CrossMark
click for updates

Original Article

Quality of Life Differences in Female and Male Patients with Fecal Incontinence

Lluís Mundet,[1,2]* Yolanda Ribas,[3] Sandra Arco,[4,5] and Pere Clavé[1,2,6]

[1]Unitat d'Exploracions Funcionals Digestives, Department of Surgery, Hospital de Mataró, Universitat Autònoma de Barcelona, Mataró, Spain; [2]Fundació Institut d'Investigació en Ciències de la Salut Germans Trias i Pujol, Badalona, Spain; [3]Department of Surgery, Consorci Sanitari de Terrassa, Terrassa, Spain; [4]Department of Nursing, Badalona Serveis Assistencials, Badalona, Spain; [5]Escola Superior de Ciències de la Salut, Tecnocampus, Mataró, Spain; and [6]Centro de Investigación Biomédica en Red de Enfermedades Hepáticas y Digestivas (CIBEREHD), Instituto de Salud Carlos III, Barcelona, Spain

Background/Aims

To explore and compare quality of life (QoL) differences in female and male patients with fecal incontinence.

Methods

Ninety-one patients with fecal incontinence (60 women, mean (SD) age 64.13 (9.72) years; 31 men, mean (SD) age 63.61 (13.33) years) were assessed for pathophysiology (anorectal manometry and ultrasound), clinical severity (Wexner and Vaizey scales), QoL (Fecal Incontinence Quality of Life Score [FIQL]) and health status (EQ-5D).

Results

External and internal anal sphincter impairment rates were 96.5% and 70.2%, respectively, in women, compared to 30% and 43.3% respectively in men ($P < 0.05$). Clinical severity was similar in both sexes, with mean (SD) Wexner scores of 10.95 (4.35) for women and 9.81 (4.30) for men, and mean (SD) Vaizey scores of 13.27 (4.66) for women and 11.90 (5.22) for men. Scores for women were significantly lower for all FIQL depression and coping subscales ($P < 0.001$) and the EQ-5D depression subscale ($P < 0.01$). EQ-5D index was 0.687 (0.20) for women and 0.835 (0.15) for men ($P < 0.001$). QoL was negatively affected by female gender (−1.336), anxiety/depression (−1.324) and clinical severity (−0.302), whereas age had a positive impact (0.055 per year) ($P < 0.01$).

Conclusions

The pathophysiology of fecal incontinence differed between the sexes. For similar severity scores, impact on QoL was higher in women. Gender had the highest impact on QoL compared to other factors. QoL measurements should be part of assessment and treatment protocols.
(J Neurogastroenterol Motil 2016;22:94-101)

Key Words

Fecal incontinence; Pathophysiology; Quality of life; Sex

*Correspondence: Lluís Mundet, RN, MSc
Proves Funcionals Digestives, Physiology Unit., Department of Nursing, Hospital de Mataró, Carretera de Cirera s/n 08304, Mataró, Spain
Tel: +34-937417700, Fax: +34-937417733, E-mail: lluismundetp@gmail.com

ⓒ 2016 The Korean Society of Neurogastroenterology and Motility
J Neurogastroenterol Motil, Vol. 22 No. 1 January, 2016
www.jnmjournal.org

94

Introduction

Fecal incontinence is defined as an involuntary loss of solid, liquid or gas stool and implies a social problem for the affected individual.[1,2] Although prevalence is estimated to be 1.4% to 3% of community-dwelling adults,[3-5] higher figures of up to 12% have been reported.[6,7] It is thought that prevalence may be underestimated because patients are often reluctant to report their symptoms.[8] Australian,[8] New Zealand,[9] Spanish,[10] and Korean[11] studies have reported prevalence rates of 15%, 12.4%, 10.8%, and 6.4% respectively, for random samples drawn from the general population. Although prevalence in women is thought to be higher than in men,[4] usually as a consequence of childbirth-related injuries,[12-14] some studies have failed to find clear epidemiological differences between the sexes, whereas other studies have actually reported higher prevalence rates for men than for women.[8] In a systematic review, Chiarelli et al[15] found very similar prevalence rates for both sexes. Moreover, it has been suggested that prevalence data may be distorted by men being more unwilling to report fecal incontinence than women.[4,8]

Fecal continence is a complex physiological function that involves anatomical and functional integrity of the anal sphincter, anal and rectal sensitivity and intrinsic and extrinsic motor innervation[16]; fecal consistency also plays a role, given that loose and liquid stools are less easily retained. Fecal incontinence is regarded as a multifactorial condition as it is not usually associated with just one pathogenic abnormality.[17] Evaluation of the health impact is a clinical challenge, as proper assessment of patients needs to take into account the pathophysiology, pathogenesis, clinical severity, and quality of life (QoL) dimensions. Pathophysiological evaluation aims to determine the functional and structural elements implicated in fecal incontinence. Standard procedures implemented in good clinical practice[18] are anorectal manometry (ARM) and ultrasound (US) imaging. Injuries to the external anal sphincter (EAS) are associated with urge fecal incontinence, whereas a damaged internal anal sphincter (IAS) or defective anal endovascular cushions may cause passive fecal incontinence.[19,20] As for pathogenesis, two classifications (Thekkinkattil et al[21] and Muñoz-Duyos et al[12]) can be used in clinical practice. Clinical severity is usually assessed by the Cleveland Clinic Incontinence Score[22] or the St. Mark's Incontinence Score,[23] commonly known as the Wexner and Vaizey scales, respectively. Finally, the specific Fecal Incontinence Quality of Life scale[24] (FIQL) or a more general instrument like the EQ-5D[25] may be used to assess the impact on QoL.

The QoL of people with fecal incontinence is usually severely affected[26-30] and the impact on their life in general can be devastating; in many cases, the patient experiences severe psychological suffering and social isolation. Although QoL for patients with fecal incontinence has been researched, little has been said about the impact of gender. Few studies of community-dwelling patients have tried to explore this aspect and results have varied: one study did not find differences between genders,[30] another found slightly better QoL in women,[31] in a third, higher coping and embarrassment scores were associated with men,[32] and a fourth study[7] reported that women had a significantly lower average QoL; in this latter study, however, the FIQL dimensions most affected were not specified.

Knowledge of how gender affects QoL can be of great importance when treating and counseling patients. The latter is key to helping them deal with this condition.

The main aim of our study was to assess QoL differences in women and men with fecal incontinence attending our motility unit and living in the community. Our hypothesis was that women have poorer QoL compared to men and consequently score lower in FIQL. Secondary aims were to assess differences in male and female pathogenesis and pathophysiology and their impact on QoL and to assess the effectiveness of the Wexner and Vaizey scales in measuring clinical severity.

Materials and Methods

Study Design

This cross-sectional observational study included patients with fecal incontinence attending the Motility Unit of the Hospital de Mataró, a public secondary hospital that provides health care to a population of 300 000. Patients were prospectively recruited between February and November 2012. The sample size was estimated by using GRANMO software, ver. 7.12 (IMIM, Barcelona, Spain). Assuming an Alpha risk of 0.05 and a Beta risk of 0.20, a SD of 0.6 (for FIQL) and a minimum expected difference of 0.4, a group of 54 women and a group of 27 men were needed. The study was approved by the Hospital Ethics Committee; all patients provided written informed consent and the study was performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki and its later amendments.

Patient Profiles

Data was collected on demographics, including socioeconomic, educational level and marital status. Complete medical histories

were also recorded, taking into account comorbidities and possible risk factors for fecal incontinence.

Pathophysiology, Pathogenesis, and Clinical Severity

The ARM study was performed using a water-perfused 5-mm-diameter catheter with 6 recording sites arranged at 60° (Mui Scientific, Mississauga, Ontario, Canada), and a second catheter with 4 longitudinal recording sites separated at 1-cm intervals with spiroidal distribution and a latex balloon at the top (Mui Scientific), as previously described.[33] Data was captured using a Polygraph ID multi-parametric recorder (Medtronic, Minneapolis, USA) and the Polygram NET data acquisition software (Medtronic). Procedures and measurements were those recommended in the Spanish Digestive Motility Group (rupo Español de Motilidad Digestiva [GEMD]) protocol.[33] IAS integrity and the presence of tears in the puborectalis muscle and the EAS[34] were assessed using a Hitachi ultrasound machine equipped with a 360° endoanal 10-MHz transducer (Hitachi Medical Corporation, Tokyo, Japan).

Pathogenesis was assessed using the Thekkinkattil et al[21] and Muñoz-Duyos et al[12] fecal incontinence classifications. The Thekkinkattil classification considers four causes (traumatic, neuropathic, combined and idiopathic), whereas the Muñoz-Duyos classification considers 6 causes (obstetric, muscular non-obstetric, neuropathic, congenital, multifactorial, and idiopathic). From the perspective of our study, the main difference between the two classifications is that the Thekkinkattil "trauma" category is broken down into "obstetric" and "muscular non-obstetric" causes in the Muñoz-Duyos classification, a distinction that broadly mirrors a risk-factor difference between the sexes (fecal incontinence in women is frequently childbirth-related).

Stool consistency was assessed using the Bristol stool chart.[35] Clinical severity was assessed using the Wexner scale[22] (0 to 20, where 0 indicates perfect continence and 20 indicates total incontinence) and the Vaizey scale (0 to 24, where 0 indicates perfect continence and 24 indicates severe incontinence). The Vaizey scale aimed to improve the severity assessment of the Wexner scale by taking into account the ability to defer defecation and the use of antidiarrheals.[23]

Impact on Health and Quality of Life

The validated Spanish version[36] of the FIQL was used to assess the impact of fecal incontinence on QoL. The FIQL consists of 29 items covering the 4 subscales of lifestyle, behavior, depression and embarrassment, each scored between 0 (greatest negative impact) and 4 (no impact).[24]

General health was assessed by the EuroQoL 5-dimensional questionnaire (EQ-5D), a widely used generic questionnaire that measures health-related QoL and health outcomes. It has been applied to a wide range of treatments and conditions, including fecal incontinence.[25,37,38] The EQ-5D is a self-reported description of a person's current health in the 5 dimensions of mobility, self-care, performance of usual activities, pain/discomfort, and anxiety/depression. It also includes a visual analogue scale that scores self-perceived health status on a scale ranging between 0 (worst imaginable health state) and 100 (best imaginable health state). The EQ-5D descriptive system can be converted to single summary index, which ranges from 0 (worst health state) to 1 (best health state).

Statistical Methods

Continuous variables were expressed as means (SD) and male-female differences were compared using the Mann-Whitney test. Categorical variables were expressed as frequencies and percentages and were analyzed using the chi-square test or Fisher's exact test. Correlations were calculated using the Pearson coefficient or Spearman's rho. P-values of 0.05 or less were considered to be statistically significant. Multivariate regression analysis was used to assess the independent effects on QoL of sex, age, severity (Wexner score), and depression. Statistical analyses were conducted using SPSS version 20.0 (IBM).

Results

Patient Profiles and Risk Factors

A total of 91 patients were included in the study, 60 (65.9%) women and 31 (34.1%) men. Mean (SD) age was 64.13 (9.72) and 63.61 (13.33) years for women and men, respectively, with no significant difference between the sexes. Most patients (70.3%) were married; of the rest, 14.3% were widowed, 11% divorced and 4.4% single. Regarding the educational level, almost half (48.4%) had primary education, 23.1% had high school, 16.5% had no studies but could write and read, 8.8% had university education, and finally, 3.3% were illiterate. There were no significant differences in marital, educational and socioeconomic statuses between the sexes. The most common risk factors were childbirth for women and low anterior resection and pelvic radiotherapy for men (Table 1). Most frequent comorbidities were depression/anxiety and hypertension, with differences between both groups for depression/anxiety that was significantly higher in women (59.9% vs 29.0% in men, $P < 0.05$).

Table 1. Risk Factors for Fecal Incontinence

Risk factor	Total (N = 91)	Women (n = 60)	Men (n = 31)	*P*-value
Childbirth	80.3%	96.6% (57)	-	-
Diabetes	18.9%	16.9% (10)	22.6% (7)	0.517
Irritable bowel syndrome	16.9%	18.6% (11)	9.7% (3)	0.355
Low anterior resection	12.7%	10.2% (6)	32.3% (10)	< 0.05
Fistula surgery	4.4%	3.4% (2)	6.5% (2)	0.606
Haemorrhoidectomy	12.2%	11.9% (7)	12.9% (4)	1.000
Pelvic radiotherapy	13.3%	6.8% (4)	25.8% (8)	< 0.05

Table 2. Pathophysiology of Fecal Incontinence

Pathophysiology	Total	Women	Men	*P*-value
Impaired EAS function	73.6%	96.5%	30.0%	< 0.001
Impaired IAS function	60.9%	70.2%	43.3%	< 0.05
Impaired extrinsic EAS reflexes	6.0%	7.3%	3.4%	0.655
Increased rectal sensitivity	11.7%	11.1%	13.0%	0.677
Reduced rectal sensitivity	9.1%	1.9%	26.1%	< 0.01

EAS, external anal sphincter; IAS, internal anal sphincter.

Table 3. Pathogenesis of Fecal Incontinence

Pathogenesis	Total	Women	Men
Thekkinkattil classes			
Trauma	74.2% (66)	91.4% (53)	41.9% (13)
Combined	7.9% (7)	3.4% (2)	16.1% (5)
Neuropathic	2.2% (2)	1.7% (1)	3.2% (2)
Idiopathic	15.7% (14)	3.4% (2)	38.7% (12)
Muñoz-Duyos classes			
Obstetric	46.1% (41)	70.7% (41)	-
Muscular non-obstetric	14.6% (13)	5.2% (3)	32.3% (10)
Neuropathic	2.2% (2)	1.7% (1)	3.2% (1)
Congenital	1.1% (1)	-	3.2% (1)
Multifactorial	30.3% (27)	22.4% (13)	45.2% (14)
Idiopathic	5.6% (5)	-	16.1% (5)

Pathophysiology, Pathogenesis, and Severity

Almost all the women, but less than one third of the men, had impaired EAS function during squeeze, and almost three quarters of the women and under half the men had impaired IAS function. Reduced rectal perception during balloon distension was significantly more frequent in men. In contrast, no major differences were found between men and women regarding extrinsic EAS motor responses to increased intra-abdominal pressure[20,39,40] (Table 2). In addition, 58.4% of our patients showed anorectal dyssynergia during defecation attempts.

According to the Bristol stool chart, slightly more than 40% of the patients had loose or liquid stools, with 25.6% scoring 5 (soft tools), and 15.6% scoring 6 (mushy stools). No differences were observed between the sexes.

As for causes of fecal incontinence, direct injury to the sphincter muscles was the main cause in women, mostly as a result of childbirth. Pathogenesis in men was mostly multifactorial but mainly caused by coloproctological surgery (Table 3).

Regarding clinical severity evaluations, there were no significant differences between men and women (Table 4).

Table 4. Fecal Incontinence Severity Scores

Severity[a]	Total	Women	Men
Wexner score	10.56 (4.34)	10.95 (4.35)	9.81 (4.3)
Vaizey score	12.80 (4.87)	13.27 (4.66)	11.90 (5.22)
Correlation	0.903 ($P < 0.001$)	0.907 ($P < 0.001$)	0.903 ($P < 0.001$)

[a]Wexner and Vaizey scores expressed as mean (SD).

Table 5. Fecal Incontinence Quality of Life Mean Scores

Mean scores[a]	Total	Women	Men	P-value
Depression	3.19	3.06 (0.64)	3.44 (0.56)	< 0.001
Embarrassment	2.77	2.61 (0.80)	3.09 (0.73)	< 0.01
Lifestyle	3.19	3.02 (0.83)	3.506 (0.67)	< 0.01
Coping	2.51	2.27 (0.86)	2.97 (0.08)	< 0.001
Overall	11.66	10.97	13.02	< 0.001

[a]The maximum score for each subscale is 4, with higher numbers indicating a lower impact.
Fecal Incontinence Quality of Life scores expressed as mean (SD).

Table 6. Fecal Incontinence Quality of Life Mean Scores According to Severity Score of Wexner Above or Below 9

	Total	Women	Men	P-value
Wexner < 9				
Depression	3.48	3.3 (0.60)	3.76 (0.10)	< 0.05
Embarrassment	3.28	3.11 (0.67)	3.57 (0.33)	< 0.05
Lifestyle	3.63	3.43 (0.70)	3.97 (0.64)	< 0.05
Coping	3.13	2.80 (0.87)	3.68 (0.23)	< 0.01
Wexner ≥ 9				
Depression	3.06	2.96 (0.63)	3.26 (0.62)	0.087
Embarrassment	2.53	2.39 (0.77)	2.83 (0.76)	< 0.05
Lifestyle	2.97	2.84 (0.82)	3.25 (0.71)	< 0.05
Coping	2.21	2.04 (0.75)	2.58 (0.72)	< 0.01

Fecal Incontinence Quality of Life scores expressed as mean (SD).

Impact on Health and Quality of Life

Although fecal incontinence had a strong impact on QoL in both sexes, women consistently scored worse than men in all subscales, and those differences were statistically significant (Table 5). Differences between sexes remained when severity was divided in two groups (lower and higher), a Wexner score of 9 being the cutpoint (Table 6).

Overall, EQ-5D results showed differences between men and women that were statistically significant for anxiety/depression. Regarding the visual analogue scale, there were no statistically significant differences between the sexes, with patients reporting intermediate scores—mean (SD) 65.63 (16.39)—for self-perceived health status. The calculation of EQ-5D index from the descriptive data showed that women had poorer health status than men, with statistically significant differences (Table 7).

Correlation and Multivariate Regression Analyses

We found significantly negative correlation between the Wexner and Vaizey clinical severity scales and QoL as measured using the FIQL. Correlations between the 2 fecal incontinence severity scales and each FIQL subscale were moderate (−0.393 to 0.652). No correlation was found between duration of the condition and QoL. Finally, correlation between the Wexner and Vaizey severity scales was $r = 0.92$.

The multivariate regression analysis to assess the independent effects on QoL of sex, age, severity (Wexner score) and depression revealed that greater severity, anxiety/depression, and female sex reduced QoL, whereas each additional year of age increased the FIQL score by 0.055 points (Table 8).

Table 7. EQ-5D Results

Health status	Total	Women	Men	*P*-value
Mobility (%)				0.188
No problems	78.9	74.6	87.1	
Moderate problems	21.1	25.4	12.9	
Major problems	0.0	0.0	0.0	
Self-care (%)				1.000
No problems	96.7	96.6	96.8	
Moderate problems	3.3	3.39	3.2	
Major problems	0.0	0.0	0.0	
Usual activities (%)				0.318
No problems	87.8	84.7	93.5	
Moderate problems	12.2	15.3	6.5	
Major problems	0.0	0.0	0.0	
Pain/discomfort (%)				0.220
No problems	40.0	35.6	48.4	
Moderate problems	50.0	50.8	48.4	
Major problems	10.0	13.6	3.2	
Anxiety/depression (%)				< 0.05
No problems	51.1	40.7	71.0	
Moderate problems	35.6	39.0	29.0	
Major problems	13.3	20.3	0.0	
Health progression (%)				< 0.05
Better than 1 year ago	23.3	15.3	38.7	
Same as 1 year ago	43.3	47.5	35.5	
Poorer than 1 year ago	33.3	37.3	25.8	
VAS (self-perceived health status)	65.63 (16.39)	63.76 (17.18)	69.19 (14.38)	0.116
EQ-5D index	0.738 (0.20)	0.687 (0.20)	0.835 (0.15)	< 0.001

VAS, visual analogue scale.

Table 8. Impact of Severity, Sex, Age, and Depression

	β[a]	*P*-value
Wexner score (each additional point)	−0.302	< 0.001
Being female	−1.336	< 0.01
Age (each year older)	0.055	< 0.01
Anxiety/depression	−1.324	< 0.01

[a]Impact on Fecal Incontinence Quality of Life (FIQL).

Discussion

Our main finding was that, for the same clinical severity, fecal incontinence had a greater impact on QoL in women compared to men, with statistically significant differences for each individual FIQL subscales and in the EQ-5D index. In addition, these differences between the sexes persisted when the sample was divided in 2 groups, one with Wexner < 9 and the other with Wexner ≥ 9, as a suggested cutpoint where FI affects significantly QoL.[36,41] A secondary finding was that the pathophysiology of fecal incontinence differed significantly between men and women, although clinical symptoms were similar.

Our results suggest—all other factors being equal—that the patient's sex has a greater impact on QoL than severity, age and anxiety/depression. In fact, more than 4 additional Wexner scale points were necessary to overcome the effect of being female. Our results are consistent with those of Alsheik et al,[7] although in that study all four FIQL subscales were combined, and partially with Cohan's,[32] who found male gender to be significantly associated with improved coping and embarrassment scores. However, other studies did not find significant differences between the sexes[30] or reported an improved life style scoring associated with being female.[31] Differences in impact on QoL in women versus men might be explained by different social expectations, as personal image has traditionally been considered more important for women. A woman with fecal incontinence may experience a certain dissonance regarding this expected image, making her prone to depression and even to social isolation. This social influence could also explain the differences

with other studies where social contexts may be slightly different.

The role of anorectal testing in fecal incontinence has been extensively discussed.[42] While some authors have argued that patients can be treated empirically,[43] others have recommended systematic ARM and US imaging for objective evaluation of anorectal structure and function to decide on a treatment strategy.[18,44] Our opinion is that ARM and US imaging are essential to achieve a clear idea of the subjacent pathophysiology.

Our finding of differences in male and female pathophysiology and pathogenesis has been corroborated by other studies.[45,46] Essentially, more women have an impaired EAS function (in our study, almost all the women compared to just one third of men), whereas impaired IAS function is common in both sexes (in our study, around three quarters of the women and almost half of the men). These data would explain the predominance of passive fecal incontinence in men and of passive and urge incontinence in women, as reported in other studies.[47]

Almost half the patients in our study showed a tendency towards diarrhea, indicated by Bristol stool chart scores of 5 or 6; some of these patients had severe gastroenterological diseases that typically present with diarrhea, primarily irritable bowel syndrome (18.6% of the women and 9.7% of the men in our study). Data on fecal consistency, which is frequently not systematically recorded in routine practice, is of great importance in the management of patients with fecal incontinence.

As would be expected, severity correlated negatively with QoL, with both the Wexner and Vaizey scales giving similar results. The FIQL dimensions with the poorest scores were coping and embarrassment, suggesting that embarrassment was a common and deeply felt emotion, with patients investing great efforts in strategies to avoid incontinence episodes. Even though pathophysiology and pathogenesis differed between men and women, overall fecal incontinence severity was not significantly different between the sexes.

The high correlation between the Wexner and Vaizey scores ($r = 0.92$) may suggest that the Vaizey score does not add any relevant information to the Wexner score. However, we consider that the Vaizey score, even if quantitatively similar to the Wexner scale, has an additional qualitative dimension because it accounts for the ability to defer defecation. In our opinion, this issue further underlines the importance of routine QoL assessments of patients whose lives are conditioned by their efforts to deal with incontinence episodes: a patient with a low clinical severity score may, in fact, have a very restricted social life if this is felt to be conditioned by the ability to defer defecation.

One of the limitations in our study was that we had fewer men than women. This could be because men seem to be more reluctant to consult about this condition, as mentioned earlier.[4,8]

Our study clearly shows that clinical severity alone is just one aspect of fecal incontinence. Even if severity is moderate or mild, fecal incontinence is very likely to affect QoL, with women appearing to be particularly negatively affected. Managing patients with fecal incontinence can be complex. Considering QoL aspects is essential in clinical practice, as improving QoL is the final objective in this condition. Thus, knowledge of all the factors influencing QoL is of great importance, and sex can be one of them.

Author contributions: Lluís Mundet: design of the work, acquisition, analysis, data interpretation, and writing; Yolanda Ribas: data acquisition, interpretation, and writing; Sandra Arco: data interpretation; and Pere Clavé: concept and design of the work.

References

1. Norton C, Christiansen J, Butler U, Harari D, Nelson RL, Pemberton J. Anal Incontinence. In: Abrams P, Cardozo L, Khoury S, Wein A, ed. Incontinence. 2nd ed. UK:Health Publication 2002:985-1044.

2. Leigh RJ, Turnberg LA. Fecal incontinence: the unvoiced symptom. Lancet 1982;1:1349-1351.

3. Nelson RL. Epidemiology of fecal incontinence. Gastroenterology 2004;126(suppl 1):S3-S7.

4. Nelson R, Norton N, Cautley E, Furner S. Community-based prevalence of anal incontinence. JAMA 1995;274:559-561.

5. Perry S, Shaw C, McGrother C, et al. Prevalence of fecal incontinence in adults aged 40 years or more living in the community. Gut 2002;50:480-484.

6. Walter S, Hallböök O, Gotthard R, Bergmark M, Sjödahl R. A population-based study on bowel habits in a Swedish community: prevalence of fecal incontinence and constipation. Scand J Gastroenterol 2002;37:911-916.

7. Alsheik EH, Coyne T, Hawes SK, et al. Fecal incontinence: prevalence, severity, and quality of life data from an outpatient gastroenterology practice. Gastroenterol Res Pract 2012;2012:947694.

8. Lam, Kennedy, Chen, Lubowski, Talley. Prevalence of fecal incontinence:

obstetric and constipation-related risk factors; a population-based study. Colorectal Dis 1999;1:197-203.

9. Sharma A, Marshall RJ, Macmillan AK, Merrie AE, Reid P, Bissett IP. Determining levels of fecal incontinence in the community: a New Zealand cross-sectional study. Dis Colon Rectum 2011;54:1381-1387.

10. Parés D, Vial M, Bohle B, et al. Prevalence of fecal incontinence and analysis of its impact on quality of life and mental health. Colorectal Dis 2011;13:899-905.

11. Kang HW, Jung HK, Kwon KJ, et al. Prevalence and predictive factors of fecal incontinence. J Neurogastroenterol Motil 2012;18:86-93.

12. Muñoz-Duyos A, Navarro-Luna A, Marco-Molina C. [Proposal for a new consensus classification for fecal incontinence.] Cir Esp 2008;83:235-241. [Spanish]

13. Kamm MA. Obstetric damage and fecal incontinence. Lancet 1994;344: 730-733.

14. Sultan AH, Kamm MA, Hudson CN, Thomas JM, Bartram CI. Anal-sphincter disruption during vaginal delivery. N Engl J Med 1993;329:1905-1911.

15. Chiarelli P, Bower W, Wilson A, Attia J, Sibbritt D. Estimating the prevalence of urinary and fecal incontinence in Australia: systematic review. Australas J Ageing 2005;24:19-27.

16. Burgell RE, Scott SM. Rectal hyposensitivity. J Neurogastroenterol Motil 2012;18:373-384.

17. Sun WM, Donnelly TC, Read NW. Utility of a combined test of anorectal manometry, electromyography, and sensation in determining the mechanism of 'idiopathic' fecal incontinence. Gut 1992;33:807-813.

18. Rao SS, Azpiroz F, Diamant N, Enck P, Tougas G, Wald A. Minimum standards of anorectal manometry. Neurogastroenterol Motil 2002;14: 553-559.

19. Rao SS. Pathophysiology of adult fecal incontinence. Gastroenterology 2004;126(suppl 1):S14-S22.

20. Lewicky-Gaupp C, Hamilton Q, Ashton-Miller J, Huebner M, DeLancey JO, Fenner DE. Anal sphincter structure and function relationships in aging and fecal incontinence. Am J Obstet Gynecol 2009;200:559, e1-e5.

21. Thekkinkattil DK, Lim M, Stojkovic SG, Finan PJ, Sagar PM, Burke D. A classification system for fecal incontinence based on anorectal investigations. Br J Surg 2008;95:222-228.

22. Jorge JM, Wexner SD. Etiology and management of fecal incontinence. Dis Colon Rectum 1993;36:77-97.

23. Vaizey CJ, Carapeti E, Cahill JA, Kamm MA. Prospective comparison of fecal incontinence grading systems. Gut 1999;44:77-80.

24. Rockwood TH, Church JM, Fleshman JW, et al. Fecal incontinence quality of life scale: quality of life instrument for patients with fecal incontinence. Dis Colon Rectum 2000;43:9-16; discussion 16-17.

25. Rabin R, de Charro F. EQ-5D: a measure of health status from the EuroQol Group. Ann Med 2001;33:337-343.

26. Norton C. Nurses, bowel continence, stigma, and taboos. J Wound Ostomy Continence Nurs 2004;31:85-94.

27. Wilson M. The impact of fecal incontinence on the quality of life. Br J Nurs 2007;16:204-207.

28. Chelvanayagam S, Norton C. Quality of life with fecal continence problems. Nurs Times 2000;96:15-17.

29. Collings S, Norton C. Women's experiences of fecal incontinence: a study. Br J Community Nurs 2004;9:520-523.

30. Bartlett L, Nowak M, Ho YH. Impact of fecal incontinence on quality of life. World J Gastroenterol 2009;15:3276-3282.

31. Christoforidis D, Bordeianou L, Rockwood TH, Lowry AC, Parker S, Mellgren AF. Fecal incontinence in men. Colorectal Dis 2011;13:906-913.

32. Cohan JN, Chou AB, Varma MG. Fecal incontinence in men referred for specialty care: a cross-sectional study. Colorectal Dis 2015;17:802-809.

33. Benages A. Técnicas para el estudio de la actividad motora digestiva: protocolos metodológicos. Barcelona: Laboratorios Menarini 1997.

34. Carlo Ratto GBD, Ann C. Lowry, Lars Påhlman, Giovanni Romano. Fecal Incontinence: diagnosis and treatment. Milan: Springer-Verlag 2007.

35. Lewis SJ, Heaton KW. Stool form scale as a useful guide to intestinal transit time. Scand J Gastroenterol 1997;32:920-924.

36. Minguez M, Garrigues V, Soria MJ, Andreu M, Mearin F, Clave P. Adaptation to Spanish language and validation of the fecal incontinence quality of life scale. Dis Colon Rectum 2006;49:490-499.

37. Grucela A, Gurland B, Kiran RP. Functional outcomes and quality of life after anorectal surgery. Am Surg 2012;78:952-956.

38. Koch SM, Melenhorst J, Uludag O, et al. Sacral nerve modulation and other treatments in patients with fecal incontinence after unsuccessful pelvic floor rehabilitation: a prospective study. Colorectal Dis 2010;12:334-341.

39. Lledó S. Guía Clínica de Cirugía Colorrectal. Volume 21. Madrid: Asociación Española de Cirujanos 2010:22.

40. Opazo A, Aguirre E, Saldaña E, Fantova MJ, Clavé P. Patterns of impaired internal anal sphincter activity in patients with anal fissure. Colorectal Dis 2013;15:492-499.

41. Rothbarth J, Bemelman WA, Meijerink WJ, et al. What is the impact of fecal incontinence on quality of life? Dis Colon Rectum 2001;44:67-71.

42. Rao SS. A balancing view: fecal incontinence: test or treat empirically--which strategy is best? Am J Gastroenterol 2006;101:2683-2684.

43. Wald A. Con: anorectal manometry and imaging are not necessary in patients with fecal incontinence. Am J Gastroenterol 2006;101:2681-2683.

44. Barnett JL, Hasler WL, Camilleri M. American Gastroenterological Association medical position statement on anorectal testing techniques. American Gastroenterological Association. Gastroenterology 1999;116:732-760.

45. Lunniss PJ, Gladman MA, Hetzer FH, Williams NS, Scott SM. Risk factors in acquired fecal incontinence. J R Soc Med 2004;97:111-116.

46. Maeda Y, Vaizey CJ, Hollington P, Stern J, Kamm MA. Physiological, psychological and behavioural characteristics of men and women with fecal incontinence. Colorectal Dis 2009;11:927-932.

47. Qureshi MS, Rao MM, Sasapu KK, et al. Male fecal incontinence presents as two separate entities with implications for management. Int J Colorectal Dis 2011;26:1589-1594.