Factors Impacting quality of life in Women with fecal incontinence

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Abstract

Objective—To characterize differences in health-related quality of life among women presenting for treatment of fecal incontinence.

Methods—Among 155 women presenting for treatment of fecal incontinence in a specialty clinic, validated questionnaires measured impact on quality of life (Modified Manchester Health Questionnaire) and severity (the Fecal Incontinence Severity Index). Bowel symptoms, including frequency, urgency, and stool consistency, were ascertained. Co-morbid diseases were self-reported. Linear regression models were constructed from significant univariate variables to examine differences seen in quality of life scores.

Results—Average age was 58.7 ± 11.5 with no differences found in quality of life scores according to race, body mass index, or number of vaginal deliveries ($p > 0.05$). Younger age, increased urinary incontinence symptoms, prior cholecystectomy, prior hysterectomy, and severity of bowel symptoms correlated with a negative impact on quality of life in univariate analysis (p

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<0.05). Average severity scores were 30.5 ± 13.7 with moderate correlation seen with increasing severity and quality of life scores ($R_2 = 0.60$). After controlling for severity, women had increased quality of life scores with more bowel urgency (15 points, 95% CI 8.1, 21.2), harder stool consistency (10 points, 95% CI 3.8, 16.3), and prior hysterectomy (9 points, 95% CI 2.7, 15.4).

Conclusion—Bowel symptoms and having a prior hysterectomy had the greatest negative impact on quality of life in women seeking treatment for fecal incontinence. Targeting individualized treatments to improve bowel symptoms may improve quality of life for women with fecal incontinence.

Keywords

fecal incontinence; women; quality of life; urinary incontinence; bowel symptoms

Introduction

Fecal incontinence (FI) is defined as the involuntary loss of solid or liquid feces that is a social or hygienic problem.[1] When analyzing the prevalence of at least monthly FI among community-dwelling women in the US, rates vary from 3-22% with older women consistently experiencing more FI than younger age groups.[2-8] Given the projected 38% increase in women aged 65 and older among the US population in the next few decades, more information is needed regarding differences in women presenting for FI treatment and the impact on quality of life (QOL).[9]

FI has a significant negative impact on QOL among women, [10-14] with few studies examining factors which impact QOL in women presenting for treatment.[13] FI may be associated with prior trauma to the external sphincter (obstetrical or prior sphincter surgery), alterations in rectal capacity and compliance, bowel symptoms such as urgency and frequency, and age-related thinning in the external anal sphincter and other pelvic muscles. Medical conditions or co-morbidities, such as diabetes, vascular disease, obesity, and neurologic diseases, are also independently associated with FI.[5-7, 10] Existing studies have examined differences in women presenting for FI treatment, but few have controlled for medical conditions and for patient centered outcomes, such as severity, on QOL.[13]

Given the paucity of data on QOL differences seen in women with FI, this study provides additional data on factors that may impact QOL in women presenting for FI treatment in a specialty-based clinic. After controlling for patient age and the severity of FI, we hypothesized that women presenting for FI treatment would have a greater negative impact on condition-specific QOL if they had more medical co-morbidities, prior trauma to the external sphincter, and increased bowel symptoms.

Methods

Participants

Participants included women who presented with a primary complaint of fecal incontinence to the Genito-Rectal Disorders Clinic at the University of Alabama at Birmingham (UAB) since 2003. All women provided written consent and the UAB Institutional Review Board (IRB) approved all data collection.

Questionnaires

Women were mailed questionnaires on fecal and urinary incontinence prior to presenting the Genito-Rectal Disorders Clinic. Demographic information, past medical history, and other potential risk factors for fecal incontinence were collected and entered into an IRB-approved

database at the time of initial presentation to the clinic. Questionnaires to assess FI included the Modified Manchester Health Questionnaire (MMHQ), which is a validated questionnaire that also includes the Fecal Incontinence Severity Index (FISI).[15, 16] The MMHQ measures health-related quality of life (HR-QOL) for FI and includes 8 subscales on the impact of FI on: overall impact, role limitations, physical/social limitations, personal relationships, emotions, sleep/energy, sexual activity, and lifestyle adaptation. The MMHQ is scaled from 0-100, for total and subscale scores, where higher scores represent a negative impact on HR-QOL. Women who reported not being currently sexual active did not respond to questions on the impact of FI on this domain, thus only 7 subscales were averaged for the calculation of the total MMHQ score in women who were not sexually active. The FISI measures the frequency of liquid, solid, mucus, or flatal incontinence that occurs from "two or more times per day," "once per day," "two or more times per week," "once a week," to "one to three times per month." Patient-weighted scores are used to determine severity and scores range from 0-61, with higher scores indicating worse FI severity.[16] A FISI score of 0 indicates continence. Women who responded to any level of flatal incontinence without having incontinence to liquid, solid, or mucous stool were considered incontinent to flatus only and not considered to have fecal incontinence. Only women with incontinence to liquid, solid, or mucous stool were included in this study.

Additional information from the MMHQ that is not used for the total or subscale scores includes questions on bowel movement frequency, fecal urgency, and stool consistency (Table 1). Bowel movement frequency was ascertained by the question, "How often do you move your bowels each day?" Response levels were: "1-2 times a day," "3-4 times a day," "5-6 times a day," "7 or more times a day," "every other day," and "less than every other day." Frequency was then categorized as "≤ every other day," "1-2 times a day," and "≥3-4 times a day." Fecal urgency was evaluated by the question, "How often do you have a strong desire to move your bowels which makes you rush to the toilet?" The response levels are: "never," "occasionally," "sometimes," "most of the time," and "all of the time." We defined fecal urgency as occurring "most" or "all of the time" with a strong desire to have a bowel movement and non-urgency as "never," "occasionally," and "sometimes." Stool consistency was characterized by the questions: "What percent of your bowel movements are hard or little balls?" and "What percent of your bowel movements are loose or watery?" Women responded to categories ranging from zero to one-hundred percent. Stool consistency was then categorized as occurring ≥ 50% or <50% for hard/little balls and for loose/watery stool.

A modified Sandvik Severity Index was used to describe urine leakage as present or absent. [17] The Medical, Epidemiologic, and Social Aspects of Aging Questionnaire (MESA) was used to evaluate symptoms of urinary incontinence (UI).[18] The MESA has two subscales; one for stress urinary incontinence symptoms and one for urge urinary incontinence symptoms. Questions referring to loss of urine at times of exertion such as laughing, sneezing, lifting, or bending define symptoms of stress urinary incontinence. Questions referring to urine loss preceded by an urge to void, or uncontrollable voiding with little or no warning define symptoms of urge incontinence. The questionnaire has a range of scores of 0-27 for stress UI symptoms and 0-18 for urge UI symptoms. Higher scores represent greater symptom severity.

Women also completed the SF-12, a generic health-related quality of life questionnaire.[19] For this analysis, the scales of the SF-12 included the mental and physical component summary scores. For the MMHQ, a higher score indicates worse symptom bother or a negative impact of symptoms on daily functioning.[15] For the scales of the SF-12, a higher score indicates a positive impact on health-related quality of life.

Clinical Evaluation with Anorectal Manometry and Endoanal Ultrasound

Anorectal manometry was completed by physicians using a water-perfused disposable catheter system (Medtronic, Inc Minneapolis, MN). Pressures were recorded during resting, squeezing, and pushing at 1 cm intervals starting at 5-6 cm from the anal verge. Maximum tolerated rectal volume was measured in milliliters using an air-filled balloon. To evaluate for tears or disruption of the internal and external anal sphincters, endoanal ultrasound using a 10 MHz, 360° window endoanal probe at 5mm intervals (B & K Medical Systems, Inc. Willmington, MA) was completed. Women who had scarring of the external anal sphincter were also documented, but not included in the sphincter tear group.

Data Analysis

Pearson's correlation coefficient was calculated between FISI scores and MMHQ scores. The relationship with all potential variables and the change in MMHQ scores was evaluated with one-way ANOVA, where a positive change represents an increase in MMHQ score (negative impact on quality of life) and a negative change representing a decline in MMHQ score (positive impact on quality of life). Data are presented as coefficients with 95% confidence intervals. In order to explore those factors that may impact differences in HR-QOL seen in women seeking treatment for FI, a step-wise linear regression model controlling for FI severity and co-morbid disorders with significant differences ($P < 0.1$) on univariate analyses was constructed. Software used for analyses was STATA 8.2 (College Station, TX).

Results

Our cohort included 164 women seeking evaluation for a primary complaint of FI. A subset of women (155/164, 95%) had complete data on the MMHQ. Age ranged from 21 to 85 years (mean age ± standard deviation was 58.7 ± 11.5 years). The sample was predominantly Non-Hispanic White participants (88%), with 9% African American, 2% Asian American, and 1% self-reported as "Other." Table 2 displays clinical characteristics of participants (n = 155) and relationship with MMHQ scores. Younger women were more likely to have higher MMHQ scores (representing a negative impact on HR-QOL). When dichotomizing age, women < 65 years of age had 15-point higher MMHQ scores than women ≥ 65 years of age. Other variables found to increase MMHQ scores ($p \leq 0.05$) were: the presence of urinary incontinence (with increasing stress and urge symptoms), prior cholecystectomy, and prior hysterectomy.

In terms of QOL, mean SF-12 physical and mental scores were 39.0 ± 5.7 and 39.1 ± 5.8, respectively, with a weak correlation seen with FISI scores ($R_2 < -0.1$ for physical and mental subscale scores). Mean FISI scores were 30.5 ± 13.2 and mean MMHQ scores were 45.4 ± 24.5. When examining MMHQ scores in comparison to FI severity, scores increased moderately ($R_2 = 0.6$) with FISI scores. Only 51% of women aged ≥ 65 years of age with FI reported currently being sexual active at the time of the questionnaire compared to 80% of women< 65 years of age (data not shown). Having more bowel symptoms including urgency and increased bowel movement frequency increased MMHQ scores by 25 points ($p < 0.001$) and 7 points ($p = 0.02$), respectively (Table 2). Stool consistency that was hard/little balls ≥ 50% of the time increased MMHQ scores by 14 points ($p = 0.001$) and loose/watery stool consistency ≥ 50% of the time increased MMHQ scores 16 points ($p < 0.001$).

Anorectal manometry and endoanal ultrasound were performed in a subset of the women presenting for FI treatment, 77% and 86%, respectively (Table 2). No significant changes in MMHQ scores were seen when evaluating objective measures such as anorectal manometry pressures and capacity. Although women who had a tear on endoanal ultrasound in either the

external or internal anal sphincters had increased MMHQ scores, this relationship was not significant.

After controlling for age, co-morbid disease, and FI severity in the linear regression model (Table 3), women reporting strong urgency symptoms had a 15-point higher MMHQ score (95% Confidence Interval 8 to 21). Women with hard stools or little balls ≥ 50% of the time had a 10-point increase in MMHQ scores. In multivariable analysis, loose or watery stool consistency was not a significant factor for increased MMHQ scores (p = 0.09) and had no interaction with urgency symptoms. Having a prior hysterectomy was associated with a 9-point increase in MMHQ scores (95% Confidence Interval 3 to 15). The decrease in MMHQ scores seen in older women remained significant after controlling for other factors. If age was dichotomized as ≥65 years of age verses <65 years of age in the multivariable model (data not shown), the decrease in MMHQ scores in women ≥ 65 years of age remained significant and had a larger magnitude of change (-9.4 points decline, 95% Confidence Interval -16.6 to -2.2). With age dichotomized in the multivariable model, having a prior hysterectomy no longer remained a significant factor impacting MMHQ scores (6.2-point increase, 95% Confidence Interval -0.1 to 12.4).

Discussion

Even after controlling for age and co-morbid diseases in this clinical cohort of women presenting for FI treatment, we found that bowel urgency symptoms, hard stool consistency, and having had a prior hysterectomy remained significant independent predictors of impaired HR-QOL. Although anal sphincter injury resulting from vaginal delivery is viewed as an important factor with regards to FI severity and QOL,[20] we found that bowel urgency and hard stool consistency had a greater negative impact on HR-QOL and deserve more attention from both a future research standpoint, as well as clinically, with assessment and treatment of FI.

Other studies have also found that bowel urgency and stool consistency are associated with FI in community-dwelling women, [2,11,21] but very few studies have examined the effect of bowel symptoms on HR-QOL in women with FI.[13] In one study that evaluated the impact of FI on HR-QOL in 157 patients attending urogynecology and colorectal clinics for various problems, increased bowel frequency and the amount of soiling had a negative impact on the Fecal Incontinence Quality of Life (FIQL) Scale.[13] Other studies have evaluated the impact of bowel symptoms on the presence of FI. In one such study by Bharucha et al, rectal urgency and symptoms of incomplete evacuation were independent risk factors for FI using a mailed bowel symptoms questionnaire among community-dwelling women.[21] In addition to fecal urgency, stool consistency plays an important role in FI and may impact fecal urgency. National data from the National Health and Nutritional Examination Survey (NHANES) from 2005-2006 found that advancing age, loose or watery stools, increased stool frequency, multiple chronic illnesses, and urinary incontinence were independent risk factors for FI in women, but this study did not assess symptoms of rectal urgency or the impact of bowel symptoms on QOL.[8] Although we did not use a validated measure to assess stool consistency, we did address the impact of stool consistency on QOL as measured by MMHQ questions. These findings may have important implications when doing FI intervention trials on modifiable risk factors and evaluating outcomes associated with HR-QOL.

Our study adds to the current literature on HR-QOL in women with FI by further evaluating and controlling for co-morbid conditions and FI severity, which are independent risk factors for FI in other studies and may also negatively impact QOL. In one other study that looked at the impact of increased FI severity on HR-QOL on the FIQL, the authors found a weak

linear correlation ($R_2 \leq 0.4$) with FI severity (FISI scores) and general QOL as measured by the SF-36 ($R_2 \leq 0.1$).[22] The lack of correlation of the FISI scores and the FIQL may be due to the scoring of the FIQL into 4 different domains, whereas the MMHQ is scored from zero to one hundred for a total score, as well as the 8 subscales. In this study, we found a moderate correlation ($R_2 = 0.6$) for increasing FI severity and a negative impact on HR-QOL. We also found a weak correlation of the SF-12 subscales with the MMHQ scores ($R_2 \leq 0.1$). Other studies utilizing different measures of FI severity and HR-QOL have found that increasing FI frequency is associated with a negative impact on QOL.[5, 23] More exploration is needed for existing measures of FI severity and HR-QOL, especially in terms of the minimal important difference needed to power future intervention studies for FI treatment.

Interestingly, we found that hard stool consistency had a greater negative impact on HR-QOL than liquid stool consistency. As a limitation of this study, the evaluation of stool consistency was ascertained from a question on the MMHQ (Table 1) and not from the validated Bristol Stool Form Scale.[24] Others have noted that FI to liquid stool had a greater negative impact on general QOL (SF-36 scores) than solid stool FI.[11] But, these studies did not address overall stool consistency in terms of diarrhea or constipation, but looked at only the type FI as liquid or solid stool loss.[11] Severe constipation and FI were found to have the greatest negative impact on QOL in a study that compared QOL among benign anorectal disorders.[25]

Women who had a prior hysterectomy had a significant negative impact on HR-QOL. Unfortunately, we did not collect information on menopausal status or the use of hormones to explore the role of hormonal status related to prior hysterectomy and the differential impact of each on HR-QOL. One small randomized controlled trial looked at changes in FI symptoms after administration of estrogen cream and did not find an improvement in FI.[26] Others have evaluated the presence of estrogen receptors in the anorectal canal with mixed findings.[27] More data are needed to evaluate the impact of menopause and hormonal changes on FI in women.

Little is known about the age-related differences on HR-QOL in women with FI. In a study by Wang et al, older women with FI were more likely to have a negative impact on HR-QOL than the younger women, but these findings were not adjusted for obstetrical factors.[12] It is possible that women 65 years of age and older were less likely to report an overall negative impact on HR-QOL than the younger women due to treatment-seeking differences for FI. Younger women may have been more likely to report and seek treatment for their FI symptoms in this cohort. Older women may have been more likely to adapt to their FI symptoms with protective undergarments, as well as limiting social interactions and travel outside the home. The MMHQ subscales do try to address these adaptive behaviors for women with FI and no significant differences were seen according to age in the lifestyle adaptation subscale of this instrument (data not shown).

Our study has a few other limitations that deserve further discussion. The main limitations of our study lie in its retrospective nature and the potential for missing data. Although data were collected prospectively, missing data were obtained through a retrospective chart review. We also had limited obstetrical data for instrumented deliveries. Another limitation of this single site study was the makeup of our patient population being nearly 90% Caucasian and the potential for referral bias, limiting the generalizability of our results. Strengths of our study include the characterization of the patient population, the use of validated instruments to assess FI severity and HR-QOL, and physiological testing with anorectal manometry and endoanal ultrasound. We plan to continue to characterize these

patients after various treatment modalities to further understand factors that may impact on improvement in symptoms.

Conclusions

Our study confirms findings of previous research, that bowel symptoms, especially urgency and stool consistency, are important factors when addressing patient-centered outcomes such as QOL for FI. Assessment and treatment of fecal urgency and stool consistency may be important factors to consider when measuring patient-centered outcomes in future FI treatment trials.

Acknowledgments

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Table 1

Bowel Symptom Questions and Responses from the Modified Manchester Health Questionnaire

Question	Bowel symptoms	Response levels	N (%) of women responding
"How often do you move your bowels each day?"	Frequency	• 1-2 times/day	65 (46%)
		• 3-4 times/day	45 (31%)
		• 5-6 times/day	6 (4%)
		• 7 or more times/day	3 (2%)
		• every other day	10 (7%)
		• < every other day	14 (10%)
"How often do you have a strong desire to move your bowels which makes you rush to the toilet?"	Urgency	• never	9 (6%)
		• occasionally	23 (16%)
		• sometimes	59 (40%)
		• most of the time	44 (30%)
		• all of the time	12 (8%)
"What percent of your bowel movements are hard or little balls?"	Hard stool consistency	• 0%	36 (25%)
		• 25%	64 (43%)
		• 50%	22 (15%)
		• 75%	19 (13%)
		• 100%	6 (4%)
"What percent of your bowel movements are loose or watery?"	Loose stool consistency	• 0%	26 (18%)
		• 25%	48 (33%)
		• 50%	43 (29%)
		• 75%	25 (17%)
		• 100%	5 (3%)

Table 2

Univariate Analysis of Demographic Variables and Co-morbid Diseases Associated with Increased HR-QOL in Women Seeking Treatment for FI, n = 155

Variables	N (%) or Mean ± standard deviation	MMHQ Score[a] Coefficient, (95% confidence interval)
Age (years)	54 ± 14	-0.3 (-0.6, 0.0)
Age ≥ 65 years	43 (28%)	-15.0 (-23.26, -6.7)
Non-White race/ethnicity	16 (10%)	1.4 (-11.5, 14.3)
Body mass index (kg/m^2)	27 ± 8	0.1 (-0.4, 0.5)
Diabetes	16 (10%)	3.3 (-9.6, 16.2)
Coronary artery disease	19 (12%)	-3.8 (-16.0, 8.5)
Hypertension	55 (35%)	3.9 (-4.4, 12.3)
Inflammatory bowel disease	16 (10%)	10.6 (-2.2, 23.3)
Urinary incontinence	69 (45%)	7.7 (-0.2, 15.6)
MESA stress scores	9 ± 6	0.6 (0.1, 1.1)
MESA urge scores	10 ± 8	0.9 (0.3, 1.6)
SF-12 subscales		
Physical	39 ± 6	-0.1 (-0.8, 0.6)
Mental	39 ± 6	-0.1 (-0.8, 0.6)
Cholecystectomy	35 (23%)	10.2 (0.8, 19.6)
Anorectal surgery (hemorrhoidectomy)	32 (21%)	-0.2 (-10.1, 9.8)
Cancer (other than skin)	14 (9%)	4.2 (-10.4, 18.9)
Hysterectomy	99 (64%)	8.7 (0.6, 16.8)
Prior c-section	14 (9%)	6.6 (-7.0, 20.3)
Number of vaginal deliveries	2 ± 1	0.7 (-2.3, 3.6)
Bowel Symptoms Variables (n = 147, except FISI scores)		
FISI scores (FI severity), n = 155	31 ± 13	1.1 (0.9, 1.3)
Fecal urgency symptoms, occurring "most" or "all of the time"	56 (38%)	24.5 (17.3, 31.8)
≥ 3-4 bowel movements/day	57 (39%)	6.8 (1.2, 12.3)
Bowel consistency hard or little balls, ≥ 50% of the time	47 (32%)	13.7 (5.4, 22.0)
Bowel consistency loose or watery, ≥ 50% of the time	73 (50%)	16.0 (8.4, 23.6)
Anorectal Manometry (n = 127) and Endoanal Ultrasound Variables (n = 141)		
Resting pressure (mmH$_2$O)	34 ± 22	-0.1 (-0.3, 0.1)
Squeeze pressure (mmH$_2$O)	64 ± 25	-0.1 (-0.2, 0.0)
Rectal capacity (ml)	138 ± 68	-0.0 (-0.1, 0.0)
External anal sphincter tear	60 (42%)	3.9 (-4.2, 12.0)
Internal anal sphincter tear	21 (15%)	8.4 (-3.0, 19.8)
Tear in both sphincters	16 (11%)	10.2 (-4.3, 24.6)

[a]MMHQ Scores vary from 0-100 with higher scores indicating a greater impact on HR-QOL. Positive coefficients represent increased MMHQ scores (negative impact on health-related quality of life); negative coefficients represent a decline in MMHQ scores (positive impact on health-related quality of life).

Table 3

Linear Regression Model of Variables Associated with Increased Impact on HR-QOL in Women Seeking Treatment for FI, n = 142

Variables	MMHQ Score, Coefficients with 95% CI[a]		
	CoE	95% CI	p value
Urgency sensation	14.7	8.1, 21.2	<0.001
Stool consistency (hard or little balls) ≥ 50% of the time	10.0	3.8, 16.3	0.002
Age (years)	-0.3	-0.5, -0.1	0.01
Fecal incontinence severity	0.8	0.6, 1.1	<0.001
Hysterectomy	9.1	2.7, 15.4	0.005

[a]Model also controlled for the following variables: age, presence of urinary incontinence, prior cholecystectomy, bowel movement frequency, and loose stool consistency.