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FECAL INCONTINENCE IN PRIMARY CARE: PREVALENCE, DIAGNOSIS, AND HEALTHCARE UTILIZATION

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Abstract

Objective—To estimate the frequency of self-reported fecal incontinence (FI), identify what proportion of these patients have a diagnosis of FI in their medical record, and compare healthcare costs and utilization in patients with different severities of FI to those without FI.

Study Design—Patients in a healthcare maintenance organization were eligible and 1707 completed a survey. Patients with self-reported FI were assessed for a diagnosis of FI in their medical record for the last five years. Healthcare costs and utilization were obtained from claims data.

Results—Fecal incontinence was reported by 36.2% of primary care patients, but only 2.7% of patients with FI had a medical diagnosis. FI adversely affected quality of life and severe FI was associated with 55% higher healthcare costs (including 77% higher gastrointestinal-related healthcare costs) compared to continent patients.

Conclusions—Increased screening of FI is needed.

Keywords

Fecal incontinence; screening; healthcare costs; healthcare utilization

INTRODUCTION

Fecal incontinence (FI), which is defined as the accidental loss of solid or liquid stool, affects a large proportion of the non-institutionalized population of the United States. Estimates range from 2.2%¹ to as high as 24%², with most estimates in the range of 7–12%^{3,4}. It has a significant impact on quality of life which may include embarrassment, social stigmatization, depression and anxiety^{5–7}. FI may also contribute to the decision to place older patients into assisted living facilities⁸. However, despite its high prevalence, its

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deleterious impact on quality of life, and the availability of effective medical and surgical treatments^{9;10}, surveys suggest that only 10%⁷ to 30%¹¹ of people with FI have discussed this with their physician.

The direct costs associated with providing care for patients with FI are largely unknown. This is due in part to the variety of treatments, ranging from medical and behavioral approaches to surgical repair^{9;10} with very different costs, and also the failure of most cost analyses to differentiate between FI and urinary incontinence^{5;12}.

The aims of this study were to: (1) estimate the prevalence of FI in primary care and its impact on quality of life and healthcare costs, (2) determine what proportion of patients with self-reported FI have a medical diagnosis of FI, (3) identify patient characteristics that increase the likelihood that FI is reported to a physician and diagnosed, and (4) estimate healthcare costs associated with FI. It is our hypothesis that patients who self-report FI are often undiagnosed and that those who self-report FI utilize more total and more GI related healthcare dollars, make more healthcare visits, and have lower health-related quality of life.

MATERIALS AND METHODS

This study represents a secondary analysis of a larger study (Nguyen TV, Palsson OS, Von Korff M *et al.* Satisfaction with laxatives in chronic constipation and irritable bowel with constipation. under review). Briefly, a large prospective study was performed to assess the impact of chronic constipation on quality of life and healthcare costs at a health management organization (HMO), Group Health Cooperative of Puget Sound (GHC), which serves more than half a million residents in the state of Washington. GHC's patient population is similar to the general population of Seattle, except that it under-represents the high and low extremes of socioeconomic status. When compared to the United States census, the study population under-represents Hispanics and African Americans and over-represents Asians.

All patients were required to be at least 18 years old, to have made at least one clinic visit (index visit) to a primary care provider at GHC between September 1, 2004 and December 31, 2005, and to have been enrolled at GHC for all of the previous 5 years. Gynecology clinics were included with other primary care clinics. Exclusions were a history of gastrointestinal cancer or resection except for appendectomy or cholecystectomy. Two groups were recruited: 676 patients with a clinical diagnosis of constipation (564.0X) at their index visit, and a control group of 1031 patients who were matched by stratified sampling to the constipated patients with respect to age and sex but who did not receive a clinical diagnosis of constipation either at their index visit or at any time in the previous 5 years. Controls were matched to constipated patients using a stratified sampling frame to recruit a specified number in each age range of both males and females. This control group was unselected except for age and sex and the exclusion of a clinical diagnosis of constipation.

The study received institutional review board approval by both the University of North Carolina at Chapel Hill and GHC. Patients received a full description of the study with all elements of informed consent. Informed consent was inferred from completion and return of the questionnaires.

The survey included questions about the patient's symptoms and history of constipation; the Rome III Diagnostic Questionnaire¹³ modules for functional constipation, IBS, and bloating; demographic information; and the SF-12 Health Survey. The SF-12 is a generic health-related quality of life scale whose 12 questions address self-perceptions of both physical and mental health¹⁴. It is scored by summing items on physical and mental scales and

transforming these into T-scores such that a score of 50 corresponds to the mean for the healthy adult population and one standard deviation below the mean for healthy controls is equivalent to a T-score of 40. A difference of 5 units is considered the minimally clinically important difference.

Patients were classified as fecally continent or incontinent based on their response to the following question in the initial survey: “In the last 3 months, how often have you accidentally leaked liquid or solid stool?” Response options were never, less than one day a month, one day a month, two to three days a month, one day a week, more than one day a week, or every day. Patients who answered “never” were classified as continent, those who answered “one day a month” or less often were categorized as infrequent FI, and those who answered “two to three days a month” or more often were categorized as frequent FI, similar to Bharucha⁶.

Healthcare costs and healthcare utilization were calculated (for consenting patients) from claims data collected by GHC for the previous 5 years using previously described methods¹⁵. Outliers were accounted for by averaging cost and utilization data for each patient over a 5-year period; 5-year means were the unit of analysis. Actual costs (not charges) were expressed in 2005 US\$. The average number of inpatient days for 5 years was obtained from these claim data and used as an index of medical comorbidity. This unvalidated index is conceptually similar to the Charlson comorbidity index, with which it correlates¹⁶.

Statistical analyses were performed using SPSS version 16.0 software (SPSS Inc., Chicago, IL). Fisher’s Exact Test was used for dichotomous data and Student’s t-test was used for continuous variables when the comparison groups were of similar size; however, for comparison of the 15 patients with medical diagnosis of FI to the 535 FI patients without a medical diagnosis, Mann-Whitney U tests were employed. General linear modeling was used to test for mediation. A p-value of < 0.05 was considered significant.

RESULTS

The control cohort included 1003 analyzable patients after excluding 28 who had missing data for the FI question. The constipation cohort included 655 patients after excluding 21 with missing data for the FI question. Average age was 66.29 years for controls and 66.02 years for constipated patients; 68% of controls and 69% of constipated patients were female.

Table 1 shows that FI at least once in the past month was reported by 34.1% (342/1003 patients) in the control cohort and by 39.4% (258/655 patients) in the constipated cohort ($p=0.074$). The overall prevalence of FI was 36.2%. Frequent (≥ 2 times/month) FI was reported by 10.7% of controls and 13.3% of constipated patients. Because there was no significant difference between those with a clinical diagnosis of constipation and those without, the two cohorts were pooled in subsequent analyses.

Table 1 also shows that patients meeting the symptom criteria for IBS were significantly more likely to report FI compared to patients without IBS. Having loose stools “often” or “always” was highly predictive of frequent FI, and having hard stools “often” or “always” was weakly predictive of FI. The relationship between IBS diagnosis and FI was not explained by the effects of loose stools because, when analysis was restricted to patients who reported loose stools and hard stools “never” or “sometimes”, those with IBS were still more likely to report frequent FI (13.9% compared to 5.8% for non-IBS patients; $\chi^2=23.004$; $p<0.001$).

Demographic variables that have been reported to influence the development of FI are shown in Table 2. FI was significantly associated with age, marital status, and race but not sex, education, or income.

The physical component of quality of life (i.e., the ability to engage in daily physical activities such as shopping and climbing stairs) was significantly lower in patients with FI, but the mental component was not (Table 3). This association was confirmed by multivariate analysis adjusting for IBS diagnosis, loose stools, hard stools, age, marital status, race, and inpatient bed days.

Average annual healthcare costs for all causes was significantly associated with FI, with patients who had frequent FI having an average of \$2897 per year higher health care costs than patients without FI. This association was confirmed by multivariate analysis adjusting for IBS diagnosis, loose stools, hard stools, inpatient bed days, age, race, and marital status. Gastrointestinal (GI) related health care costs were significantly related to FI in univariate analyses, but this relationship did not survive multivariate testing. Likewise, the frequency of health care visits was significantly higher in patients with frequent FI compared to patients without FI (average difference of 4.21 visits per year). This association was also confirmed by multivariate testing. Univariate testing showed the number of GI-related outpatient visits to be significantly increased in patients with frequent FI compared to those without FI, but this was no longer significant after multivariate adjustment. Figure 1 shows the proportion of primary care patients who had a medical diagnosis of FI. Only 15 patients with self-reported FI had a clinical diagnosis of FI in the medical record for the last 5 years (2.7% of those with self-reported FI; 1% of all evaluable patients). This analysis was limited to patients who gave permission for review of their medical records (550 with self-reported FI and 920 without self-reported FI). Ten of the 15 patients with a medical diagnosis of FI came from the control cohort and 5 from the constipated cohort. (Fifty patients who reported FI on questionnaires did not give permission for review of their medical records.)

The next set of analyses investigated factors that may influence which patients with FI receive a medical diagnosis of FI. Nine of 15 patients with a medical diagnosis of FI had 2 or more accidents per month, and this association was significant at $p=0.023$. Ten of 15 patients with a medical diagnosis of FI had IBS, but the association of IBS to medical diagnosis of FI was not statistically significant due to the large number of IBS patients with FI who did not receive a medical diagnosis for it. Neither diarrhea nor constipation was predictive of receiving a medical diagnosis for FI.

We also examined whether patients with the greatest impact of FI on their quality of life were the most likely to receive a medical diagnosis, but found no evidence for this (Table 4). We did find that patients who received a medical diagnosis of FI had significantly higher GI-related health care costs, increased numbers of outpatient visits overall, and increased numbers of GI-related outpatient visits.

COMMENT

These data show that FI is highly prevalent among older medical patients in the primary care clinics of an HMO – a third are affected-- and this problem is usually undiagnosed-- only 15 (2.7%) with self-reported FI had a clinical diagnosis of FI in their medical record for the last 5 years. This is important because it shows that healthcare providers are not actively screening for FI and it suggests that patients may be pessimistic that physicians can help with this problem. Others have also reported that the majority of patients with FI do not report this to their physician¹⁷. This low rate of screening and care-seeking is unfortunate because there are a variety of treatments that can reduce the severity of FI and in some cases eliminate it altogether.

Others have reported that patients with more frequent symptoms of FI are more likely to consult their physicians⁷ and our data confirm this. However, it is important to recognize that not all patients with frequent FI report it to their physician: in this study, 95% of patients with frequent FI had no medical diagnosis of FI.

FI had a significant impact on the physical but not the mental aspects of quality of life even in patients who had not discussed their FI with their doctor. The impact on the physical components of quality of life was greater than a half standard deviation (decrease from a T-score of 44.9 to 36.6) which meets the accepted definition of a clinically meaningful effect. The failure to see an impact of FI on the mental component of quality of life contrasts with other studies which have reported a significant impact on anxiety, depression, and willingness to socialize^{6,18}. The most likely explanation for this disparity is that the SF12 is a generic quality of life instrument that is not sensitive to the specific impact of FI; those reporting a significant psychosocial impact of FI have used disease-specific instruments⁶. An important observation in our study was that infrequent FI (once a month or less often) had an effect on the physical component of quality of life comparable to that of frequent FI, showing the importance of diagnosing and treating even the patient with “mild” or infrequent FI.

Previously, the healthcare costs for FI have remained largely unknown because the treatment and care of patients with FI is layered and complicated, and divergent approaches have been used to estimate FI related costs. Several authors have looked at the costs of surgical repair alone^{19,20}; some have evaluated the costs associated with obstetrical injuries²¹, while others have evaluated the costs of outpatient care²². Surgical costs range from €3,724 to \$17,166. Outpatient costs have been reported at €2,169 per patient year with more than half of the total costs of FI made up of indirect costs²²; however, this study was performed in the Netherlands and may not be applicable to the population of the United States.

We compared total direct healthcare costs and GI-related healthcare costs between patients who reported FI and those that did not. This approach to estimating the economic burden of a disease has been used to estimate the economic burden of other diseases, such as Alzheimer’s disease²³ and rosacea²⁴. Patients with frequent FI had 55% higher total healthcare costs and 77% higher GI related healthcare costs, and they also had significantly more total outpatient visits and GI outpatient visits. The difference in total health care cost and utilization remained significant after adjusting for age, IBS diagnosis, medical comorbidity, and other contributors to increased health care.

However, we cannot assume that these differences in healthcare costs are directly attributable to surgical or medical management of FI. The discrepancy between the incremental cost for all healthcare in patients with frequent FI (\$2897) versus the smaller incremental cost for GI related healthcare (\$219) suggests that most of the excess healthcare cost seen in patients with FI is for comorbid illnesses. This conclusion is reinforced in our study by two other observations: First, we found that only 2.7% of patients with self-reported FI had received a medical diagnosis for their FI, but the remaining 97.3% of patients whose FI had not been diagnosed also had significantly higher total healthcare costs and GI-related healthcare costs. The second observation is that the presence and the severity of FI are both significantly associated with the total number of inpatient bed days – a surrogate marker for the overall ill health. Thus, although we were able to show by multivariate regression that FI is independently associated with increased health care costs after adjusting for number of inpatient bed days and other confounders, our estimates of the healthcare costs associated with FI should be interpreted with caution.

There were other limitations to this study: It involved a large HMO based population, and costs may differ for patients seen by other types of providers. However, in 1997, one quarter of the U.S. population were enrolled in HMOs according to the National Center for Health Statistics (www.cdc.gov/nchs/pressroom/98news/hspr98.htm). We also studied an older population of patients, and because the prevalence of FI increases with age¹, these data likely over-estimate the prevalence of FI in younger adults. A strength of our study is that it involved a large population and included both sexes, although in comparison to the U.S. overall, Asians were over-represented and African-Americans were under-represented. Another limitation is that we were not able to include out-of-pocket healthcare costs such as the purchase of protective devices and over the counter medications, which are believed to be large. Moreover, it is believed that FI increases the likelihood of a patient being referred to a nursing home, and this is a significant additional healthcare costs which was not captured in this study⁵.

Future directions may include (1) a more detailed analysis of medical charges to determine what types of healthcare account for the excess costs seen in patients with FI, (2) questionnaires targeted at capturing over-the-counter costs for pads, containment devices, and medications; (3) methods for capturing indirect costs related to work absenteeism, decreased work productivity, or termination of employment due to FI; and (4) studies of the cost of nursing home referral that may be attributable to having FI.

In conclusion, FI symptoms are prevalent in an HMO setting but are rarely diagnosed. This finding reemphasizes the importance of screening patients for FI as this is a treatable condition that is associated with a deleterious impact on quality of life and increased healthcare costs when left untreated. Overall, the total healthcare costs are 55% higher and GI-related costs are 77% higher in patients with frequent FI symptoms, but it is unknown how much of the excess healthcare costs are directly related to FI vs. being related to other co-morbid medical conditions.

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Reference List

1. Nelson R, Norton N, Cautley E, Furner S. Community-based prevalence of anal incontinence. *JAMA*. 1995; 274:559–61. [PubMed: 7629985]
2. Varma MG, Brown JS, Creasman JM, Thom DH, Van Den Eeden SK, Beattie MS, et al. Fecal incontinence in females older than aged 40 years: who is at risk? *Dis Colon Rectum*. 2006; 49:841–51. [PubMed: 16741640]
3. Melville JL, Fan MY, Newton K, Fenner D. Fecal incontinence in US women: a population-based study. *Am J Obstet Gynecol*. 2005; 193:2071–76. [PubMed: 16325618]
4. Whitehead WE, Borrud L, Goode PS, Meikle S, Mueller ER, Tuteja A, et al. Fecal incontinence in US adults: epidemiology and risk factors. *Gastroenterol*. 2009; 137:512–7. 517.
5. Miner PB Jr. Economic and personal impact of fecal and urinary incontinence. *Gastroenterol*. 2004; 126:S8–13.
6. Bharucha AE, Zinsmeister AR, Locke GR, Schleck C, McKeon K, Melton LJ. Symptoms and quality of life in community women with fecal incontinence. *Clin Gastroenterol Hepatol*. 2006; 4:1004–09. [PubMed: 16630766]

7. Bharucha AE, Zinsmeister AR, Locke GR, Seide BM, McKeon K, Schleck CD, et al. Prevalence and burden of fecal incontinence: a population-based study in women. *Gastroenterol.* 2005; 129:42–49.
8. Nelson RL. Epidemiology of fecal incontinence. *Gastroenterol.* 2004; 126:S3–S7.
9. Makol A, Grover M, Whitehead WE. Fecal incontinence in women: causes and treatment. *Womens Health (Lond Engl).* 2008; 4:517–28. [PubMed: 19072490]
10. Gladman MA, Knowles CH. Surgical treatment of patients with constipation and fecal incontinence. *Gastroenterol Clin North Am.* 2008; 37:605–25. viii. [PubMed: 18793999]
11. Johanson JF, Lafferty J. Epidemiology of fecal incontinence: the silent affliction. *Am J Gastroenterol.* 1996; 91:33–36. [PubMed: 8561140]
12. Morris AR, Ho MT, Lapsley H, Walsh J, Gonski P, Moore KH. Costs of managing urinary and faecal incontinence in a sub-acute care facility: a “bottom-up” approach. *Neurourol Urodyn.* 2005; 24:56–62. [PubMed: 15573385]
13. Thompson, WG.; Drossman, DA.; Talley, NJ.; Walker, L.; Whitehead, WE. Rome III diagnostic questionnaire for the adult functional GI disorders (including alarm questions) and scoring algorithm. In: Drossman, DA.; Cprazzoaro, E.; Delvaux, M.; Spiller, RC.; Talley, NJ.; Thompson, WG., et al., editors. *Rome III: The Functional Gastrointestinal Disorders*. McLean, VA: Degnon Associates, Inc; 2006. p. 917-51.
14. Gandek B, Ware JE, Aaronson NK, Apolone G, Bjorner JB, Brazier JE, et al. Cross-validation of item selection and scoring for the SF-12 Health Survey in nine countries: results from the IQOLA Project. *International Quality of Life Assessment. J Clin Epidemiol.* 1998; 51:1171–78. [PubMed: 9817135]
15. Nyrop KA, Palsson OS, Levy RL, Korff MV, Feld AD, Turner MJ, et al. Costs of health care for irritable bowel syndrome, chronic constipation, functional diarrhoea and functional abdominal pain. *Aliment Pharmacol Ther.* 2007; 26:237–48. [PubMed: 17593069]
16. Schneeweiss S, Maclure M. Use of comorbidity scores for control of confounding in studies using administrative databases. *Int J Epidemiol.* 2000; 29:891–98. [PubMed: 11034974]
17. Landefeld CS, Bowers BJ, Feld AD, Hartmann KE, Hoffman E, Ingber MJ, et al. National Institutes of Health State-of-the-Science Statement: Prevention of Fecal and Urinary Incontinence in Adults. *Ann Intern Med.* 2008
18. Norton NJ. The perspective of the patient. *Gastroenterol.* 2004; 126:S175–S179.
19. Buttafuoco A, Keighley MR. Cost of pelvic floor repair for faecal incontinence. *Dig Surg.* 2000; 17:623–26. [PubMed: 11155009]
20. Sung VW, Rogers ML, Myers DL, Akbari HM, Clark MA. National trends and costs of surgical treatment for female fecal incontinence. *Am J Obstet Gynecol.* 2007; 197:652–55. [PubMed: 18060967]
21. Mellgren A, Jensen LL, Zetterstrom JP, Wong WD, Hofmeister JH, Lowry AC. Long-term cost of fecal incontinence secondary to obstetric injuries. *Dis Colon Rectum.* 1999; 42:857–65. [PubMed: 10411431]
22. Deutekom M, Dobben AC, Dijkgraaf MG, Terra MP, Stoker J, Bossuyt PM. Costs of outpatients with fecal incontinence. *Scand J Gastroenterol.* 2005; 40:552–58. [PubMed: 16036507]
23. Zhao Y, Kuo TC, Weir S, Kramer MS, Ash AS. Healthcare costs and utilization for Medicare beneficiaries with Alzheimer’s. *BMC Health Serv Res.* 2008; 8:108. [PubMed: 18498638]
24. Romanowicz M, Stephenson JJ, Del Rosso JQ, Lenhart G. Healthcare utilization and costs of patients with rosacea in an insured population. *J Drugs Dermatol.* 2008; 7:41–49. [PubMed: 18246697]

Primary Care Patients

Figure 1.

Primary care patients who reported fecal incontinence (FI) in the past month. Only a small fraction (2.7%) of FI patients had a medical (MD) diagnosis. Excluded from analysis were 50 with FI and 138 without FI who refused permission to review their medical records.

Table 1

Relationship of Bowel Symptoms to Severity of Fecal Incontinence

	No FI	FI<2/month	FI>2/month	Statistical Significance
CLINICAL DIAGNOSIS OF CONSTIPATION:				
No	65.9% (n=661)	23.4% (n=235)	10.7% (n=107)	$\chi^2=5.213$ P=0.074
Yes	60.6% (n=397)	26.1% (n=171)	13.3% (n=87)	
ROME CRITERIA FOR IBS:				
No	69.7% (n=739)	22.4% (n=237)	7.9% (n=84)	$\chi^2=57.793$ P<0.001
Yes	53.1% (n=312)	28.6% (n=168)	18.4% (n=108)	
LOOSE STOOLS:				
Never or sometimes	67.2% (n=1006)	23.6% (n=353)	9.3% (n=139)	$\chi^2=113.906$ P<0.001
Often or always	31.0% (n=48)	34.2% (n=53)	34.8% (n=54)	
HARD STOOLS:				
Never or sometimes	65.5% (n=791)	23.8% (n=288)	10.7% (n=129)	$\chi^2=6.151$ P=0.046
Often or always	59.3% (n=261)	26.6% (n=117)	14.1% (n=62)	

Table 2

Demographics in patient subgroups defined by severity of Fecal Incontinence

	No FI	FI<2/month	FI 2/month	Statistical Significance
AGE: (mean years)	63.2	69.6	73.6	F=14.513, P<0.001
SEX:				
Females	53.6% (n=719)	23.2% (n=260)	12.7% (n=142)	$\chi^2=4.464$ P=0.107
Males	63.5% (n=333)	26.7% (n=140)	9.7% (n=51)	
MARITAL STATUS:				
Single, separated, divorced or widowed	57.8% (n=312)	26.3% (n=142)	15.9% (n=86)	$\chi^2=17.965$ P<0.001
Living with partner or married	66.9% (n=739)	23.4% (n=259)	9.7% (n=107)	
EDUCATION:				
High school or less	62.7% (n=235)	24.3% (n=91)	13.1% (n=44)	$\chi^2=0.998$ P=0.607
College or professional	64.4% (n=816)	24.4% (n=309)	11.2% (n=142)	
RACE:				
Caucasian	62.7% (n=912)	25.3% (n=368)	12.0% (n=174)	$\chi^2=6.697$ P=0.035
Other races	71.9% (n=146)	18.2% (n=37)	9.9% (n=20)	
PERSONAL INCOME:				
\$0–49,999	62.4% (n=653)	25.0% (n=262)	12.5% (n=131)	$\chi^2=6.354$ P=0.174
\$50,000–99,000	68.1% (n=246)	23.5% (n=85)	8.3% (n=30)	
\$100,000 or greater	68.5% (n=37)	20.4% (n=11)	11.1% (n=6)	

Table 3
Relationship of Healthcare Costs and Outpatient Visits in to Severity of Fecal Incontinence

	No FI	FI<2/month	FI 2/month	Univariate p-value	Multivariate p-value
SF-12 Physical Composite	44.90	40.75	36.60	<0.001	<0.001
SF-12 Mental Composite	52.17	50.96	51.05	0.072	0.278
All Cause Health Care Costs	\$5258	\$6975	\$8155	<0.001	0.003
GI Related Costs	\$285	\$375	\$504	0.004	0.275
All Cause Outpatient Visits	8.12	10.01	12.33	<0.001	<0.001
GI Outpatient Visits	0.41	0.54	0.70	<0.001	0.062
Inpatient Bed Days	0.36	0.51	0.67	<0.001	

Multivariate testing employed General Linear Modeling and adjusted for the following covariates: IBS diagnosis, Loose stools, Hard stools, Age, Marital status, Race, and Inpatient bed days.

Table 4

Differences between Fecally Incontinent Patients with versus those without a Medical Diagnosis: Quality of Life, Healthcare Costs, and Healthcare Utilization

	FI but no Diagnosis	FI with Diagnosis	p-value *
SF-12 Physical Composite	39.32	35.17	0.218
SF-12 Mental Composite	51.10	51.14	0.670
All Cause Health Care Costs	\$7312	\$8900	0.114
GI Related Costs	\$412	\$635	0.043
All Cause Outpatient Visits	10.60	17.75	0.001
GI Outpatient Visits	0.58	1.09	0.003

* Significance tested by Mann-Whitney non-parametric test due to small sample size for one group.