IQR 0–5]).

Fecal incontinence resolved with usual management from the regular care team within 3 months in 30% of the subjects living in their own homes, but not in any of the nursing home subjects. Loose stools were the most prevalent factor present at baseline in 13 of the 19 (68%) subjects whose problem resolved.



**Figure 1** Flow chart depicting the number of subjects with fecal incontinence referred to the study.

**Table 1** Baseline characteristics of the subjects in each setting. The childbirth data refers to the number of women who had one or more vaginal deliveries

	Subjects living at home	Acute elderly care ward patients	Rehab elderly care ward patients	Nursing home subjects	Statistics
Mean age (years) (95%CI)	72.6 (69.3–75.9)	84.3 (81.8–86.7)	81.7 (78.9–84.5)	83.8 (80.9–86.7)	
Males	11 (37%)	12 (40%)	16 (53%)	14 (47%)	
Females	19 (63%)	18 (60%)	14 (47%)	16 (53%)	
Participation rates	40%	41%	58%	79%	
Median <b>Barthel index of ADL</b> (IQR)	16 (14–18)	3 (1–6)	5 (2–7)	5 (1–8)	$X^2 = 53.09$ DF = 3 P < 0.01
Median <b>MMSE score</b> (IQR)	30 (29–30)	27 (22–28)	27 (24–29)	24 (19.5–27.5)	$X^2 = 30.894$ DF = 3 P < 0.01
Anorectal surgery	14 (46.7%)	4 (13.3%)	4 (13.3%)	1 (3.3%)	$X^2 = 20.861$ DF = 3 P < 0.01
Urogenital surgery	13 (43.3%)	5 (16.7%)	3 (10%)	3 (10%)	$X^2 = 16.724$ DF = 3 P < 0.01
<b>Childbirth</b> (% refers to women in the group)	19 (100%)	11 (61.1%)	11 (78.6%)	13 (81.3%)	
<b>Rectal examination</b>					
Yes	N/A	4 (13%)	4 (13%)	N/A	
Declined	N/A	18 (60%)	21 (70%)	N/A	
From medical records	6 (20%)	8 (27%)	5 (17%)	4 (13%)	

**Abbreviations:** ADL, activities of daily living; DF, degrees of freedom; IQR, interquartile range; MMSE, Mini-Mental State Examination; N/A, not available.

## Mortality

Twenty-two of the 120 (18%) subjects in the study died before the 3 month review. All but 3 of these were in the hospital wards at the baseline assessment. Thirteen (43%) of the acute ward subjects with FI did not survive.

## Discussion

This study has demonstrated that the relative distribution of the multiple contributory factors previously described for FI in older adults (Barrett 2002) varies between the healthcare settings in which patients are seen.

The present study concentrated on the general health factors but it has underestimated the extent of the anorectal factors in FI in the four settings. Only a few had anorectal examinations as part of their routine medical care (which was not examined in this study) and assent or consent tended to

be low for the physical examination for reasons given later in the discussion.

Previous anorectal physiology work has demonstrated abnormal anorectal physiology in a dependent group of older people with FI (Barrett 1988), but that only accounted for 35% of the variance in a multiple regression analysis of the presence of FI and its frequency.

Sanford (1975) has previously demonstrated that the onset of FI is often the issue that leads to the discontinuation of home care and a move into an institution. The significant difference in age and Barthel ADL scores between the living at home and nursing home groups indicates that they are very different and this is reflected in the difference in the relative prevalence of the contributory factors in these two settings. More contributory factors were found in the nursing home subjects. Cognitive impairment was the most

**Table 2** The prevalence of factors contributing to FI in the older adults studied in each of the settings

	Subjects living at home	Acute elderly care ward patients	Rehab elderly care ward patients	Nursing home subjects	Statistics
Fecal loading	6 (20%)	17 (57%)	19 (63%)	21 (70%)	$X^2 = 18.012$ DF = 3 P < 0.01
Functional disability	5 (17%)	25 (83%)	25 (83%)	20 (67%)	$X^2 = 38.222$ DF = 3 P < 0.01
Cognitive impairment	5 (17%)	13 (43%)	14 (47%)	26 (87%)	$X^2 = 30.033$ DF = 3 P < 0.01
Loose stools	11 (37%)	20 (67%)	17 (57%)	6 (20%)	$X^2 = 13.086$ DF = 3 P < 0.01
Anorectal incontinence	1 (3%)	2 (7%)	1 (3%)	0	
Comorbidity	11 (37%)	11 (37%)	20 (67%)	14 (47%)	$X^2 = 7.232$ DF = 3 P > 0.05

**Abbreviations:** DF, degrees of freedom; FI, fecal incontinence.

prevalent with a large element of fecal loading and functional disability which is consistent with previous studies (Johanson et al 1997; Brocklehurst et al 1999; Chassagne et al 1999). Loose stools were the most prevalent factor in the subjects living at home.

The relative prevalence of these factors should be borne in mind when clinically assessing patients in these settings as the relative importance of treatment approaches should reflect the difference in the contributory factors in various clinical settings.

Thirty percent of the living at home patients improved with routine medical care during the 3-month study period. These patients were on the register of the continence service and therefore included patients with long-term ongoing problems. The sample did not include new acute cases in whom a better result might have been anticipated though there is still a lack of reliable evidence to predict treatment success rates on general patients. Harari and colleagues (2004) achieved an increase in bowel movements following a single intervention in community dwelling post stroke patients with constipation or FI, but no alteration in episodes of FI. The intervention was a one-off assessment by a nonspecialist nurse who had received some basic bowel management training. The patient and carer were given some education, provided with a booklet and the patient's doctor was informed of the bowel condition and treatment.

In their landmark paper, Tobin and Brocklehurst (1986) demonstrated the potential for improvement in the care

home sector using simple measures. These included daily enemas followed by lactulose and weekly enema for those with fecal loading and codeine phosphate daily with twice-weekly enemas for those with anorectal incontinence. The FI did not resolve in any of the nursing home subjects in the current study. This issue needs to be considered in future work as either the original study does not apply to the current nursing home population, or the findings are not being implemented, or both.

The subjects recruited from acute and rehabilitation elderly care wards were similar in many respects. Functional disability, fecal loading and loose stools were all contributory factors for FI in the majority of patients in these settings. This is similar to the only previous study when loose stools, increased severity of illness and older age were found to be the significant factors for FI on acute medical wards (Bliss et al 2000). Comorbidity was more common among the rehabilitation ward patients in the current study.

## FI assessment

In routine clinical practice digital rectal examination is an essential component of the assessment of an older person with FI. Sadly these examinations were not performed in over 80% of the fecally incontinent patients in the rehabilitation wards studied even though continence has a major impact on discharge planning. The Royal College of Physicians national continence audit confirms that this lack of adequate assessment is widespread (BBC 2005).

**Table 3** Comparison of the baseline characteristics of patients in relation to whether their FI had resolved or not when reviewed after 3 months

	FI still present	FI resolved	Deceased	P value
n	79 (66%)	19 (16%)	22 (18%)	
Male	42 (53%)	2 (11%)	9 (41%)	
Female	37 (47%)	17 (90%)	13 (59%)	
Median Barthel ADL at baseline (IQR)	6 (2–12)	13 (7–17)	1 (0–5)	< 0.01
Setting in which assessed at baseline				
Own homes n = 30	21 (70%)	9 (30%)	0	
Acute care wards n = 30	12 (40%)	5 (17%)	13 (43%)	
Rehab wards n = 30	19 (63%)	5 (17%)	6 (20%)	
Nursing homes n = 30	27 (90%)	0	3 (10%)	
Contributory factors to FI at baseline. The percentages quoted for each variable below relates to the maximum number of subjects in that column.				
Cognitive impairment	44 (56%)	1 (5%)	13 (59%)	< 0.01
Disability	47 (60%)	9 (47%)	19 (86%)	< 0.05
Loose stools	27 (34%)	13 (68%)	14 (64%)	< 0.01
Fecal loading	40 (51%)	9 (47%)	14 (64%)	> 0.05
Anorectal incontinence	2 (3%)	1 (5%)	1 (5%)	
Comorbidity	36 (46%)	8 (42%)	12 (55%)	> 0.05

**Abbreviations:** ADL, activities of daily living; FI, fecal incontinence; IQR, interquartile range.

Only 13 (22%) of the 60 study subjects in the hospital setting had a digital rectal examination performed as part of their routine clinical assessment. Another 8 (13%) had one performed as part of this study. Some of the study subjects who did not have rectal examinations performed were too ill, but the majority had cognitive impairment and separate assent was not given for that part of the study. These findings are in contrast to a previous finding that most older adults with no cognitive impairment and that were not critically ill would give permission for a digital rectal examination to be performed on them (Morgan et al 1998).

### 3-month mortality

The 3-month mortality rate was highest in the acute ward patients at 43%. It is increasingly recognized that fecal as well as urinary incontinence in early stroke patients is a poor prognostic factor for survival (Nakayama et al 1997). The mortality among the acute ward patients in this study data suggests that loss of continence in the setting of any acute illness may be a marker of terminal illness as suggested in previous studies in older adults living at home

(Nakanishi et al 1999) or in a nursing home (Chassagne et al 1999).

There was an increased mortality associated with FI in frail older adults especially those in the hospital setting. This may be more related to the underlying illness than the incontinence itself.

### Conclusions

The distribution of the factors contributing to FI in older people living at home differs from those cared for in nursing home and hospital wards settings. These differences need to be borne in mind when assessing people in different settings. Management appears to result in a cure for those who are not significantly disabled with loose stools as a cause for their FI.

Part of the reason why resolution of FI is poor may be related to inadequate assessments, especially rectal examinations. Further research would be useful in looking at treatment options and whether FI in the acute setting is a marker of terminal illness. It would be interesting to see if the distribution of the factors contributing to FI in older people in this study is similar outside the United Kingdom.

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