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Associated Factors and the Impact of Fecal Incontinence in Women with Urge Urinary Incontinence: From the Urinary Incontinence Treatment Network's BEDRI Study

Alayne D. MARKLAND, DO, MSc¹, Holly E. RICHTER, PhD, MD², Kimberly S. KENTON, MD, MS³, Clifford WAI, MD⁴, Charles W. NAGER, MD⁵, Stephen R. KRAUS, MD⁶, Yan XU, MS⁷, and Sharon L. TENNSTEDT, PhD for the Urinary Incontinence Treatment Network⁷

¹ Department of Medicine, Division of Gerontology, Geriatrics, and Palliative Care, University of Alabama at Birmingham, Birmingham, AL

² Department of Obstetrics and Gynecology, Division of Women's Pelvic Medicine and Reconstructive Surgery, University of Alabama at Birmingham, Birmingham, AL

³ Departments of Obstetrics & Gynecology and Urology, Loyola University Medical Center, Maywood, IL

⁴ Departments of Obstetrics & Gynecology, University of Texas Southwestern, Dallas, TX, USA

⁵ Department of Reproductive Medicine, University of California, San Diego, Medical Center, San Diego, CA

⁶ Department of Urology, The University of Texas Health Science Center, San Antonio, San Antonio, TX

⁷ New England Research Institutes, Watertown, MA

Abstract

Objectives—To determine prevalence, risk factors, and impact on quality of life (QOL) that fecal incontinence (FI) symptoms have on women seeking treatment for urge urinary incontinence (UUI).

Study Design—Baseline sociodemographic, history, physical examination, and validated questionnaire data were analyzed in 307 women enrolled in the Behavior Enhances Drug Reduction of Incontinence (BEDRI) study for associations with FI. FI was defined as loss of liquid/solid stool occurring at least monthly. Multivariable logistic regression models compared women with FI and UUI to women with only UUI.

Results—Prevalence of monthly FI was 18%, liquid stool (12%) and solid stool (6%). In multivariable analysis, FI was associated with vaginal delivery, posterior vaginal wall prolapse, higher body mass index, and UUI symptoms. QOL was worse in women with FI/UUI than isolated UUI.

Conclusion—Women seeking treatment for UUI have high rates of monthly FI with a negative impact on QOL.

Corresponding Author: Alayne Markland, DO, MSc, University of Alabama at Birmingham, Department of Medicine, Division of Gerontology, Geriatrics, & Palliative Care, BVAMC, GRECC 11-G, Room 8220, 700 South 19th Street, Birmingham, Alabama 35233, E-mail: amarkland@aging.uab.edu, 205-558-7064 phone, 205-558-4749 fax.

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Keywords

urge urinary incontinence; fecal incontinence; risk factors; women; quality of life

Introduction

Fecal incontinence has a significant impact on well-being and quality of life (QOL), but many women are reluctant to discuss it with their medical providers. In community-dwelling women, the prevalence of monthly fecal incontinence varies from 3–7%, but increases to 24% for annual fecal incontinence. In women with urinary incontinence, 9–24% have fecal incontinence.^{1–4}

The prevalence of dual incontinence (urinary and fecal incontinence) may be similar among women with different types of urinary incontinence.⁴ Fecal incontinence and stress urinary incontinence prevalence ranges from 8–16%, and other studies suggest the same prevalence among women with urge urinary incontinence.^{5–7} Some common factors related to dual incontinence in women include: age, increased body mass index, number of births/mode of delivery, and impairments in activities of daily living.^{8–11} Neurologic disorders, such as stroke, and systemic disorders, such as diabetes, may be risk factors for both urinary and fecal incontinence, affecting urge more than stress incontinence symptoms.¹⁰

Fecal incontinence has a greater impact on QOL than isolated urinary incontinence, with the greatest impairments seen in women with liquid compared to solid stool incontinence and women with both urinary and fecal incontinence.^{12,13} Although it is known that quality of life is significantly impaired in women with dual incontinence, less is known about the impact that fecal incontinence has on QOL in women with specific types of urinary incontinence. Common mechanisms of pelvic floor dysfunction may exist in women with urge incontinence and fecal incontinence. Therefore, our objectives were to report the prevalence of dual incontinence, to evaluate the impact that dual incontinence has on QOL, and to identify factors associated with fecal incontinence in a cohort of women with urge predominant urinary incontinence.

Materials and Methods

Design

The Behavior Enhances Drug Reduction of Incontinence (BEDRI) clinical trial, performed by the Urinary Incontinence Treatment Network (UITN), enrolled 307 women with pure or predominant urge incontinence. The objective of the study was to determine whether combining behavioral training and antimuscarinic drug therapy improves women's ability to subsequently discontinue medication and sustain a significant reduction of incontinence episodes. Women were randomized to receive ten weeks of drug therapy or drug therapy combined with behavioral training (pelvic floor muscle training, bladder control techniques) followed by discontinuation of drug therapy. In brief, self-reported symptoms for inclusion included: ≥ 3 months of urge incontinence, an urge symptom index $>$ stress symptom index on the Medical, Epidemiologic, and Social Aspects of Aging Project (MESA) questionnaire,¹⁴ and at least 7 episodes of incontinence on a 7-day bladder diary. Some of the exclusion criteria involved: being <6 months post-partum, inability to contract pelvic muscles during evaluation, prior participation in a formal behavioral therapy program for incontinence of >2 months in the last 2 years, continuous urinary leakage, post-void residual volume >150 ml, and systemic diseases known to affect bladder function (e.g. Parkinson's disease, multiple sclerosis, spina bifida, spinal cord injury or trauma). The trial design including detailed exclusion criteria are described elsewhere.¹⁵ All participants provided written informed consent and each local institutional review board reviewed and approved the study protocol.

Measures

Data on fecal incontinence were collected at baseline (prior to randomization) by self-reported questionnaires (previously reported, but not validated).⁷ The occurrence of fecal incontinence was determined by the following questions: “Do you have leaking or loss of control of liquid stool?” and “Do you have leaking or loss of control of solid stool?” Frequency of leakage was ascertained with the question: “How often does this happen – less than once a month, more than once a month but less than once a week, more than once a month, but less than every day, or every day?” In this study, we report on fecal incontinence that occurred at least “more than once a month but less than once a week,” “more than once a week but less than everyday,” and “everyday.” Women who reported only liquid fecal incontinence were compared to women with solid fecal incontinence. Women in the solid fecal incontinence group included those with the combination of solid and liquid stool incontinence or isolated solid stool incontinence. These two groups were combined due to low number of women who reported having isolated solid stool incontinence. The presence of flatal incontinence was assessed by the question, “Do you have leaking or loss of control of gas?” Frequency of flatal incontinence was assessed similar to fecal incontinence.

Factors Associated with Fecal Incontinence

Factors potentially associated with fecal incontinence were assessed by questionnaires, physical examination, and bladder diaries. Sociodemographic factors were ascertained through self-report and included age, race/ethnicity, education, and socioeconomic status. Socioeconomic status was measured with the Nam-Powers-Boyd Occupations Status Score¹⁶ that ranks occupations based on educational requirements and expected salary, where a higher score indicates greater status. Self-reported health status and history factors included the presence of diabetes and congestive heart failure, and the frequency of straining with bowel movements. Body mass index (recorded in kg/m²) was calculated from measured height and weight. Specific factors related to obstetrical and gynecological history included the number of vaginal deliveries, the weight of the largest baby, hysterectomy, and prior urinary incontinence surgery or treatment. Prior urinary incontinence surgery included any surgeries specific for incontinence with or without prolapse repair (done > 6 months prior to enrollment). Prior urinary incontinence medical treatment included: drug treatments (none for at least 4 weeks prior to randomization), bladder training (including changes in fluid intake and timing of urination), pelvic muscle exercises (formal training for >2 months within past 2 years excluded), electrical stimulation, electromagnetic therapy, acupuncture, and biofeedback. Menopause was defined as not having had a menstrual period for the past 12 months. Women self-reported their menopause status as: “pre-menopausal”, “post-menopausal”, “somewhere in-between”, and “not sure.” Women who reported being “somewhere in-between” were classified as being peri-menopausal. Urinary incontinence symptoms were measured with the frequency of symptoms of stress and urge urinary incontinence as measured by responses to the questionnaire for the Medical, Epidemiologic, and Social Aspects of Aging Project (MESA), with higher scores indicating more frequent symptoms for each incontinence subscale (stress urinary incontinence and urge urinary incontinence).¹⁴ Physical examination factors included digital evaluation of anal sphincter contraction (normal or decreased), presence and stage of pelvic organ prolapse as quantified by the Pelvic Organ Prolapse Quantification system (POP-Q),¹⁸ and digital palpation of pelvic floor squeeze duration and strength as measured by the Brinks score (scored as a duration of >0 and ≤3 compared to > 3 seconds).^{17, 18} POP-Q points Ap and Bp represent two points on the posterior vaginal wall. Point Ap is a point in the midline of the posterior vaginal wall 3 cm proximal to the hymenal ring and has a range of −3.0 cm to +3.0cm. Point Bp is the most dependent position between Ap and the vaginal cuff or posterior fornix and has a range of −3.0 to the total vaginal length (TVL).¹⁷

Impacts of Fecal Incontinence

Urinary incontinence symptom bother and severity were measured by self-report. Symptom bother was measured by the Urogenital Distress Inventory (UDI) to assess the degree to which urinary incontinence symptoms are troubling to women.¹⁹ Bother was computed as the average of the bother of symptoms experienced, with subscales used to evaluate obstructive, irritative, and stress voiding symptoms.¹⁹ Average number per day of incontinence episodes was collected by 7-day bladder diary.

QOL assessment included two measures for urinary incontinence-specific QOL and a measure of general health-related QOL. The Incontinence Impact Questionnaire (IIQ) was used to assess lower urinary tract symptom QOL.¹⁹ Scores on the IIQ are reported as total scores, with higher scores representing increased impact in incontinence specific QOL. The Overactive Bladder Questionnaire (OAB-q) was also used to assess QOL for symptoms of overactive bladder.²⁰ The OAB-q has two subscales, measuring severity and QOL in four domains (concern, coping, sleep, and social interaction). Scores are scaled from 0 to 100, where higher scores indicate greater impact in symptom severity. Higher scores in the OAB-q QOL scales indicate less bother. The Short Form Health Survey (SF-12) was used to assess data on health-related QOL (HR-QOL), specifically related to mental and physical impact, with lower scores representing worse HR-QOL.²¹

Data Analysis

We compared women with urinary incontinence without fecal incontinence, urinary incontinence with isolated liquid stool fecal incontinence, and urinary incontinence with both liquid and solid stool fecal incontinence with regard to selected factors using means or frequency distributions. We then collapsed the latter two groups into monthly fecal incontinence and used logistic regression to evaluate bivariate associations of those factors with any fecal incontinence. A significance level of <0.1 was used to select potential factors into the initial multiple logistic regression model in which monthly fecal incontinence (including both liquid and solid stool incontinence) was the dependent variable. The initial multivariable analysis included: age, SES (Nam-Powers occupational score), BMI, diabetes, previous UI surgery/treatment, POP-Q_Bp, any vaginal delivery, MESA stress score, MESA urge score, and UDI total score. We used POP-Q Bp instead of both point Ap and Bp to reduce collinearity and we did not include flatal incontinence because it is correlated with solid or liquid stool. The impact measures were not included in the multivariable analysis. All analyses were computed using SAS statistical software (SAS Institute, Inc. Cary, NC).

Results

Demographic characteristics and responses to questions on fecal incontinence were available from all 307 women who enrolled in BEDRI. The baseline prevalence of having both urinary incontinence and monthly fecal incontinence was 18% ($n = 56$), with 12% ($n = 38$) reporting loss of isolated liquid stool and 6% ($n = 18$) reporting solid fecal incontinence.

Table 1 compares the characteristics of women with urge urinary incontinence to the other two incontinence groups. Bivariate logistic regression analysis was used to evaluate the association of each factor with any fecal incontinence compared to urge urinary incontinence. Women with monthly fecal incontinence had lower socioeconomic status as measured by occupation scores, a higher mean BMI, more flatal incontinence, greater posterior vaginal wall prolapse as measured by Point Ap and Bp on the POP-Q, more vaginal deliveries, a prior history of incontinence surgery and/or treatment, and more self-reported stress and urge incontinence symptoms than women with isolated urge urinary incontinence. No differences were seen with regards to racial/ethnic differences or socioeconomic level.

There are several differences in the impact of incontinence on symptom bother (UDI), urinary incontinence-specific QOL (IIQ and OAB-q), and HR-QOL (SF-12) by incontinence type. In Table 2, women with monthly fecal incontinence reported worse urinary incontinence-specific QOL and HR-QOL than did women with only urge urinary incontinence. When compared to women with urge urinary incontinence alone, those with urge urinary incontinence and fecal incontinence reported: higher IIQ scores implying more impact on their daily activities, a greater impact on their HR-QOL on the physical health domain, a marginally significant difference in their overactive bladder symptoms/severity, and a greater impact in the total OAB-QOL scores, specifically the sleep and social interactions domains.

In the final multivariable analysis (Table 3), women who had had at least one vaginal delivery had 2.7 times the estimated odds (OR = 2.7, 1.1 – 6.6) of having monthly fecal incontinence in conjunction with urge urinary incontinence than did women with no vaginal deliveries. Other factors related to higher odds of fecal incontinence included increased posterior vaginal wall prolapse quantified by the POP-Q (OR = 1.4, 1.1 – 1.8), more frequent urge symptoms (OR = 1.2, 1.0 – 1.3) and a higher BMI (OR = 1.1, 1.0 – 1.1).

Comment

Fecal incontinence is common in women with urge urinary incontinence, as nearly 20% of women within this study also reported fecal incontinence. More impressive is the dramatic impact fecal incontinence together with urge urinary incontinence has on all aspects of women's QOL. Not surprisingly, women with both conditions (urge urinary incontinence and fecal incontinence) reported greater impact on their general health related QOL than women with only urge urinary incontinence. Our data are consistent with previous reports demonstrating the high rates of fecal incontinence in women with urinary incontinence.^{1,2,7} The added contribution of our study is that it provides rates of fecal incontinence in a population of women who have a specific subtype of urinary incontinence, namely urge incontinence. Additionally, unlike previous population-based studies that represent certain geographic regions,¹ the data from this current study were obtained from a number of clinical sites across the United States, thus allowing the findings to be generalized to other clinical settings. Despite the impact of fecal incontinence on QOL, few women report their symptoms to a physician. Therefore, physicians caring for women seeking treatment for urge urinary incontinence should specifically inquire about fecal incontinence symptoms.

Vaginal parity was the factor most strongly associated with both urge urinary incontinence and fecal incontinence in regression analysis. Vaginal delivery is a known risk factor for fecal incontinence,^{22,23} and vaginally parous women have electromyographic changes in the external anal sphincter consistent with a denervation/re-innervation injury not found in nulliparous women.^{24,25} This finding may suggest a common mechanism related to pudendal nerve injury, which may result with vaginal delivery, affecting control of the bladder and the external anal sphincter in women with dual incontinence. Slightly more advanced posterior vaginal wall prolapse was also associated with urge urinary incontinence and FI. This study reports a small increase in posterior vaginal wall prolapse (POP-Q point Bp equal to 0.4 cm) that may be statistically significant, but may not be clinically relevant. However, in the CARE study, women with advanced prolapse undergoing abdominal sacrocolpopexy had significant improvements in both urge urinary incontinence and fecal incontinence with restoration of their prolapse after surgery.²⁶

Results from this study demonstrate that there is significant impact on QOL in women with dual incontinence. Indeed, scores on the SF-12, a general HR-QOL questionnaire, were lower by almost 10 points in women with dual incontinence when compared with women with urinary incontinence alone. These findings are consistent with another study where the quality of life

in women with dual incontinence was compared with those with isolated urinary or fecal incontinence.^{27,30} In that study, subjects with both urinary and fecal incontinence had greater impairment in physical functioning than women with either form of incontinence alone. To provide some perspective, similar reductions in QOL scores were seen in community-dwelling adults who had suffered a severe stroke.²⁸ Although no validated fecal incontinence-specific measure of QOL was utilized in this study, women with fecal incontinence did have significant decreases in the IIQ score. This finding may be indicative of the global impact that a pelvic floor symptom has on general QOL and not necessarily represent the specific effect of fecal incontinence. One of the strengths of this study rests in its multi-institutional design. This facilitates subject recruitment from a more representative population base and thus allows the results to be applicable to the general population. Additionally, with the exception of fecal incontinence, validated questionnaires and objective measures of pelvic floor dysfunction were used. Since the completion of this study, a number of validated questionnaires assessing severity and symptoms of fecal incontinence have become available and we acknowledge that these would have strengthened our study design. Interestingly, women with fecal incontinence also had more overactive bladder symptom severity and bother on the QOL. This may reflect the fact that perhaps the combination of OAB symptoms, urge urinary incontinence, and fecal incontinence has additive impact on QOL. Without a comparison group of women with lone fecal incontinence, the additive impact of dual incontinence on QOL cannot be fully assessed in this study. Alternatively, questionnaires that are not disease-specific may not be sensitive enough to detect changes in QOL associated with fecal incontinence, representing one of the limitations of this study.

Some have suggested that women with liquid stool incontinence may have “lower” QOL compared with women with solid stool incontinence.¹² Further, the frequency of liquid and solid stool incontinence may be very different. Combining patients with solid fecal stool and those with solid and liquid stool into one single group may potentially alter both the prevalence and mask the true impact of fecal incontinence. Lastly, sampling bias may be introduced since women who are seeking care for their urinary incontinence may have altered quality of life from, as well as complain of, other forms of incontinence more often than in the general population. In summary, the prevalence of fecal incontinence in this study (18%) was comparable to other studies in middle-aged women with fecal incontinence presenting for treatment for urogynecological disorders, such as urinary incontinence and pelvic organ prolapse. Given the negative impact on QOL in women suffering from dual incontinence, physicians treating women with urinary incontinence should also evaluate and treat fecal incontinence symptoms.

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APPENDIX

STEERING COMMITTEE

William Steers, MD, Chair (University of Virginia Charlottesville, VA); Ananias Diokno, MD, Veronica Mallett, MD, Salil Khandwala, MD (William Beaumont Hospital, Royal Oak, MI and Oakwood Hospital, Dearborn MI; U01 DK58231); Linda Brubaker, MD, MaryPat FitzGerald, MD (Loyola University Medical Center, Maywood, IL; U01 DK60379); Holly E. Richter, PhD, MD, L. Keith Lloyd, MD (University of Alabama, Birmingham, AL; U01 DK60380); Michael Albo, MD, Charles Nager, MD (University of California, San Diego, CA; U01 DK60401); Toby C. Chai, MD, Harry W. Johnson, MD (University of Maryland, Baltimore, MD; U01 DK60397); Halina M. Zyczynski, MD, Wendy Leng, MD (University of Pittsburgh, Pittsburgh, PA; U01 DK 58225); Philippe Zimmern, MD, Gary Lemack, MD (University of Texas Southwestern, Dallas, TX; U01 DK60395); Stephen Kraus, MD, Thomas Rozanski, MD (University of Texas Health Sciences Center, San Antonio, TX; U01 DK58234); Peggy Norton, MD, Lindsey Kerr, MD (University of Utah, Salt Lake City, UT; U01 DK60393); Sharon Tennstedt, PhD, Anne Stoddard, ScD (New England Research Institutes, Watertown, MA; U01 DK58229); Debuene Chang, MD, John W. Kusek, PhD, Leroy M. Nyberg, MD, PhD (National Institute of Diabetes & Digestive & Kidney Diseases); Anne M. Weber, MD (National Institute of Child Health and Human Development).

CO-INVESTIGATORS

Diane Borello-France, PT, PhD; Kathryn L. Burgio, PhD; Seine Chiang, MD; Ash Dabbous, MD; Chiara Ghetti, MD; Patricia S. Goode, MD; Lee N. Hammontree, MD; Kimberly Kenton, MD; Jerry Lowder, MD, Karl Luber, MD; Emily Lukacz, MD; Alayne Markland, DO, MSc; Shawn Menefee, MD; Pamela Moalli, MD; Kenneth Peters, MD; Joseph Schaffer, MD; Amanda Simsiman, MD; Larry Sirls, MD; Robert Starr, MD; R. Edward Varner, MD.

STUDY COORDINATORS

Rosemary Bradt, RNC; Laura Burr, RN; Karen Debes, RN; Tamara Dickinson, RN; Rosanna Dinh, RN, CCRC; Judy Gruss, RN; Alice Howell, RN, BSN, CCRC; Kathy Jesse, RN; D. Lynn Kalinoski, PhD; Kristen Mangus; Karen Mislanovich, RN; Judy Murray, CCRC; Shelly O'Meara, RN; Janese Parent, RN; Norma Pope, RN; Caren Prather, RN; Sylvia Sluder, CCRP; Mary Tulke, RN; Robin Willingham, RN, BSN; Gisselle Zazueta-Damian.

INTERVENTIONISTS

Dorothy Atkins, CRNP, MS; Jan Baker, APRN; Karen Debes, RN; Kathy Jesse, RN; RYanne R. Johnson, BSN, RNC, WHNP; R. Jeannine McCormick, RN, MSN, CRNP; Karen Mislanovich, RN; Christy Moore, RN, BSN; Elva Kelly Moore, RN; Amy Mutch, CRNP; Betsy Nielsen-Omeis, RN, BSN; Lisa Radebaugh, MScN, CRNP; Patsy Riley, RN; Karen VandeVegt, PT.

BIostatistical Coordinating Center

Kimberly J. Dandreo, MSc; Corinne J. Leifer, BA; Heather Litman, PhD, Susan M. McDermott, MPH, GNP; Anne Stoddard, ScD (Co-PI); Sharon Tennstedt, PhD (PI); Liane Tinsley, BA; Yan Xu, MS.

Data Safety and Monitoring Board

Elizabeth A. Gormley MD (Chair), Dartmouth-Hitchcock Medical Center, Lebanon NH; Paul Abrams MD, Bristol Urological Institute, Bristol UK; Diedre Bland MD, Blue Ridge Medical Associates, Winston Salem NC; J. Quentin Clemens MD, Northwestern University Medical School, Chicago IL; John Connett PhD, University of Minnesota, Minneapolis MN; William Henderson PhD, University of Colorado, Aurora CO; Dee Fenner MD, University of Michigan, Ann Arbor MI; Sheryl Kelsey PhD, University of Pittsburgh, Pittsburgh PA; Deborah Myers MD, Brown University School of Medicine, Providence RI; Jacek Mostwin MD, Johns Hopkins Hospital, Baltimore MD; Bassem Wadie MBBCh, MSc, MD, Mansoura Urology and Nephrology Center, Mansoura, Egypt.

Table 1
Sociodemographic and Clinical Characteristics for Women with UI, UI and Monthly Fecal Incontinence According to Type

Type of Incontinence, N = 307	Isolated UI (n=251)	FI of Liquid Stool only (n=38)	Liquid & Solid Stool FI (n=18)	P value comparing* FI to UI
Sociodemographic				
Age (years)	56.5 ± 13.8	60.0 ± 14.0	55.7 ± 14.1	0.30
Race/Ethnicity				0.11
White	159 (63.9)	22 (57.9)	9 (50)	
African American	48 (19.3)	6 (15.8)	3 (16.7)	
Latina	24 (9.6)	4 (10.5)	2 (11.1)	
Other	18 (7.2)	6 (15.8)	4 (22.2)	
Education, ≤HS/GED	62 (24.7)	5 (13.2)	4 (22.2)	0.17
SES, Occupational Score	62.1 ± 24.0	55.8 ± 23.9	52.8 ± 23.3	0.04
Health Status, History, & Physical Exam				
BMI (kg/m ²)	32.2 ± 7.8	33.0 ± 11.1	39.9 ± 10.6	0.03
Diabetes	28 (11.2)	7 (18.4)	4 (22.2)	0.09
Congestive Heart Failure	1 (0.4)	1 (2.6)	0 (0)	0.29
Flatal (Gas) incontinence				0.001
Monthly or more	127 (50.6)	28 (73.7)	14 (77.8)	
Straining				0.42
No	149 (59.6)	23 (60.5)	11 (61.1)	
Straining ≤25% of the time	57 (22.8)	6 (15.8)	3 (16.7)	
Straining >25% of the time	44 (17.6)	9 (23.7)	4 (22.2)	
Decreased anal sphincter contraction	13 (5.2)	3 (7.9)	1 (5.6)	0.56
POP-Q Stage				0.41
0-I	162 (64.8)	22 (57.9)	9 (50)	
II	80 (32)	14 (36.8)	9 (50)	
III-IV	8 (3.2)	2 (5.3)	0 (0)	
POP-Q Point Ap	-2.3 ± 0.9	-1.9 ± 1.2	-1.9 ± 1.2	0.01
POP-Q Point Bp	-2.3 ± 1.0	-1.9 ± 1.2	-1.8 ± 1.2	0.007
Pelvic Floor Strength (Brinks total score)	8.9 ± 1.8	8.7 ± 1.4	8.3 ± 1.3	0.12
Pelvic Floor Squeeze Duration:				0.64
>0 and ≤3	47 (18.7)	8 (21.1)	4 (22.2)	
>3	204 (81.3)	30 (78.9)	14 (77.8)	
Number of vaginal deliveries	2.0 ± 1.8	2.7 ± 1.8	2.1 ± 1.8	0.04
Weight of largest baby (gm), (N=220)	3536.1 ± 575.8	3663.6 ± 588.2	3696.3 ± 619.3	0.15
Menopausal Status				0.94
Pre-menopausal	55 (21.9)	7 (18.4)	4 (22.2)	
Post-menopausal	160 (63.7)	28 (73.7)	10 (55.6)	
Peri	32 (12.7)	3 (7.9)	3 (16.7)	

Type of Incontinence, N = 307	Isolated UII (n=251)	FI of Liquid Stool only (n=38)	Liquid & Solid Stool FI (n=18)	P value comparing FI to UII
Unknown	4 (1.6)	0 (0)	1 (5.6)	
Hysterectomy	98 (39)	13 (34.2)	7 (38.9)	0.64
Prior UI surgery/treatment Type of UI symptoms (MESA Score)	94 (37.5)	20 (52.6)	9 (50)	0.05
Stress subscale	10.1 ± 6.1	12.2 ± 5.7	14.9 ± 6.4	0.001
Urge subscale	10.8 ± 3.3	12.1 ± 3.2	13.0 ± 3.3	0.001
UI Severity				
Accidents per day	3.6 ± 2.5	3.7 ± 2.3	4.4 ± 2.3	0.45
Symptom Bother				
UDI (total score)	116.7 ± 48.8	127.9 ± 46.1	158.3 ± 53.9	0.005
UDI obstructive symptoms	14.2 ± 15.9	15.2 ± 14.7	26.6 ± 15.4	0.05
UDI irritative symptoms	57.0 ± 21.7	61.0 ± 20.6	73.4 ± 20.9	0.01
UDI stress symptoms	45.6 ± 28.5	51.8 ± 26.2	58.3 ± 33.5	0.05

Continuous measurements are reported as mean ± standard deviation. Categorical variables are reported as n (%).

KEY: UII = urge urinary incontinence; FI = fecal incontinence

* P values are from logistic regression analysis predicting monthly FI (combined liquid and liquid/solid stool groups).

Table 2

Quality of life measures in women with monthly fecal incontinence in comparison to women with urge urinary incontinence

QOL Measures	Isolated UII (n=251)	Monthly FI (n=56)	P value *
IIQ (Higher scores, more bother)	145.1 ± 96.7	191.5 ± 103.5	0.002
SF-12 (Higher scores, better health)	94.6 ± 15.2	87.6 ± 15.5	0.003
Mental	48.6 ± 10.4	46.8 ± 11.4	0.26
Physical	45.9 ± 10.9	40.8 ± 12.5	0.002
OAB-q Severity (Higher scores, worse severity)	59.1 ± 20.7	65.0 ± 21.3	0.06
OAB-q Quality of Life Total Score (Higher scores, less bother)	63.2 ± 23.3	55.4 ± 26.9	0.03
Concern	55.2 ± 26.6	47.5 ± 30.0	0.06
Coping	58.6 ± 28.9	51.8 ± 29.7	0.11
Sleep	60.5 ± 29.6	51.8 ± 30.4	0.05
Social interaction	84.3 ± 20.3	75.7 ± 27.3	0.03

KEY: UII = urge urinary incontinence; FI = fecal incontinence

* P values are from two-sample t tests comparing mean QOL measures among women with isolated UII to those with monthly FI.

Table 3

Multiple logistic regression analysis of potential factors associated with monthly fecal incontinence and urge urinary incontinence*

	Odds Ratio	95% C.I.	P value
Age (+10 years)	1.15	0.89 – 1.47	0.29
Vaginal delivery (Yes vs. No)	2.67	1.08 – 6.64	0.03
Posterior Vaginal Wall			
Prolapse (POPQ, Bp)	1.38	1.06 – 1.81	0.02
Urge Score (+ 1 unit)	1.15	1.04 – 1.26	0.005
BMI	1.05	1.01 – 1.09	0.01

* Initial model included these variables: SES (Nam-Powers occupational score), diabetes (presence/absence), previous UI surgery/treatment, MESA stress score, and UDI total score.