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Functional disability among older women with fecal incontinence

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Abstract

Objectives—The prevalence of functional disability for basic activities of daily living (ADLs) in older women with fecal incontinence (FI) is not well characterized. Our objective was to determine the prevalence of functional disability among in community-dwelling older women with fecal incontinence.

Study Design—We conducted a secondary database analysis of the 2005–06 National Social Life, Health and Aging Project (NSHAP), a cross-sectional study of community-dwelling older adults conducted by single in-home interviews. FI was defined an affirmative answer to the question, “Have you lost control of your bowels (stool incontinence or anal incontinence)?” with a frequency of “at least monthly”. We then examined functional status. Women were asked about seven basic ADLs. Statistical analyses with percentage estimates and 95% confidence intervals (CI) were performed.

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Elisabeth A. Erekson, MD MPH: study design, analysis and interpretation of data, critical revision of manuscript for important intellectual content; Maria M. Ciarleglio, PhD: analysis and interpretation of data; Paul D. Hanissian, MD, critical revision of manuscript for important intellectual content; Kris Strohbehn, MD: critical revision of manuscript for important intellectual content; Julie PW Bynum, MD MPH, interpretation of data and critical revision of manuscript for important intellectual content, and Terri R. Fried, MD: interpretation of data and critical revision of manuscript for important intellectual content.

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Results—1,412 women were included in our analysis. FI, at least monthly, was reported by 5.5% (n=77) of community-dwelling older women. 63.2% (95% CI 50.1, 76.4) of women with FI reported difficulty or dependence with 1 ADLs and 31.2% (95% CI 18.9, 43.6) specifically reported difficulty or dependence with using the toilet. After adjusting for age category, race/ethnicity, education level, women with FI had 2.6 increased odds (95% CI 1.26, 5.35) of difficulty or dependence compared with women with no FI. Other significant risk factors for increased functional difficulty/dependence included obesity (body mass index $\geq 30\text{kg/m}^2$) and depressive symptoms.

Conclusions—Consistent with other large epidemiologic studies, we found monthly FI was reported by 5.5% (n/N=77/1,412) of older women. Over 60% of community-dwelling older women with FI report functional difficulty or dependence with 1 ADL and specifically, over 30% of women with FI report difficulty or dependence using/reaching the toilet. Due to the high prevalence of functional disability in older women with FI, we propose that initial evaluation and treatment of FI may be improved by considering functional status.

Keywords

fecal incontinence; functional disability; activities of daily living

Introduction

Fecal incontinence (FI) is an embarrassing condition that impacts multiple aspects of older women's lives. FI is defined as the uncontrolled passage of fecal material greater than once per month recurring for ≥ 3 months by ROME III criteria.(1) Moderate to severe FI is reported by 2.8% to 15.3% of women ≥ 65 years in the United States.(2,3) FI is associated with increased depressive symptoms, poor self-rated health and social isolation.(4) The prevalence of FI increases with increasing age.(3) Other risk factors for FI in women include smoking, increasing BMI, and diseases increasing diarrhea and rectal urgency such as inflammatory bowel disease and irritable bowel syndrome.(1–3, 5–7)

In the gastroenterology literature, causes of FI can be divided into organic and functional etiologies.(1) Organic etiologies for FI include disruptions in the muscles or nerves of the anal sphincter complex from obstetric trauma and abnormal innervations of the brain (e.g. stroke or dementia), spinal cord or peripheral neuropathies.(2,3) Many gastrointestinal disorders are termed “functional” or idiopathic when exact organic causes of these disorders are not known and refer to disorders of stool consistency and rectal urgency.(1–3,8)

Functional limitations refer to physical and/or cognitive difficulties and also increase with increasing age. Functional dependence is the inability to perform an activity of daily living (ADL) including dressing, bathing, eating, toileting, and getting in and out of bed without assistance.(9) Functional dependence has been demonstrated to lead to increased risk of adverse outcomes of aging including inpatient hospitalization, admission to a skilled nursing facility, and increased mortality in older adults.(10) Adults can also be independent but report difficulty in performing ADLs. Difficulty in performing ADLs independently is an intermediate step in the functional disability spectrum but demonstrated to be predictive of poor health outcomes.(11) In addition to functional disabilities, compromised mobility,

measured by walking speed, use of assistive devices and number of falls, has also been shown to have strong and consistent associations with adverse outcomes of aging.(10,12,13)

Incontinence, both urinary and fecal incontinence, has also been associated with adverse outcomes of aging and attributed to play a critical role in the decision for admission to a skilled nursing facility.(14–16) Additionally, self-reported decreased physical activity and poor mobility are associated with FI in epidemiologic studies in adults,(2,3,17) which suggests another aspect of functional etiologies of FI, in addition to disorders of stool consistency and rectal urgency, are the functional limitations that prevent a person from reaching or using the toilet. The prevalence of functional disability for basic ADL in older women with FI is not well characterized. Our objective was to determine the prevalence of functional disability and characterize the type of disability among community-dwelling older women with FI using a nationally representative sample.

Methods

We conducted a secondary database analysis of the National Social Life, Health and Aging Project (NSHAP), a cross-sectional cohort of community-dwelling men and women in the United States between the ages of 57–85 years surveyed in 2005–2006.(18) The NSHAP was conducted to examine social networks, overall health, and sexual practices of older adults.(19) Adults were targeted for possible participation in the NSHAP study from a prior population-based study, the Health and Retirement Study.(20) The overall weighted survey response rate of the NSHAP was 75.5%. Data were collected from an in-home interview conducted in English or Spanish by trained research personnel utilizing computer-assisted personal interview methods.(21) The 2005 to 2006 NSHAP dataset is maintained at the Interuniversity Consortium for Political and Social Research at the University of Michigan and we formally requested use of this data for this secondary database analysis. Written exemption for this study was obtained from the Yale University Institutional Review Board as this work involved research of an existing dataset from a public source.

For this analysis, we chose to focus specifically on women as the risk factors and etiologies of FI are different between genders. Women were excluded if they had missing data for questions on incontinence (n=98). All women were asked, “How frequently...have you lost control of your bowels (stool incontinence or anal incontinence)?” Women could respond “daily”, “a few times per week”, “a few times per month”, “a few times per year”, and “none”. Women were categorized as having FI if they answered with frequency consistent with monthly symptoms including: “every day”, “a few times a week” or “a few times per month”. Women were categorized as having no FI if they answered “a few times per year” or “none”. We chose monthly loss of control of bowels to represent FI consistent with ROME III criteria and accepted definitions of FI in epidemiologic studies.(1)

We then categorized functional status. Women were asked about seven basic ADLs including walking across a room, walking one block, dressing, bathing, eating, toileting, and getting in and out of bed.(22) Women’s functional status for each ADL was categorized into one of three categories: independent, independent with difficulty if they reported difficulty with performing an ADL but did not require assistance and dependent if they reported

inability to perform an ADL without assistance.(11) The composite functional status measure combined the responses of all 7 ADLs as a single variable. Consistent with the categorization proposed by Gill et al., women were placed into one of three categories for composite functional status: independent, functional difficulty, and functional dependence. (11) Women who could not perform one or more ADL without assistance were categorized as dependent. Women reporting difficulty in performing one or more ADLs, without reporting dependence on others to perform any ADL, were categorized as independent with difficulty. Women were categorized as independent if they reported no difficulty or dependence in performing any of the seven ADLs.

We also analyzed compromised mobility using multiple measurements. We first examined the results of a timed “Get up and Go” test conducted by direct observation in the participant’s home at the time of the single NSHAP in-person interview. The timed “Get up and Go” test includes the total time it takes a women to rise from a seated position without using armrest, walk 3 meters, turn around, return 3 meters, and sit-down and is the preferred measurement of mobility advocated by the American Geriatric Society.(23) We defined compromised mobility as a total “Get up and Go” test time of more than 12 seconds. Additionally, we examined other measurements of mobility including if a woman was observed to walk unsteadily during the timed test and if she was observed to use a cane or other assistive walking device. Finally, we examined self-reported measurements of mobility including the frequency of physical activity in the last month and the number of falls in the last year.

Demographics including age category (57 to 64 years, 65 to 74 years, and 75 to 85 years), race/ethnicity, education level and self-reported health status relative to peers overall health, parity, obesity (body mass index (BMI) ≥ 30 kg/m²), number of medical comorbidities and depressive symptoms were then examined as descriptive variables and potential confounders. Depressive symptoms were measured by the modified Center for Epidemiological Studies-Depression (CES-D) scale. The modified CES-D scale is an 11 question screening test for depressive symptoms.(24,25) Each question had a score from 0–3, with score scales ranging from 0–33 and higher scores indicating more depressive symptoms.

Statistical analyses, including descriptive and inferential statistics were performed as appropriate. The NSHAP dataset allowed data to be weighted to provide an estimate of population characteristics representative of community-dwelling older Americans aged 57 to 85 years. Survey weights were applied to crude frequency estimates to account for the differential probability of inclusion in the sample. Percentage estimates and 95% CI were obtained to report weighted frequencies. Model fitting and variance estimates used in the construction of CI account for the stratified and clustered nature of the design to produce unbiased estimates of standard errors.

A logistic regression analysis was then performed to examine the relationship between the dependent variable of FI and the independent variable of functional difficulty or dependence with 1 ADL. Potential confounders were considered for inclusion in the final model based on their significance in univariable analysis ($p < .1$). Significant confounders were included

in the final adjusted model if they continued to impact the final model. Statistical analyses were performed using SAS 9.2 (SAS Institute, Inc., Cary, NC) and STATA 11.0 (StataCorp, College Station, TX). Post-hoc power calculation was performed as our sample size was limited by the size of the NSHAP dataset. We determined that we had .997 power to detect the difference in functional dependence/disability between women with and without FI (two-sided, $\alpha = .05$). All authors had access to the study data and have reviewed and approved the final manuscript.

Results

A total of 1,412 women were included in our analysis. Ninety-eight women were excluded due to missing data in regard to incontinence status. FI was reported by 5.5% (n=77) of women. (Table 1) Women with FI tended to report their health status relative to peers as “much worse/somewhat worse” compared with other women [26.5% (95% CI-12.7, 40.2) vs. 10.4% (95% CI-8.3, 12.4); $p = .04$]. Median number of medical comorbidities were higher in women with monthly FI [2.5 (95% CI-1.4, 3.6)] compared with other women [1.5 (95% CI-0.6, 2.5)] $p < .001$. Depressive symptoms, measured by mean CES-D scores, were increased in women with FI [9.6 (95% CI-8, 11.2)] compared with other women (5.4 (95% CI 5.2, 5.7)) $p = .001$.

Women with monthly FI were more likely to report difficulty or dependence with each of the 7 basic ADLs compared with women without FI ($p < .001$ for all). (Table 2) Eight hundred thirty-six women, 484 women, and 92 women were classified as independent, independent with difficulty and dependent for composite functional status, respectively. (Table 2) Among older women with FI, 30.8% (95% CI 18.6%, 43.1%) specifically reported difficulty or dependence with using/reaching the toilet. Among older women with FI, 63.2% (95% CI 50.1%, 76.4%) reported functional difficulty or dependence for 1 ADL.

After adjusting for age category, race/ethnicity, education level, women with FI had 2.6 increased odds (95% CI 1.26 – 5.35) functional difficulty or dependence with 1 ADL compared with other women. (Table 3) Other significant risk factors for increased difficulty/dependence with toileting included obesity (BMI ≥ 30 kg/m²) and depressive symptoms (CES-D score). (Table 3)

The percentage of women with compromised mobility, defined as a total time of ≥ 12 seconds on the “Get up and Go” test, was significantly different between women with FI (70.0% (95% CI-53.9, 86.0)) compared with other women (50.7% (95% CI 44.9, 56.4)) $p = .03$. (Table 4) Women with FI were more likely to use a cane or assistive walking device [18.6% (95% CI 1.7, 35.5)] compared with other women [8.8% (95% CI- 6, 11.5)] $p = .001$. Women with monthly FI were more likely to report falling in the last 12 months [45.9% (95% CI 31.3, 60.5)] compared with other women [24.1% (95% CI 20.7, 27.4)]; $p = .0005$.

Comments

In a nationally representative cohort of community-dwelling women age 57 to 85, 5.5% of women reported FI at least monthly. We found the prevalence of functional difficulty and dependence was present in the majority of women with FI. Over 60% of community-

dwelling older women with FI report functional difficulty or dependence with one of seven basic ADLs and specifically, over 30% of women with FI report difficulty or dependence using/reaching the toilet.

Similar to others, we found that women with FI had more medical comorbidities, increased depressive symptoms and reported their overall health status as worse than their peers. We found increased functional difficulty and dependence with each of the 7 basic ADLs among older women with FI. In a study examining risks factors for monthly FI in women from the Nurses' Health Study (NHS), Townsend et al. reported that functional limitations in 4 categories (defined as substantial limitations in climbing one flight of stairs, walking one block, bathing or dressing) were associated with FI [Age-adjusted Odds Ratio (OR) = 1.87 (95% CI 1.75, 2.00)].(5) One critique of the NHS is that the participants are highly educated nurses and may not represent the community dwelling population. Our findings of increased functional disability among women with FI in a separate cohort of community-dwelling older women confirm the findings of Townsend et al. and add additional insight to specific disability with toileting.

Decreased reports of physical activity and poor mobility have been consistently associated with FI.(2,3,17) Goode et al. demonstrated decreased timed walking scores, decreased time chair stands, and increased falls in the past year in both men and women reporting FI at least once monthly in the University of Alabama at Birmingham (UAB) aging study of 1,000 older adults.(2) Similarly, we observed decreased physical activity, an increase in the use of assistive walking devices and an increase in reported falls in the last 12 months among older women with FI. Our findings of the increased presence of falls and need for assistive walking devices coupled with decreased physical activity among older women with FI suggest that FI may commonly result from functional disabilities and physical limitations. These functional disabilities and difficulties with mobility likely often coexist with organic etiologies such as disruption of the anal sphincter complex and decreased pelvic floor tone.

Our study is limited by its cross-sectional design; therefore causality between FI and functional limitations cannot be determined. We cannot determine if functional limitations lead to depression and FI symptoms or if FI symptoms lead to depression and functional limitations. We did demonstrate functional disability is common in women with FI. Our study is also limited by being a secondary database analysis and further information on certain variables was not collected. The primary objectives of the NSHAP were to examine the social networks and sexual health of community-dwelling older adults in the United States. This secondary analysis was not a part of the original study design which introduces certain biases. Specifically, we do not have information on the etiologies and treatments of FI or treatments in this population. However, we could report very specific and reproducible data on functional status and mobility of a nationally representative cohort of older women. In-home interviews were conducted in person in English and Spanish. Although every question was standardized, not every question in the NSHAP was validated in both English and Spanish with could introduce error in how participants answered questions. Additionally, our findings are limited to English and Spanish speaking women. Finally, bowel symptoms were asked in a consistent way, but a validated severity index score (e.g.

the fecal incontinence severity index (FISI)) was not utilized which further limits our findings.

In conclusion, greater than 60% of older women with FI report functional disabilities in at least one of seven ADLs and over 30% of community-dwelling older women with FI report functional difficulty or dependence using the toilet. Due to the high prevalence of functional disability and compromised mobility in older women with FI, we propose that evaluation and treatment of women presenting with FI should consider their functional status and mobility. We propose that if FI develops late in life, many decades after a woman's last vaginal delivery, initial evaluation and treatment of functional status, mobility and stool consistency may be warranted prior to evaluation and surgical management of anal sphincter defects. Further research is needed to elucidate if evaluation and treatment of functional disabilities and mobility among women seeking treatment for FI will improve outcomes.

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Clinical Implications

- Greater than 60% of older women with FI report functional disabilities in at least one of seven ADLs and over 30% of community-dwelling older women with FI report functional difficulty or dependence using the toilet.
- The increased presence of falls and increased need for assistive walking devices coupled with decreased physical activity among older women with FI suggest that FI may commonly result from functional disabilities and physical limitations. These functional disabilities and difficulties with mobility likely often coexist with other organic etiologies of FI such as disruption of the anal sphincter complex and decreased pelvic floor tone.
- Due to the high prevalence of functional disability and compromised mobility in older women with FI, we purpose that evaluation and treatment of women presenting with FI should consider functional status and mobility.
- If FI develops late in life, many decades after a woman's last vaginal delivery, initial evaluation and treatment of functional status, mobility and stool consistency may be warranted prior to evaluation and surgical management of anal sphincter defects.

Table 1

Demographics and clinical characteristics of community-dwelling older women with fecal incontinence. Weighted.

Variable	Unweighted Respondents N=1,412	Daily/Weekly/Monthly fecal incontinence N=77	No/Yearly fecal incontinence N=1,335	P
Age Category:				0.713
57–64	463	41 (26.2–55.8)	40.1 (36.8–43.4)	
65–74	495	30.3 (17.6–43)	35 (31.9–38.1)	
75–85	454	28.7 (18.5–38.9)	24.9 (22.3–27.4)	
Race/Ethnicity				0.759
White	991	77.4 (68.1–86.8)	81.3 (77.4–85.3)	
Black	261	12.8 (5.3–20.3)	10.7 (7.8–13.6)	
Hispanic, non-black	126	6.8 (1–12.5)	6.1 (3–9.1)	
Other	26	3 (0–6.7)	1.9 (0.9–3)	
Health Insurance				0.325
Medicaid or Medicare	302	25.2 (12–38.4)	21.2 (17.3–25)	
Private Insurance	662	51.8 (38.4–65.3)	62.3 (58.3–66.4)	
Other	187	22.9 (9–36.9)	16.5 (14–18.9)	
Education				0.015
Less than high school	319	35.3 (21–49.6)	17.5 (14.3–20.7)	
High school or equiv.	418	29.1 (17.8–40.3)	29.9 (26.9–32.9)	
Some college	432	21.7 (11.7–31.6)	33.6 (29.7–37.5)	
Bachelor's degree or higher	243	14 (2.6–25.4)	19 (15.8–22.2)	
Health Status Relative to Age Peers				0.003
Much worse/Somewhat worse	136	26.5 (12.7–40.2)	10.4 (8.3–12.4)	
Same/Somewhat better/Much better	1049	73.5 (59.8–87.3)	89.6 (87.6–91.7)	
Parity				0.278
No live births	32	5.8 (0–17)	1.9 (1.1–2.8)	
> 1 live births	1273	94.2 (83–100)	98.1 (97.2–98.9)	
BMI category				0.123
< 30 kg/m ²	810	72 (61.3–82.8)	62.8(59.7–65.9)	
30 kg/m ²	500	28 (17.2–38.7)	37.2(34.1–40.3)	
Medical Comorbidities (Median IQR)	1412	2.5 (1.4–3.6)	1.5 (0.6–2.5)	<.001
CES-D Score (Mean 95% CI)	1385	9.6 (8–11.2)	5.4 (5.2–5.7)	<.001

All values listed as a weighted estimate (95% Confidence Interval) unless otherwise specified.

BMI: Body Mass Index

CES-D: Center for Epidemiological Studies-Depression Scale. Range 0–33; higher score indicates greater depressive symptomology

Table 2

Activities of daily living in community-dwelling older women with fecal incontinence. Weighted

Variable	Unweighted Respondents N= 1,412	Daily/Weekly/Monthly fecal incontinence N=77	No/Yearly fecal incontinence N=1,335	P
Walking across the room				0.002
Independent	1201	72.5 (58.2–86.9)	88.1 (86.1–90.1)	
Independent with difficulty	199	25.7 (11.5–40)	11.4 (9.5–13.2)	
Dependent	12	1.7 (0–3.9)	0.5 (0.2–0.9)	
Walking one block				<.001
Independent	958	48 (34–61.9)	73.8 (71–76.6)	
Independent with difficulty	365	41.6 (27.3–55.8)	21.6 (19–24.1)	
Dependent	88	10.5 (3.9–17.1)	4.6 (3.3–5.9)	
Dressing				<.001
Independent	1193	64.2 (50.9–77.4)	86.6 (84.3–89)	
Independent with difficulty	211	35 (21.8–48.2)	12.9 (10.7–15.1)	
Dependent	8	0.8 (0–2)	0.5 (0–0.9)	
Bathing or showering				<.001
Independent	1259	75 (63.9–86)	91.8 (90.1–93.4)	
Independent with difficulty	141	23.6 (12.8–34.5)	7.6 (6.1–9.1)	
Dependent	11	1.4 (0–3.6)	0.6 (0.1–1.1)	
Eating				<.001
Independent	1339	79.7 (69.6–89.9)	96.4 (95.3–97.4)	
Independent with difficulty	71	20.3 (10.1–30.4)	3.5 (2.5–4.5)	
Dependent	2	0	0.1 (0–0.2)	
Getting in and out of bed				0.001
Independent	1210	72.2 (59.8–84.6)	87.7 (85.3–90.1)	
Independent with difficulty	197	27 (14.6–39.3)	12.1 (9.8–14.5)	
Dependent	5	0.8 (0–2)	0.2 (0–0.5)	
Using the toilet				<.001
Independent	1214	68.8 (56.4–81.1)	87.9 (86–89.8)	
Independent with difficulty	196	30.8 (18.6–43.1)	12.1 (10.1–14)	
Dependent	2	0.4 (0–1.2)	0.1 (0–0.2)	
Composite functional status ^a				<.001
Independent	836	36.8 (23.6–49.9)	64.5 (61.1–67.8)	
Independent with difficulty	484	52.8 (39.3–66.2)	30.7 (27.6–33.8)	
Dependent	92	10.5 (3.9–17.1)	4.9 (3.6–6.1)	

All values listed a weighted estimate (95% Confidence Interval) unless otherwise specified.

^a Composite functional status Independent = no difficulty or dependence on any activity of daily living.

Independent with difficulty = difficulty on any activity of daily living (but no dependence for any ADLs) Dependent = dependence on any activity of daily living

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Table 3

Multivariate logistic regression model for predictors of fecal incontinence among community-dwelling older women (N= 1412, N used in model = 1286)

Variable	Adjusted OR	95% CI	p-value
Functional Disability			0.01
No disability	1		
Difficulty or dependence	2.60	1.26 5.35	
Age Group, years			0.872
57–64	1		
65–74	0.80	0.34 1.91	
75–85	0.85	0.41 1.76	
Race			0.972
White	1		
Black	1.01	0.48 2.13	
Hispanic, non-black	0.88	0.39 1.98	
Other	1.50	0.17 13.16	
Education			0.192
Less than High School	1		
High School or Equivalent	0.58	0.26 1.27	
Some College	0.42	0.18 0.98	
Bachelor's Degree or Higher	0.33	0.09 1.19	
BMI category			0.003
< 30 kg/m ²	1		
30 kg/m ²	0.42	0.24 0.75	
CES-D Score	1.091	1.04 1.14	<0.001

CI = confidence interval

BMI = body mass index

CES-D = Center for Epidemiological Studies-Depression Scale

Participants excluded from model for missing data included: 102 for missing BMI and 24 for missing CES-D score.

Table 4

Mobility in community-dwelling older women with fecal incontinence. Weighted

	Daily/Weekly/Monthly fecal incontinence N=77	No/Yearly fecal incontinence N=1,335	<i>P</i>
Compromised mobility	70 (53.9–86)	50.7 (44.9–56.4)	0.032
Walked unsteadily	18.6 (1.7–35.5)	8.8 (6–11.5)	0.101
Used cane or walker	19 (4–34)	1.8 (0.4–3.2)	<0.001
Frequency of physical activity			
Never or < 1 time per month	32.7 (19.4–45.9)	17.4 (14.9–19.9)	0.003
Fallen in the past 12 months	45.9 (31.3–60.5)	24.1 (20.7–27.4)	<0.001
Number of falls in past 12 months (Mean 95% CI)	4.7 (1.3–8.2)	2.1 (1.8–2.3)	0.136

All values listed as a weighted estimate (95% Confidence Interval) unless otherwise specified.

Compromised mobility was total time 12 seconds to complete 'Get Up and Go' test