A Population-Based Study of Irritable Bowel Syndrome and Fecal Incontinence Postpartum

by

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Abstract

Background: Fecal incontinence, defined for the purposes of this study as unintentional loss of flatus, liquid or solid stool that poses a social or hygienic problem, has been estimated to affect between 4% and 25% of the postpartum population. One study of the economic impact of fecal incontinence postpartum (FIPP) estimated the cost of evaluating and treating fecal incontinence postpartum at $17,166 per patient. Factors affecting fecal incontinence postpartum have been postulated to include demographic factors such as age and ethnicity, lifestyle factors such as smoking and exercise, obstetric factors such as fetal weight and mode of delivery, and medical factors such as autoimmune or gastrointestinal disorders, including Irritable Bowel Syndrome (IBS). However, previous studies of Irritable Bowel Syndrome and fecal incontinence postpartum have been limited by small numbers, retrospective review, or academic referral center participants.

Methods: This is a subgroup analysis of a parent population-based cross-sectional survey sent to women within 3 months of delivering a live birth in the state of Oregon to define the prevalence of fecal incontinence postpartum. This subgroup study evaluated the cohort of women with a diagnosis of IBS at any time prior to delivery for the development of new or recurrent fecal incontinence postpartum. Inclusion criteria: survey respondents who were residents of Oregon delivering a live birth in Oregon between October 2002 and September 2003 with a self-identified diagnosis of Irritable Bowel Syndrome antepartum and returning the survey between 11 and 27 weeks postpartum. Exclusion criteria: Women with abortion, stillbirth, residence out-of-state, missing identifiers, survey respondents self-identified as never having had IBS or only having had IBS after delivery. The cohort of women with antepartum IBS and fecal incontinence postpartum is compared to the cohort of women with IBS but without fecal incontinence postpartum to further identify risk factors for the development of fecal incontinence in women with IBS.

Results: 1145 postpartum women reported having the diagnosis of IBS prior to delivery, and were included in the analysis. Of those, 69% experienced fecal incontinence postpartum. The prevalence of fecal incontinence postpartum in the setting of IBS was significantly associated with obesity before this pregnancy (OR 2.12, p=0.01) and tobacco use (OR 1.52, p=0.07). History of delivery by Cesarean section decreased the risk of developing fecal incontinence postpartum in women with IBS (OR 0.71, p=0.02).

Conclusions: This is the largest population-based study of pregnant women with IBS specifically looking at risk factors for developing postpartum fecal incontinence. This study suggests that there are modifiable risk factors (weight and tobacco use) that increase a woman's risk for postpartum fecal incontinence in the face of IBS. Because many women do not voluntarily discuss their symptoms of fecal incontinence with their healthcare providers, the risk factors identified in the present study may identify women with IBS who are at particularly high risk for developing new or recurrent fecal incontinence postpartum. Such high-risk women may benefit from more intensive counseling, monitoring, or specific intervention such as weight control or alternate mode of delivery.

Chapter 1

Introduction

Control of defecation is one of the most socially regulated of basic body functions, with toilet-training in childhood aimed at maintaining continence until an acceptable opportunity arises to defecate in privacy. Suppression of defecation results from tonic contraction of the internal anal sphincter and the external anal sphincter, and failure to maintain control of continence poses social and hygienic consequences. Although the internal anal sphincter is controlled by involuntary autonomic reflexes, the external anal sphincter, innervated by the pudendal nerve, is under voluntary, somatic control.

Ordinarily, when feces enter the rectum, distention of the rectal wall initiates afferent signals that initiate peristaltic waves forcing feces toward the anus. As the peristaltic wave approaches the anus, the internal anal sphincter receives inhibitory signals and if the external anal sphincter is also voluntarily relaxed, defecation occurs. However, in the toilet-trained human being, relaxation of the internal sphincter causes an instantaneous contraction of the external sphincter and the conscious mind then takes over the control of the external sphincter. If the external sphincter is kept contracted, the defecation reflex dies out after a few minutes, until additional amounts of feces enter the rectum (5). Fecal incontinence occurs when there is failure in this complex reflex arc, leading to either failure to distinguish between gas, liquid and solid contents of the rectum, or inability to exert conscious control over the relaxation of the anal sphincter.

Most studies of fecal incontinence have been in nursing home populations, but in 1995, Nelson et al reported a telephone survey of the community-dwelling population of

Wisconsin about fecal incontinence. 2570 households comprising 6959 individuals were asked "In the last year, have you or anyone in your household experienced unwanted or unexpected or embarrassing loss of control of bowels or gas?" In this study, 153 individuals (2.2%) reported fecal incontinence, with 70% of incontinent subjects younger than 65, and 63% women. 18% of the subjects reporting incontinence required the use of protective undergarments, and 36% had consulted a physician. Notably, fecal incontinence caused sufficient distress that two respondents planned to move to an extended care facility because of fecal incontinence, and two others planned to have corrective surgery. Unfortunately, obstetric history was not obtained in this study, and while women reported higher incidence of fecal incontinence, the explanation for this differential affliction remained unclear (16).

Thus, generally accepted estimates of fecal incontinence are thought to range between 2-3% of community-dwelling persons, leading to significant social or hygienic consequences. It is one of the most common reasons for nursing home admissions, and up to 50% of nursing home residents have fecal incontinence (17). Although fecal incontinence is more prevalent with increased age, it is also a disorder that has long been known to affect young women postpartum; indeed, 70% of subjects with fecal incontinence in the Nelson study were under 65, and 63% were women.

In 1993, Sultan et al reported a study of 202 consecutive women at least 34 weeks gestation presenting to a London hospital. At six weeks before and six weeks after delivery, they performed an interview of symptoms of fecal urgency and incontinence, as well as anal endosonography, manometry, studies of pudendal nerve terminal motor latency, and perineometry at each assessment. They reported that 13% of primiparous women and 23% of multiparous women experienced fecal urgency or incontinence at six weeks postpartum

from vaginal delivery. They further found that 35% of primiparous women with fecal incontinence had anal sphincter defect on endosonography at 6 weeks, and this endosonographic finding appeared to persist in women followed to 6 months. Vaginal delivery, mechanical trauma to the anal sphincter, injury to the pudendal nerve, and the use of obstetrical forceps for delivery were significantly associated with the development of fecal incontinence postpartum. None of the women with symptoms of bowel function disturbance spontaneously reported their symptoms nor sought medical attention (22).

Hall et al reported a self-administered survey of 50 women seen at 6-week postpartum follow-up, and found a higher incidence of fecal incontinence postpartum, with 38% experiencing at least one episode of fecal incontinence, and 10% experiencing incontinence of stool. In this study, perineal laceration during delivery was the most significant obstetric correlate of fecal incontinence postpartum. Notably, perineal laceration requiring any repair was a common event, with 60% of the women in this study experiencing perineal laceration during delivery that required repair. Of those with perineal laceration requiring repair, 50% developed fecal incontinence postpartum (6).

However, fecal incontinence remains an underreported and poorly understood problem postpartum. MacArthur et al reported a study of 906 women who were interviewed a mean of 10 months after delivery, and found that although 4% of the study population experienced fecal incontinence postpartum, only 14% of women experiencing fecal incontinence consulted with a physician about their symptoms. The most commonly cited reason for not consulting a physician was that the women thought their symptoms would eventually improve. Other cited reasons for not consulting a healthcare provider included the perceived severity of the problem. Embarrassment, the belief that their experience was just a

natural part of having a baby, and the feeling that the doctor couldn't do anything were also cited (13).

Factors affecting fecal incontinence postpartum have been postulated to include demographic factors such as age and ethnicity, lifestyle factors such as smoking and exercise, obstetric factors such as fetal weight and mode of delivery, and medical factors such as autoimmune or gastrointestinal disorders.

In 2001, Chaliha et al reported a study of anal function finding that vaginal delivery caused pelvic floor trauma resulting in decreased maximal anal squeeze pressures and anal sphincter defect (1). However, the presence of symptoms of fecal incontinence was not related to anal pressures, sensation, or sphincter integrity, and the true pathophysiology of fecal incontinence postpartum remains elusive.

One small study of fecal incontinence postpartum has suggested Irritable Bowel Syndrome (IBS) to be an important correlate of postpartum fecal incontinence. In 1998, Donnelly et al reported a study of 312 primiparous women, of whom 34 (11%) had a pre-existing diagnosis of IBS. They found that 71% of women with IBS had symptoms of fecal incontinence postpartum, compared to 18% of women without IBS. They also found that there were no symptomatic differences in fecal incontinence between women with and without IBS at six months postpartum, suggesting that the increased symptomatology in women with pre-existing IBS was related to the postpartum period, rather than due to the underlying IBS. In this study, anal manometry, pudendal nerve terminal motor latency and endosonography were similar in women with or without IBS. Anal mucosal electrical sensitivity was greater in the women with IBS before and after delivery, but did not correlate with fecal incontinence (3). Other studies have deliberately excluded women with irritable

bowel syndrome because of the difficulty distinguishing the symptoms of IBS from the effects of pregnancy and childbirth (1).

Irritable Bowel Syndrome is a chronic or recurrent functional disorder of the bowel without an accompanying structural abnormality. It is characterized by abdominal pain or discomfort, and changes in stool frequency and/or consistency. It accounts for 12% of primary care visits (15), and leads to an estimated $8 billion annually in medical expenditures, including medical consultations, testing, and treatment, excluding over-the-counter treatments and time lost from work (25). Studies of the impact of Irritable Bowel Syndrome on time lost from work indicate that it is the second-leading cause of absenteeism, behind the common cold (21). Epidemiologic studies show that women are affected twice as often as men, and women more often experience constipation-type IBS than men.

The diagnosis of Irritable Bowel Syndrome is made clinically, and the Rome II criteria have been generally agreed upon for defining IBS for research purposes: at least 12 weeks out of the previous 12 months characterized by abdominal pain or discomfort associated with changes in stool frequency and/or consistency (27). However, the diagnosis is often uncertain and made as a diagnosis of exclusion, as there are no specific pathognomonic symptoms nor any gold-standard diagnostic test. Symptoms of IBS are often recurrent or chronically persistent, with Holmes et al finding that in a 6-year follow-up of 77 patients with IBS, 57% continued to meet criteria for IBS (8). Similarly, Harvey et al found in 5-8 years of follow-up of 97 patients that 74% continued to be symptomatic (7).

No clear pathophysiologic etiology has been demonstrated for Irritable Bowel Syndrome, nor is confirmatory testing available at this time, though myoelectric activity may

record high-amplitude bursts in the interdigestive phase. However, intestinal myoelectric testing is not readily available, and IBS remains a diagnosis based on history in the appropriate clinical setting, and the absence of red flags for other disorders.

Treatment aims at education, dietary modification, stress management, exercise, and medications such as antimuscarinic agents, antidepressants, anxiolytics, laxatives and motility agents.

Aims of the study:

This study is designed to provide population-based estimates of the prevalence of new or recurrent fecal incontinence postpartum in women with antepartum Irritable Bowel Syndrome delivering in the state of Oregon. Furthermore, it is designed to identify potentially modifiable lifestyle and obstetric factors that may impact the prevalence of fecal incontinence postpartum in women with Irritable Bowel Syndrome.

Research Question:

What is the prevalence of fecal incontinence postpartum in women with Irritable Bowel Syndrome, and are there modifiable risk factors for fecal incontinence postpartum in this population of women with IBS?

Chapter 2

Methods:

Parent study design:

The parent study was a population-based cross-sectional survey over the course of a year to define the prevalence of new or recurrent fecal incontinence postpartum. In the parent study, Oregon residents delivering a live birth between October 2002 and September 2003 were identified via the Oregon Health Department Division of Vital Statistics birth records, and were mailed a questionnaire within 3 months of delivery.

Research tools: Questionnaire (Appendix A)

The survey was a self-administered two-page mailed questionnaire in English and Spanish. The survey asked detailed questions about fecal incontinence symptoms, timing of incontinence, characteristics of this and previous pregnancies, breastfeeding, lifestyle factors and underlying medical conditions.

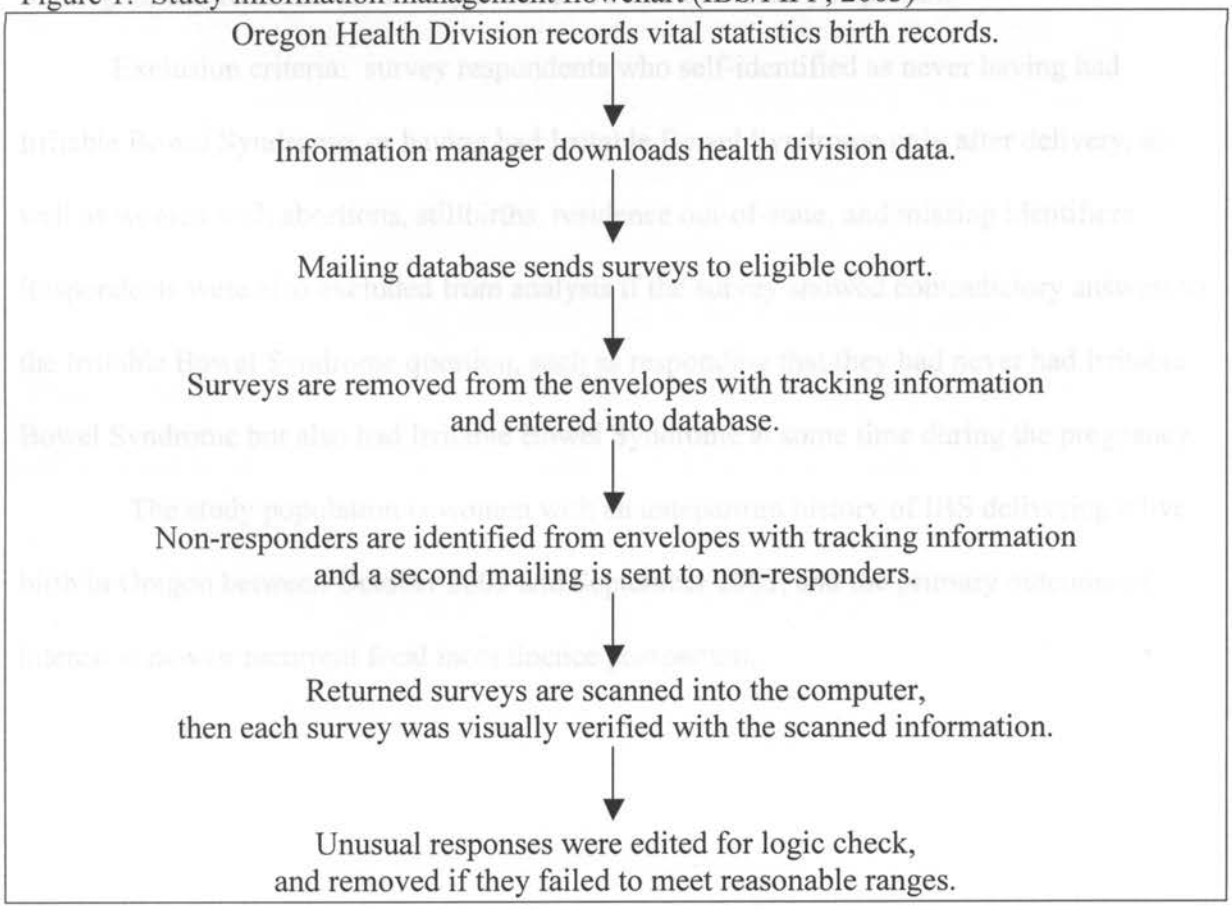
Respondents were categorized as having fecal incontinence postpartum if they answered yes to any of the following questions (Appendix A):

- Since delivery of this baby, have you ever experienced an inability to control passage of gas?
- Since delivery of this baby, have you ever experienced an inability to control diarrhea?
- Since delivery of this baby, have you ever experienced an inability to control solid stool?
- Since delivery of this baby, have you ever passed gas during intercourse?
- Since delivery of this baby, do you have difficulty telling the difference between gas or stool?
- Since delivery of this baby, do you need to rush to the toilet to avoid soiling yourself when you have your first urge to have a bowel movement?

Survey methodology:

The survey methodology was patterned after the previously validated CDC Pregnancy Risk Assessment Monitoring System (PRAMS). Mailings began within 3-4 months after delivery, as identified through birth certificate files from the Oregon Health Department Division of Vital Statistics. A pre-survey letter introduced the new mother to the FIPP study, informing her that a questionnaire packet would soon arrive in the mail. An initial mailed questionnaire packet was then mailed to all mothers 3-7 days after the pre-survey letter. A tickler was sent 7-10 days after the initial questionnaire packet. A second mailed questionnaire was sent to all mothers who did not respond to the initial questionnaire within 7-14 days of the tickler.

Figure 1: Study information management flowchart (IBS/FIPP, 2003)



IBS/FIPP study subjects:

Women who self-identified as having Irritable Bowel Syndrome any time either before and/or during this pregnancy were included in the analysis. Survey respondents who returned the survey before 11 weeks or after 27 weeks postpartum were excluded from the analysis to maintain consistency with the parent study. Women who reported having been diagnosed with Irritable Bowel Syndrome only after this pregnancy were excluded from the study, as it would be improbable that future diagnosis of Irritable Bowel Syndrome could affect the development of fecal incontinence postpartum.

Inclusion criteria: survey respondents who self-identified as having had Irritable Bowel Syndrome at any time before and/or during this pregnancy, had a live birth in the state of Oregon, and returned the survey between 11 and 27 weeks postpartum.

Exclusion criteria: survey respondents who self-identified as never having had Irritable Bowel Syndrome, or having had Irritable Bowel Syndrome only after delivery, as well as women with abortions, stillbirths, residence out-of-state, and missing identifiers. Respondents were also excluded from analysis if the survey showed contradictory answers to the Irritable Bowel Syndrome question, such as responding that they had never had Irritable Bowel Syndrome but also had Irritable Bowel Syndrome at some time during the pregnancy.

The study population is women with an antepartum history of IBS delivering a live birth in Oregon between October 2002 and September 2003, and the primary outcome of interest is new or recurrent fecal incontinence postpartum.

Study variables:

1. Age at first baby by quintiles
2. Age at time of this baby by quintiles
3. BMI prior to this pregnancy and BMI during this pregnancy were categorized as underweight (BMI <18.5), normal weight (BMI 18.5-24.9), overweight (BMI 25-29.9), and obese (BMI >29.9).
4. Weight of this baby by quintiles
5. Weight of the biggest baby by quintiles
6. Number of total deliveries
7. Tobacco use
8. Mode of delivery (vaginal delivery versus cesarean section)
9. History of perineal tear or cut

Data analysis:

The Statistical Package for the Social Sciences (SPSS) computer software was utilized for statistical analysis of the data. Categorical data were analyzed using the chi-square test. Associations between potential risk factors and the presence of fecal incontinence postpartum were calculated one variable at a time using chi-square tests. The Mantel-Haenzsel summary chi-square test was used to assess for potential confounding variables by stratification. Since the population distribution may not be normal, the Wilcoxon rank sum test was also performed. For multivariate analysis, logistic regression analysis was used to identify a set of independent risk factors for fecal incontinence. The stepwise method of variable selection was used. All p values calculated were two-tailed. The alpha level of significance was set at 0.05.

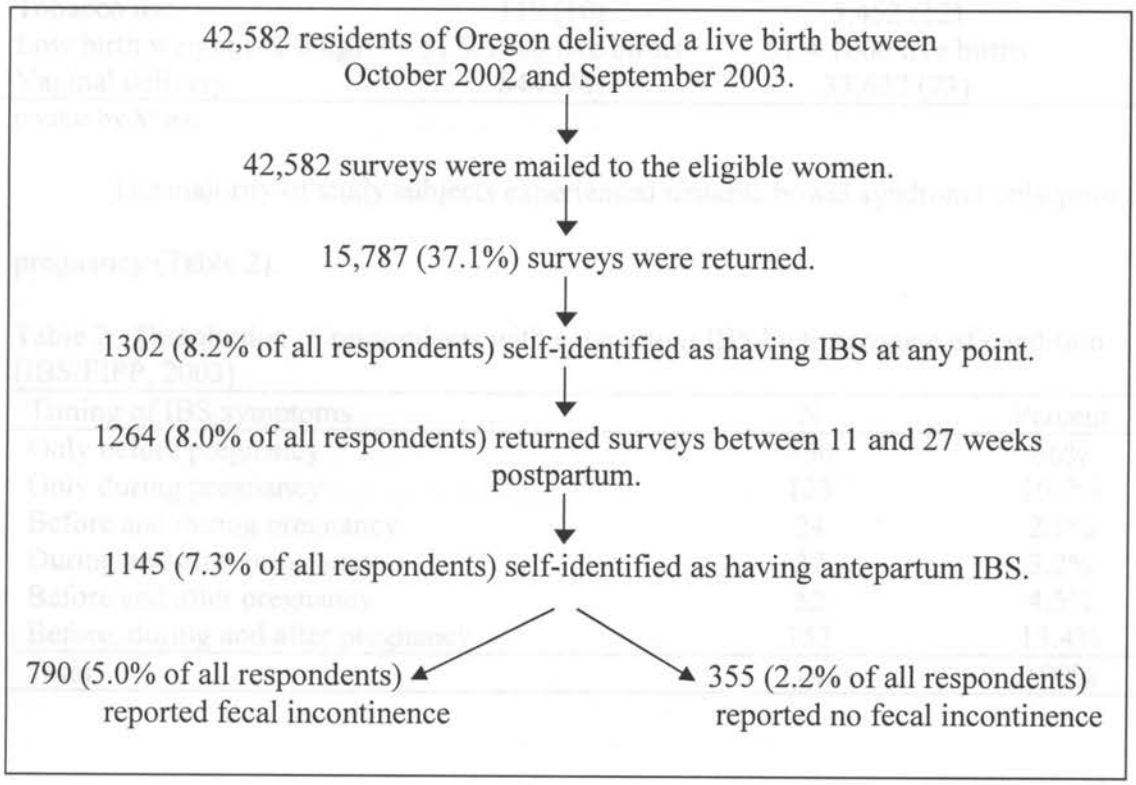
Chapter 3

Results:

Section I: Survey response

In the survey year beginning October 2002 and ending September 2003, 42,582 women delivering a live birth in Oregon were identified via the Oregon Health Department birth records database, and surveys were mailed within 3 months. 15,787 surveys were returned, for a 37.1% response rate. 1302 surveys reported having had Irritable Bowel Syndrome at some point, and 35 surveys were excluded because they did not return the survey within 11 to 27 weeks postpartum. Additionally, 122 surveys were excluded because they reported having had IBS only after delivery.

Figure 2: Study entry and patient outcomes. Women returning the survey before 11 weeks or after 27 weeks or with IBS only after delivery were excluded from the study (IBS/FIPP, 2003).



Section II: Characteristics of the study subjects

The IBS study population was compared to the Oregon state statistics for a similar time period. 1145 of eligible survey respondents reported having had antepartum Irritable Bowel Syndrome. The IBS/FIPP study participants were slightly older and had fewer births when compared to Oregon vital statistics data for 2003 (Table 1).

Table 1: Maternal demographics of study participants compared to general Oregon peripartum population from the Oregon Vital Statistics Annual Report 2003 (IBS/FIPP, 2003)

Characteristics	Study participants N (%)	Oregon Vital Statistics 2003 Data (20) N (%)	p value
Age at this birth			<0.01
<20	20 (2)	4,163 (9)	
20-24	174 (15)	11,901 (26)	
25-29	346 (30)	13,033 (28)	
30-34	400 (35)	10,840 (24)	
>34	203 (18)	5989 (13)	
Primiparous	456 (40)	18,245 (40)	0.93
Tobacco use	119 (10)	5,452 (12)	0.12
Low birth weight (<2.5 kg)	51.9/1000 live births	61.4/1000 live births	0.19
Vaginal delivery	844 (74)	33,627 (73)	0.73

p value by X^2 test

The majority of study subjects experienced irritable bowel syndrome only prior to pregnancy (Table 2).

Table 2: Distribution of respondents with antepartum IBS by timecourse of condition (IBS/FIPP, 2003)

Timing of IBS symptoms	N	Percent
Only before pregnancy	756	66%
Only during pregnancy	123	10.7%
Before and during pregnancy	24	2.1%
During and after pregnancy	37	3.2%
Before and after pregnancy	52	4.5%
Before, during and after pregnancy	153	13.4%
Total	1145	100%

Section III:

Characteristics of Survey Respondents with Irritable Bowel Syndrome by Fecal Incontinence Postpartum Status:

Among survey respondents, 69% of women with antepartum IBS experienced fecal incontinence postpartum. The distribution of the timecourse of IBS symptoms did not differ significantly in women who developed fecal incontinence postpartum and those who did not (Table 3).

Table 3: Timecourse of IBS symptoms by fecal incontinence status (IBS/FIPP, 2003)

Timing of IBS symptoms	FIPP N (%)	No FIPP N (%)
Only before pregnancy	505 (64)	251 (71)
Only during pregnancy	97 (12)	26 (7)
Before and during pregnancy	15 (2)	9 (2)
During and after pregnancy	25 (3)	12 (3)
Before and after pregnancy	36 (5)	16 (5)
Before, during and after pregnancy	112 (14)	41 (12)
Total	790 (100)	355 (100)

$p=0.11$ by X^2 test

BMI prior to this pregnancy was highly correlated with BMI after this pregnancy, with a correlation coefficient of 0.92, and therefore BMI prior to this pregnancy was chosen for analysis.

Statistically significant differences between women who developed fecal incontinence postpartum were seen in BMI prior to this pregnancy, age by quintile at first pregnancy, tobacco use, vaginal delivery, history of perineal tear or cut, and history of cesarean. There was no statistically significant difference by age by quintile at this delivery, parity, and weight of this baby or biggest baby (Table 4).

Table 4: Characteristics of women with IBS by fecal incontinence status (IBS/FIPP, 2003)

Characteristics	FIPP N (%)	No FIPP N (%)	p value
BMI before pregnancy			0.01
Underweight (BMI<18.5)	28 (4)	11 (3)	
Normal weight (BMI 18.5-24.9)	404 (53)	214 (62)	
Overweight (BMI 25-29.9)	161 (21)	75 (22)	
Obese (BMI ≥30)	165 (22)	43 (13)	
Age at first delivery by quintile			0.02
14-20 years	142 (19)	38 (11)	
21-24 years	173 (23)	71 (21)	
25-27 years	143 (19)	75 (23)	
28-31 years	154 (21)	77 (23)	
32-42 years	137 (18)	72 (22)	
Age at this delivery by quintile			0.09
16-24 years	148 (19)	46 (13)	
25-27 years	136 (17)	60 (17)	
28-30 years	162 (21)	69 (19)	
31-33 years	169 (21)	88 (25)	
34-50 years	173 (22)	92 (26)	
Weight of this baby by quintile			0.25
1.06-6.63 pounds	144 (19)	76 (22)	
6.69-7.31 pounds	171 (22)	75 (22)	
7.38-7.81 pounds	172 (22)	58 (16)	
7.88-8.44 pounds	140 (18)	68 (20)	
8.50-14.75 pounds	145 (19)	69 (20)	
Weight of biggest baby by quintile			0.97
1.50-6.88 pounds	139 (19)	67 (21)	
6.94-7.56 pounds	139 (19)	59 (19)	
7.63-8.06 pounds	122 (17)	51 (16)	
8.13-8.75 pounds	162 (23)	70 (22)	
8.81-12.75 pounds	154 (22)	70 (22)	
Tobacco use	92 (11)	27 (8)	0.04
Vaginal delivery	599 (76)	245 (69)	0.02
History of tear or cut	579 (76)	229 (68)	0.01
History of cesarean	221 (28)	123 (35)	0.03
Parity			0.30
1 birth	315 (41)	141 (42)	
2 births	261 (34)	128 (38)	
3-9 births	185 (24)	69 (20)	

p value by X^2 test

Univariate analysis by logistic regression for maternal factors is shown in Table 5. In univariate analysis, statistically significant differences were seen in the two groups by obesity prior to pregnancy, age 21-24 years at first delivery, age 31-50 years at this delivery, weight of this baby between 7.63 and 8.06 pounds, tobacco use, vaginal delivery, history of tear or cut, and history of cesarian.

Table 5: Univariate logistic regression comparisons of maternal factors among women with IBS and fecal incontinence status (IBS/FIPP, 2003)

Characteristics	Odds ratio	95% CI	p value
BMI before pregnancy			
Underweight (BMI<18.5)	1.35	0.66-2.76	0.41
Normal weight (BMI 18.5-24.9)	Reference		
Overweight (BMI 25-29.9)	1.14	0.83-1.57	0.43
Obese (BMI ≥30)	2.03	1.40-2.96	0.01
Age at first delivery by quintile			
14-20 years	Reference		
21-24 years	1.96	1.24-3.10	0.01
25-27 years	1.28	0.86-1.91	0.22
28-31 years	1.00	6.72-1.49	0.99
32-42 years	1.05	0.71-1.56	0.81
Age at this delivery by quintile			
16-24 years	Reference		
25-27 years	0.71	0.45-1.10	0.13
28-30 years	0.73	0.47-1.13	0.16
31-33 years	0.60	0.39-0.91	0.02
34-50 years	0.58	0.39-0.89	0.01
Weight of this baby by quintile			
1.06-6.63 pounds	Reference		
6.94-7.56 pounds	1.20	0.82-1.78	0.35
7.63-8.06 pounds	1.57	1.04-2.35	0.03
8.13-8.75 pounds	1.09	0.73-1.62	0.69
8.81-12.75 pounds	1.10	0.74-1.65	0.61
Tobacco use	1.60	1.02-2.51	0.04
Vaginal delivery	1.41	1.07-1.86	0.02
History of tear or cut	1.50	1.13-2.00	0.01
History of cesarean	0.73	0.56-0.96	0.02
Parity			
1 birth	Reference		
2 births	0.91	0.68-1.22	0.54
3-9 births	1.20	0.85-1.69	0.29

p value by univariate logistic regression

When stepwise variable selection was used to perform regression analysis with a cut point of p=0.10 for removal, obesity prior to pregnancy, tobacco use and history of cesarean remained significant (Table 5).

Table 6: Stepwise logistic regression comparisons of selected maternal factors among women with IBS and fecal incontinence status (IBS/FIPP, 2003)

Risk factors	Odds ratio	95% CI	p value
BMI prior to pregnancy			
Normal weight	Reference		
Underweight	1.27	0.62-2.61	0.52
Overweight	1.17	0.84-1.61	0.35
Obese	2.12	1.45-3.09	0.01
Tobacco use	1.52	0.97-2.40	0.07
History of cesarean	0.71	0.53-0.93	0.02

1098 cases included in the analysis; p value by stepwise logistic regression

Chapter 4

Discussion:

Through this population-based cross-sectional survey, the prevalence of fecal incontinence postpartum in 1145 women with antepartum Irritable Bowel Syndrome was found to be 69%. This finding is similar to the smaller Donnelly study of 34 patients with IBS, which reported a prevalence of 71% of fecal incontinence postpartum in women with IBS (3). This analysis of the experience of fecal incontinence postpartum in women with antepartum Irritable Bowel Syndrome provides population-based information about potentially modifiable maternal and obstetric risk factors for the prevalence of FIPP in this population, though with caveats.

This study is not without limitations. It is unknown if the cohort of women with IBS responding to this survey are a representative sample of women with IBS delivering a live birth in Oregon. There were fewer women younger than 20 years old, with more than four births and with low birth weight babies responding to this survey compared to the general Oregon postpartum population. Women with IBS may have been more likely to identify themselves as having IBS if they experienced fecal incontinence postpartum, or conversely, more women with fecal incontinence postpartum may have responded to this questionnaire. The prevalence of fecal incontinence postpartum in the population without IBS was not studied in this analysis, and therefore no comparison can be made with the non-IBS population.

Second, Irritable Bowel Syndrome status was self-reported, and there was no attempt to validate the diagnosis, nor was there any way to identify women with antepartum fecal

incontinence. Some women may have confused Irritable Bowel Syndrome with Inflammatory Bowel Disease or other gastrointestinal syndromes, though the prevalence of IBD at 10-70 per 100,000 (12) is much lower than IBS and thus would not be anticipated to affect outcome to any degree of significance.

Finally, the true prevalence of Irritable Bowel Syndrome in women delivering a live birth in Oregon during the study year remains unknown. Previous studies have described 10-15% prevalence estimations of Irritable Bowel Syndrome in North American communities, but they did not look specifically at the peripartum population (23).

Although the information for this study was obtained through a questionnaire, there is evidence that use of a questionnaire improves response compared to verbal questioning. In the UK, Thomas TM et al found that community services reports underestimated the prevalence of fecal incontinence when compared with mailed survey (26). In their study, both men and women were more likely to report fecal incontinence in a mailed survey than in the community services report:

Table 7: Comparison of respondents reporting fecal incontinence in community services report versus mailed survey (Thomas, 1984)

		Community services report	Mailed survey
Men	15-64 years old	0.5%	4.2%
	>64 years old	4.9%	10.9%
Women	15-64 years old	0.4%	1.7%
	>64 years old	8.8%	13.3%

Although surveys are subject to recall bias, the questionnaires in this study were sent to the new mothers within 3 months of delivery to minimize the effect of time, and recall bias is unlikely to be a significant factor. Moreover, other studies have previously demonstrated that women accurately remember their birth experience for decades when compared to medical charts (4).

Despite the limitations of this study, the 69% prevalence of fecal incontinence postpartum in women with IBS in this study has significant implications for the care of women with IBS in the peripartum period. One study of the cost of obstetrically-related fecal incontinence estimated it to be $17,166 per patient (14). Thus, if the results of this study is in fact generalizable to the Oregon population with IBS, with an average of 40,000 deliveries in Oregon per year, an estimated 8% IBS in the postpartum population, and 69% of women with IBS experiencing FIPP, approximately 2208 women with IBS would be expected to have fecal incontinence postpartum each year. If 14% of them seek medical care (as was found in the MacArthur study), annual expenditures for evaluation and treatment of fecal incontinence postpartum in women with IBS would be expected to total $5.3 million in Oregon alone. Better understanding of the scope of the problem may assist in the financial planning of agencies that provide care to pregnant and postpartum women such as the Oregon Health Plan.

Chapter 5

Conclusion:

This study found women with antepartum Irritable Bowel Syndrome to have a 69% prevalence of fecal incontinence postpartum. Both IBS and FIPP have significant social and health impact, including the costs of care and quality of life burdens. Although this population-based cross-sectional study does not elucidate the true prevalence of fecal incontinence postpartum in women with IBS in Oregon, it does suggest that a significant proportion of women with IBS are likely to develop new or recurrent fecal incontinence postpartum, and modifying tobacco use or reassessing mode of delivery may attenuate this risk.

Because many women do not volunteer their symptoms of fecal incontinence with their healthcare providers, this population of women with history of Irritable Bowel Syndrome may benefit from close monitoring and specific questioning to reduce the morbidity related to fecal incontinence postpartum.

Future studies comparing the population of women with IBS to women without IBS may elucidate the differences in their experiences with fecal incontinence postpartum.

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FIPP Study

e are interested in fecal incontinence in women after childbirth. We would like to ask you about your childbirth experiences. Most of these questions are about the baby you just delivered. When we ask about previous births, we will state it in the question.

INSTRUCTIONS: This form will be scanned and read by a computer: Please write clearly and fill in the circles completely using ONLY a BLUE or BLACK PEN. Please do NOT USE PENCIL. Thank you for your help.

Today's Date: ☐☐ / ☐☐ / ☐☐☐☐

1. How many weeks has it been since you gave birth?
☐☐ weeks

2. Since delivery of this baby, how often do you have a bowel movement (stool) on average?
- O 2 per day or more
- O 1 per day
- O Every other day
- O 2 per week
- O 1 per week
- O Less than 1 per week

3. Since delivery of this baby, have you ever experienced an inability to control passage of gas?
- O No
- O Yes, less than 1 time per week
- O Yes, 1 to 3 times per week
- O Yes, daily

4. Since delivery of this baby, have you ever experienced an inability to control diarrhea?
- O No
- O Yes, less than 1 time per week
- O Yes, 1 to 3 times per week
- O Yes, daily

5. Since delivery of this baby, have you ever experienced an inability to control solid stool?
- O No
- O Yes, less than 1 time per week
- O Yes, 1 to 3 times per week
- O Yes, daily

6. Since delivery of this baby, have you ever passed gas during intercourse?
O Have not resumed intercourse O No O Yes

7. Since delivery of this baby, have you ever lost stool during intercourse?
O Have not resumed intercourse O No O Yes

8. Since delivery of this baby, do you have difficulty telling the difference between gas or stool?
O No O Yes O I don't know

9. Since delivery of this baby, do you need to rush to the toilet to avoid soiling yourself when you have your first urge to have a bowel movement? O No O Yes

10. If you answered YES to any of the the above questions (questions 3 to 9), when did the symptoms first start?
- O Before 1st child
- O After 1st child
- O After 2nd child
- O After 3rd child
- O After 4th or more

11. If all of the above symptoms (questions 3-9) have stopped, when did they stop?
- O Have not stopped
- O Only happened one time
- O After less than 1 week
- O After 1-4 weeks
- O After 5-8 weeks
- O After more than 8 weeks

12. How old were you when you had this baby? ☐☐ years

13a. If this is not your first baby, how old were you when you had your first baby? ☐☐ years

13b. How many total babies have you delivered? ☐☐

13c. How many sets of multiples have you had?
O None ☐ set(s) of twins ☐ set(s) of triplets or more

14. How much did this baby weigh at birth?
☐☐ lbs ☐☐ ounces OR ☐☐☐☐ grams

15. If this is not your first baby, how much did your heaviest baby weigh?
☐☐ lbs ☐☐ ounces OR ☐☐☐☐ grams

16. Which of the following best describes this delivery or any previous deliveries? *(Fill in all that apply.)*

	This baby	1st Delivery	2nd	3rd	4th	5th
Vaginal delivery without use of any device	O	O	O	O	O	O
Forceps-assisted vaginal delivery	O	O	O	O	O	O
Vacuum-assisted vaginal delivery	O	O	O	O	O	O
Cesarean after labor and pushing	O	O	O	O	O	O
Cesarean after labor, never pushed	O	O	O	O	O	O
Cesarean never labored	O	O	O	O	O	O

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Please turn over this page and continue....

17. For how long did you push during delivery of this baby?
☐☐ hours ☐☐ minutes

18. If this is not your first baby, how long was the longest you ever pushed? ☐☐ hours ☐☐ minutes

19. Did you have repair of any cuts or tears with this or any previous deliveries?

This baby	O No	O Yes	O I don't know
1st delivery	O No	O Yes	O I don't know
2nd delivery	O No	O Yes	O I don't know
3rd delivery	O No	O Yes	O I don't know
4th delivery	O No	O Yes	O I don't know
5th delivery	O No	O Yes	O I don't know

20. In this or any previous pregnancy, did you ever have a tear or cut that went through your anus?

This baby	O No	O Yes	O I don't know
1st delivery	O No	O Yes	O I don't know
2nd delivery	O No	O Yes	O I don't know
3rd delivery	O No	O Yes	O I don't know
4th delivery	O No	O Yes	O I don't know
5th delivery	O No	O Yes	O I don't know

21. Do you currently smoke? O No O Yes

22. Have you smoked more than 100 cigarettes in your entire life? O No O Yes

23. During the last half of your pregnancy, what percentage of your day did you spend standing on average?
- O 0%
- O 1 - 25%
- O 26 - 50%
- O 51 - 75%
- O More than 75%

24. Are you currently, or did you ever breast-feed this baby?
O No O Yes

If Yes, for how long have you or did you breast feed?
- O Less than 4 weeks
- O 4 weeks - 12 weeks
- O 13 weeks to present

25. Did you ever breast-feed any other child? O No O Yes

If Yes, for how long with each child?

	1st child	2nd child	3rd child	4th child	5th child
Less than 4 weeks	O	O	O	O	O
4 weeks - 12 weeks	O	O	O	O	O
13 weeks - 1 year	O	O	O	O	O
More than 1 year	O	O	O	O	O
Never breast-fed	O	O	O	O	O

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26. How much did you weigh before this pregnancy?
☐☐☐ lbs OR ☐☐☐ kilos

27. How tall are you? ☐☐ feet ☐☐ inches OR ☐☐☐ cm

28. How much weight did you gain in this pregnancy?
☐☐☐ lbs OR ☐☐☐ kilos

29. The following is a list of medical conditions. Please indicate when you have had the condition or if you have never had the condition.
(Fill in all that apply.)

	Never	Before you were ever pregnant	During any pregnancy	After this pregnancy
Diabetes	O	O	O	O
Lupus (SLE)	O	O	O	O
Scleroderma	O	O	O	O
Antiphospholipid synd.	O	O	O	O
Rheumatoid arthritis	O	O	O	O
Irritable bowel disorder	O	O	O	O
Asthma	O	O	O	O
Constipation	O	O	O	O
Leakage of urine	O	O	O	O

30. Please indicate when you have participated in the following activities, or if you have never participated.
(Fill in all that apply.)

	Never	Not during any pregnancy	During a previous pregnancy	During this pregnancy
Aerobic dance	O	O	O	O
Jog or run	O	O	O	O
Basketball	O	O	O	O
Volleyball	O	O	O	O
Tennis/racquetball	O	O	O	O
Soccer	O	O	O	O
Yoga	O	O	O	O
Downhill skiing	O	O	O	O

We are currently conducting other studies in this research area and would like to invite you to participate further. We do not have any identifying information on you.

- O **No**, I would not like more information about participating in these studies.
- O **Yes**, I would like more information about participating in these studies. Here is my contact information:

Name:_____ Phone:_____

Address:_____

_____

Thank you very much for taking the time to fill out this survey!