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Selected symptoms associated with sexual and physical abuse history among female patients with gastrointestinal disorders: the impact on subsequent health care visits

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ABSTRACT

Background. Despite a growing literature pointing to the deleterious health effects of sexual and physical abuse history, few studies provide evidence about which medical symptoms are most affected. The aim of this paper is to determine the impact of sexual and physical abuse history on a selected set of medical symptoms, and to test how such abuse, medical symptoms and functional disability may affect subsequent health care visits.

Methods. We studied 239 women from a referral-based gastroenterology clinic; follow-up data were available on 196 of these women. All women were interviewed about sexual and physical abuse history.

Results. Women with abuse history, particularly those with severe abuse, were much more likely to report somatic symptoms related to panic (e.g. palpitations, numbness, shortness of breath), depression (e.g. difficulty sleeping, loss of appetite), musculoskeletal disorders (e.g. headaches, muscle aches), genito-urinary disorders (e.g. vaginal discharge, pelvic pain, painful intercourse), skin disturbance (e.g. rash) and respiratory illness (e.g. stuffy nose). Furthermore, we found that the severity of abuse history, somatic symptoms and functional disability predicted 30% of the variance in health care visits during the subsequent year, and that the effect of abuse severity on visits was explained by abused women having more somatic symptoms and functional disability.

Conclusions. Patients' reports of abuse history, somatic symptoms and functional disability appear to be important factors in explaining the number of health care visits among a clinic sample of women with gastrointestinal disorders.

INTRODUCTION

Recently, there has been growing documentation that sexual and physical abuse are associated with many indicators of poor health (Drossman *et al.* 1990; Hendricks-Matthews, 1993; Laws, 1993; Longstreth & Wolde-Tsadik, 1993; Toomey *et al.* 1993; Leserman *et al.* 1995). Our previous research (Drossman *et al.* 1990; Leserman *et al.* 1996, 1997) and other studies (Briere & Runtz, 1988; Springs & Friedrich, 1992; Longstreth & Wolde-Tsadik, 1993; Bendixen *et al.* 1994; Golding, 1994; Scarinci *et al.* 1994; Walker *et al.* 1995) have linked abuse with the reporting of more medical symptoms and consequently more functional disability. Specifically, abuse history has been associated with more gastrointestinal (GI) symptoms and disorders (Felitti, 1991; Lechner *et al.* 1993; Longstreth & Wolde-Tsadik, 1993; Golding, 1994; Talley *et al.* 1994; Drossman *et al.* 1995, 1996), pelvic pain (Walker *et al.* 1988; Rapkin

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et al. 1990; Springs & Friedrich, 1992; Walling *et al*. 1994) and headache pain (Domino & Haber, 1987; Moeller *et al*. 1993). Besides these somatic complaints, however, few studies have systematically examined whether abuse history is related to a variety of other medical symptoms. The current paper will focus on whether a selected set of medical symptoms are associated with sexual and/or physical abuse history among a sample of women from a referral-based gastroenterology practice. We will further address the issue of whether the greater number of medical symptoms and poor functional disability among abused women is associated with more health care visits during the subsequent year.

Using the probability sample of the Los Angeles Epidemiological Catchment Area project, Golding found that women with sexual assault history reported more gastrointestinal symptoms, muscular pain, cardiopulmonary symptoms (e.g. chest pain), genito-urinary symptoms (e.g. pain on urination, pain during intercourse) and neurological symptoms (e.g. fainting, loss of voice, paralysis) compared to women without abuse histories (Golding, 1994). In studies of female primary care and gynaecology patients, childhood abuse has been associated with more gastrointestinal (Lechner *et al*. 1993; Moeller *et al*. 1993), respiratory (Lechner *et al*. 1993), neurological (including headaches) (Lechner *et al*. 1993; Moeller *et al*. 1993), genito-urinary (e.g. pelvic pain, bladder and vaginal infections, sexual dysfunction) (Springs & Friedrich, 1992; Lechner *et al*. 1993; Moeller *et al*. 1993), and depressive (e.g. fatigue, sleep disturbance) (Moeller *et al*. 1993) symptoms. Being overweight or obese was also more common among women with abuse history (Springs & Friedrich, 1992; Moeller *et al*. 1993). Compared with matched controls, women with histories of sexual abuse during childhood reported more gastrointestinal (Rimsza *et al*. 1988; Felitti, 1991), musculoskeletal (Rimsza *et al*. 1988) and genito-urinary symptoms (Rimsza *et al*. 1988), more headaches (Felitti, 1991) and being overweight; these symptoms were evident months to years after the abuse (Felitti, 1991).

In our preliminary study of 13 symptoms among female patients with GI disorders, sexually and/or physically abused women reported more than twice the musculoskeletal pain (e.g. headaches, backaches, pain in eyes), and cardiopulmonary symptoms (e.g. shortness of breath, chest pain), four times more pelvic pain and three times more fatigue than women without abuse histories (Drossman *et al*. 1990). In a study of patients with fibromyalgia, those with sexual abuse histories reported more gastrointestinal symptoms, numbness, fatigue and unexplained weight change (Taylor *et al*. 1995).

Given that women with abuse history appear to have a wide variety of medical symptoms, resulting in physical and psychosocial disability (Golding, 1994; Leserman *et al*. 1996, 1997; Scarinci *et al*. 1994), it may not be surprising that abuse history has also been linked to more health care visits (Felitti, 1991; Talley *et al*. 1994; Drossman *et al*. 1996). We know of no studies, however, that have shown whether abuse history, particularly severe abuse, directly predicts future health care use or whether the effect of abuse on health care visits is mediated by greater reporting of somatic symptoms and functional disability. The nature of these relationships will be explored more fully in the current study.

Based on the studies cited above, we hypothesize that sexual and/or physical history, particularly severe abuse, will be associated with a greater frequency of selected musculoskeletal, cardiopulmonary, neurological, genito-urinary and respiratory symptoms, as well as more somatic symptoms related to depression (e.g. fatigue, weight loss, sleep difficulties) among our sample of referral-based patients with GI disorders. In this select sample, we expect that severe abuse, somatic symptoms and functional disability at study entry will be associated with greater numbers of health care visits during the subsequent year. We have not examined symptoms related to GI disorders since variation on these symptoms would likely be from their specific type of GI disease or illness.

METHOD

Sample and procedures

Data were collected on 239 female patients from a referral gastroenterology clinic at the University of North Carolina. While waiting to see their physicians in the clinic, all English-speaking female patients between age 18 and 70 were asked consecutively to enrol in a longitudinal study. The study was approved by our Insti-

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tutional Review Board and all subjects signed a written informed consent before participating in the study. Those agreeing to be studied, returned for a full day visit where they filled out questionnaires, and were administered a structured interview concerning sexual and physical abuse history. Data were collected over a 2-year period. Of the 731 women who met eligibility requirements and were asked to be in the study, 239 (33% of eligible) returned for a full day visit. The latter group made up our sample. We were able to obtain 1 year follow-up data on 196 (82%) of our sample (27% of those meeting eligibility) to assess health services longitudinally.

Measurement

Sexual and physical abuse

A structured interview was developed to assess the presence of sexual and physical abuse history, as well as the details concerning the abuse. To meet criteria for sexual abuse incidents in adults, there had to be a clear threat of harm or force; feeling pressured to have sex was not sufficient. To meet criteria for sexual abuse in children, the threat of force did not have to be as clearly established; 'unwanted' incidents sufficed where threat of force was implied by the age differential between perpetrator and victim. Subjects who indicated that they may have been abused, but were not sure, were not included in the abused group.

'Sexual abuse' was defined as any of two types of forced sexual experiences involving contact: sexual touching and vaginal or anal intercourse (rape). 'Touch' was defined in terms of being touched with hands, mouth or objects on the breast or genital areas where force or threat of harm was used. Also included was being made by force or threat of harm to touch another person's genitals with mouth or hands. 'Rape' referred to being made by force or threat of harm to have vaginal or anal intercourse. We considered these abusive experiences to be hierarchical in invasiveness, that is, rape (intercourse) being more serious than touch, based on our previous analyses (Leserman *et al.* 1996). Subjects were categorized on sexual abuse based on their most invasive sexual abuse experience. Incidents of attempted sexual abuse where no contact resulted (e.g. encounters with exhibitionists, attempted rape with no sexual touching) were excluded because our previous research showed that only contact sexual abuse was related to worse health (Leserman *et al.* 1996).

In addition, we assessed 'physical abuse' by interviewing subjects to determine if they ever had a serious life threat from a physical attack, over and above that which may have occurred during the sexual abuse. The attack could have occurred with or without a weapon, but must have been with the intent to kill or seriously injure them. Although being beaten and kicked without an attempt to kill or seriously harm was also considered physical abuse, we did not include these experiences because our previous research showed that only life threatening physical abuse was related to later health outcome (Leserman *et al.* 1996). Thus, the abused group in the current study includes women meeting criteria for sexual and/or life threatening physical abuse history.

The sexual and physical abuse history also included information about the details of the abuse. In a previous paper, we developed an abuse severity measure based on those dimensions of abuse that were most associated with poor health outcome (Leserman *et al.* 1997). This empirically derived measure was constructed by summing the following: (1) presence of rape (0 = no sexual abuse, 1 = touch sexual abuse, 2 = forced intercourse); (2) experiencing serious injury during sexual abuse (0 = no serious injury, 2 = serious injury); and (3) number of life threats (0 = no life threats, 1 = 1, 2 or 3 life threats, 2 = 4 or more life threats). Thus, the severity measure ranges between 0 and 6.

Medical symptoms

Non-GI medical symptoms included a list of 30 symptoms (e.g. frequent headaches, feeling fatigued, rash). Symptoms were chosen from other symptom checklists and verified as commonly occurring among women by the National Ambulatory Medical Care Survey (Schneider *et al.* 1979). Note that two symptoms ('other symptoms' and 'unexpected bleeding from any part of the body not caused by accident or injury') that were previously included in our published analyses (Leserman *et al.* 1996), were omitted here since these might have included GI type symptoms. At study entry,

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women indicated whether each of the symptoms was present or absent during the previous 6 months.

We factor analysed the data on the 30 somatic symptoms (principal components with varimax rotation) in order to determine underlying symptom clusters and to reduce the data. The factor analysis yielded seven theoretically meaningful factors with eigenvalues above one. Most items loaded greater than 0·40 on a factor and thus we created seven scales from these factors (see Table 1). We created the scales by averaging the number of symptoms present on each scale, so that scales could range from 0 to 1, indicating the proportion of present symptoms. Note that two symptoms, cold hands or feet and weight gain did not load on any factor and will be considered separately. Further verification of item classification into scales was made by checking that each item added to the total reliability of the scale. The seven scales were: panic symptoms (Kuder–Richardson 20 (α-20) = 0·73), depressive symptoms (α-20 = 0·66), musculoskeletal (α-20 = 0·67), genito-urinary symptoms (α-20 = 0·65), menstrual symptoms (α-20 = 0·66), skin symptoms (α-20 = 0·42), and respiratory symptoms (α-20 = 0·42). Items in most scales are shown in Table 2.

Functional disability

The overall summary scale of the Sickness Impact Profile (SIP) was used as a measure of functional disability (Bergner *et al*. 1981). The SIP assesses the degree to which health status currently affects daily functioning in physical (e.g. mobility), psychosocial (e.g. social interaction, emotional behaviour) and other (e.g. home management, recreation) activities. The SIP was administered at study entry.

Health care visits

We obtained data on health care visits from four mailed questionnaires that were collected at 3-month intervals during the year subsequent to the study visit. We asked subjects the following question: 'How many times did you seek treatment for medical problems from a doctor or other health care provider in the past 3 months? Do not count any care you may have received while you were a bed-patient overnight in a hospital or nursing home. Do not count general check-ups or childbirth related visits'. Since many subjects did not complete all the mail-back questionnaires, we substituted the average of the non-missing data when at least two of the four data points were available. We excluded 43 cases with no data or only one data point. Analyses showed that the missing group did not differ from the rest of the sample on abuse history.

Background variables

Demographic data were obtained by questionnaire. Primary diagnosis (functional *versus* organic) was determined by patient's physicians and reviewed by one of the authors (D.A.D.) where diagnosis was in question. Functional diagnoses included those conditions with no known structural or biochemical basis to explain symptoms (e.g. IBS, functional abdominal pain, functional dyspepsia). Organic disease included disorders such as ulcerative colitis, Crohn's disease, and liver, pancreatic-biliary and acid peptic disease.

Data analysis

All data analyses used two-tailed tests. We used analysis of co-variance to predict the seven symptom domains with presence or absence of abuse history and multiple regression with the abuse severity scale. All analyses controlled for the background variables of age, race, education, and disease type (functional *versus* organic). For symptom domains that were significantly related to either abuse measure, we further explored which items were associated with these abuse measures using logistic regression, controlling for the same background variables.

A series of regression models were run predicting total health care visits during the previous year with variables entered in the following order: (1) background variables (age, education, race and disease type); (2) abuse severity; and (3) somatic symptoms and functional disability. Given outliers in the distribution of total health care visits, we ranked this variable before running all analyses.

RESULTS

Description of the study sample

The average age of women in this study was 39·4 years (S.D. = 12·3), with a range from 18 to 70, and mean education was 14·0 years (S.D. = 2·8).

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Table 1. *Abuse measures with somatic symptom groups* (N = 239)

	Presence of abuse history*						Abuse severity scale†		
	Abused		Not abused						
Symptom domains	Mean	(S.E.)	Mean	(S.E.)	β	P	β	P	Inc. R^2
Panic (cardiopulmonary/ neurological)	0·43	(0·03)	0·26	(0·03)	0·27	0·0001	0·27	0·0001	0·07
Depressive	0·51	(0·03)	0·37	(0·03)	0·22	0·0006	0·29	0·0001	0·08
Musculoskeletal	0·55	(0·03)	0·40	(0·03)	0·23	0·0004	0·25	0·0002	0·06
Genito-urinary	0·38	(0·02)	0·20	(0·02)	0·30	0·0001	0·37	0·0001	0·13
Menstrual	0·30	(0·03)	0·29	(0·03)	0·02	0·77	0·01	0·86	0·00
Skin	0·32	(0·03)	0·21	(0·03)	0·18	0·006	0·19	0·005	0·03
Respiratory	0·49	(0·03)	0·43	(0·03)	0·08	0·21	0·20	0·002	0·04

* Results from analysis of co-variance, controlling age, race, education and disease type (functional *versus* organic), with least square means, standard errors, standardized regression coefficients and P values shown for presence *versus* absence of sexual and/or physical abuse.
† Results from multiple regression, controlling age, race, education and disease type (functional *versus* organic), with abuse severity standardized regression coefficients and associated P values. The Incremental (Inc.) R^2 indicates the amount of variance accounted for by abuse severity minus that accounted for by the control variables.

Table 2. *Abuse measures with specific somatic symptoms* (N = 239)

	Presence of abuse history*			Abuse severity scale		
	Adj OR	(CI)	P	Adj OR	(CI)	P
Panic (cardiopulmonary/neurological)						
Shortness of breath	2·49	(1·39–4·54)	0·002	1·27	(1·06–1·52)	0·01
Palpitations	2·42	(1·39–4·28)	0·002	1·42	(1·19–1·73)	0·0002
Chest pain	1·81	(0·99–3·34)	0·06	1·21	(1·00–1·45)	0·04
Numbness or tingling	2·52	(1·46–4·40)	0·001	1·35	(1·13–1·63)	0·001
Weakness or faintness	1·78	(1·05–3·03)	0·03	1·19	(0·99–1·42)	0·06
Blurred or double vision	2·35	(1·26–4·53)	0·009	1·21	(1·01–1·46)	0·04
Depressive						
Difficulty sleeping	2·78	(1·63–4·79)	0·0002	1·45	(1·19–1·80)	0·0004
Tired or fatigued	2·26	(1·25–4·17)	0·008	1·33	(1·07–1·71)	0·02
Loss of appetite	1·54	(0·88–2·72)	0·14	1·38	(1·15–1·67)	0·0007
Unexplained weight loss	1·70	(0·84–3·56)	0·15	1·31	(1·07–1·60)	0·009
Musculoskeletal						
Frequent backaches	1·07	(0·63–1·80)	0·81	1·11	(0·94–1·33)	0·23
Muscle aches in neck shoulders or limbs	2.27	(1·34–3·91)	0·003	1·33	(1·10–1·63)	0·004
Stiff or aching joints	1·59	(0·95–2·70)	0·08	1·20	(1·02–1·44)	0·04
Frequent headaches	3·32	(1·93–5·83)	0·0001	1·52	(1·24–1·89)	0·0001
Pain in eyes or ears	2·05	(1·16–3·71)	0·02	1·18	(0·99–1·41)	0·07
Genito-urinary						
Pain with urination	1·58	(0·90–2·80)	0·11	1·35	(1·12–1·62)	0·001
Vaginal discharge/itching	2·65	(1·51–4·72)	0·0008	1·42	(1·18–1·72)	0·0002
Low sexual desire	2·45	(1·37–4·46)	0·003	1·32	(1·10–1·59)	0·003
Painful intercourse	2·98	(1·50–6·23)	0·003	1·48	(1·22–1·82)	0·0001
Pelvic pain	4·25	(2·16–8·82)	0·0001	1·44	(1·19–1·76)	0·0002
Skin						
Rash or skin itching	2·18	(1·25–3·87)	0·007	1·20	(1·01–1·43)	0·04
Sensitive skin	1·58	(0·84–2·99)	0·16	1·20	(0·99–1·44)	0·06
Excessive sweating	1·57	(0·86–2·90)	0·14	1·17	(0·97–1·40)	0·10
Respiratory						
Stuffy or runny nose	1·66	(0·96–2·88)	0·07	1·38	(1·13–1·72)	0·003
Cough	0·87	(0·52–1·46)	0·60	1·06	(0·90–1·26)	0·48
Sore throat or fever	1·52	(0·85–2·72)	0·16	1·26	(1·06–1·52)	0·01

* Results from logistic regression adjusting for age, race, education and disease. Adjusted odds ratios (Adj. OR) and confidence intervals (CI) are shown.

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The racial distribution was 83·7% white, and 16·3% non-white (11·7% African-American and 4·6% other racial/ethnic groups). The majority of patients have a primary GI diagnosis of organic disease (61·5%). Fully half of the women (50·6%) have had some type of 'contact' sexual and/or life threatening physical abuse. In terms of abuse severity scores, 49·4% had no abuse, 33·5% had moderate severity scores (1 or 2), and 17·1% had the most severe abuse ($\geqslant 3$). For the vast majority of abused women, sexual and physical abuse occurred many years before the study; 75% had their last sexual abuse $\geqslant 10$ years earlier and 83% had their last life threat $\geqslant 5$ years previously.

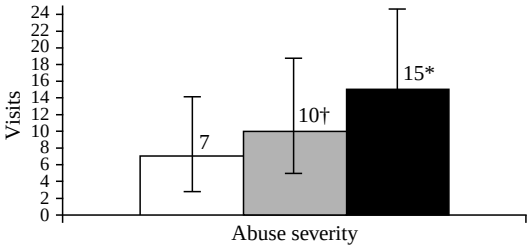

FIG. 1. Median health care visits during the subsequent year by abuse severity (□, no abuse; ▨, moderate (score 1–2); and ■, severe (score 3–6)). Bars represent the 25% and 75% quartiles. ANOVA on number of visits (ranked) yielded significant differences among the three abuse groups ($F = 8{\cdot}36$, $P = 0{\cdot}0003$, df = 2,193). * Those with severe abuse had significantly more visits than no abuse ($t = -4{\cdot}05$, $P < 0{\cdot}0001$) and moderate abuse ($t = -2{\cdot}49$, $P = 0{\cdot}01$). † There was a trend for the moderate abuse group to be higher than those with no abuse $t = -1{\cdot}90$, $P = 0{\cdot}06$).

Abuse and symptoms

Table 1 shows the abuse measures (presence or absence of abuse and abuse severity) with each symptom domain. Note that both measures of abuse are associated with panic, depressive, musculoskeletal, genito-urinary and skin symptoms. In addition, the abuse severity scale is significantly associated with respiratory symptoms. Neither measure is associated with menstrual symptoms. Abuse severity appears to be a narrowly better predictor of symptoms than presence or absence of abuse as indicated by the slightly higher standardized regression coefficients on several scales. Where it is a significant predictor, abuse severity explains from 3 to 13% of the variance in symptom domains.

Table 2 shows the relationship of abuse measures to the individual symptoms composing the symptom domains that were previously shown to be related to abuse measures. Note that those with abuse history have from almost 2 to 2·5 times the chance of reporting panic type symptoms (e.g. shortness of breath, palpitations, numbness, weakness, blurred or double vision) compared to women without abuse history. Depressive symptoms (e.g. difficulty sleeping, fatigue) occurred over twice as often among those with abuse. Musculo-skeletal symptoms (e.g. muscle aches, headaches, pain in eyes or ears) were reported from about 2 or 3 times more by those with abuse. Genito-urinary symptoms (e.g. vaginal discharge, low sexual desire, painful intercourse, pelvic pain) were acknowledged from 2·5 to over 4 times more among women with abuse history. Even rashes or skin itching was reported twice as frequently by those with abuse history. Weight gain, an item not in any scale, was also more commonly reported among abused women (Adj. OR = 1·85, CI = 1·05–3·30, $P = 0{\cdot}03$).

Abuse severity was significantly related to seven symptoms that were generally only trending towards significance with presence or absence of abuse. These included: chest pain, loss of appetite, unexplained weight loss, stiff or aching joints, pain with urination, stuffy or runny nose, and sore throat. For each unit increase in abuse severity (range from 0 to 6), subjects had from 1·2 to 1·5 times greater chance for reporting 20 somatic symptoms. Note that pelvic pain, painful intercourse, vaginal symptoms, frequent headaches, and difficulty sleeping were the symptoms most highly related to abuse history, regardless of the abuse measure used.

Health care visits

We next examined how abuse severity, number of somatic symptoms and functional disability might affect health care visits over the subsequent year. Fig. 1 shows that those with severe abuse had a median of eight more health care visits during the following year than those without abuse ($P < 0{\cdot}0001$); those with moderate abuse had a median of three more visits than those not abused ($P = 0{\cdot}06$). Table 3 indicates that severity of abuse was related to more subsequent health care visits, after controlling for background variables. Furthermore, women with more somatic symptoms during the 6 months before the initial study visit, and those reporting more

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Table 3. *Regression of abuse severity, number of somatic symptoms and functional disability with total health care visits during the subsequent year**

	STβ	*P*	STβ	*P*
Abuse severity	0·30	0·0001	0·04	0·53
Symptoms			0·22	0·003
Functional disability			0·39	0·0001
Increment to R^2		0·09		0·30

* Results are from a series of regression equations, controlling for background variables (age, education, race, and disease type). The first equation shows abuse added to the model. The second equation shows abuse, somatic symptoms and functional disability added to the model. STβ indicates the standardization regression coefficients. Increment to R^2 is the amount of variance explained by the total model subtracting variance accounted for by background variables. Total health care visits have been ranked ($N = 196$).

health related disability (e.g. physical and psychosocial dysfunction) at study entry had greater numbers of health care visits during the following year. Note that the effect of abuse severity on number of health care visits was explained by medical symptoms and functional disability (as indicated by the reduced regression coefficient for abuse when these two variables were added to the model). In other words, women with severe abuse had more somatic symptoms and health related disability which accounted for why they reported more health care visits. Note, there was a high correlation of abuse severity with number of total symptoms ($r = 0{\cdot}40$, $P < 0{\cdot}0001$) and with functional disability ($r = 0{\cdot}48$, $P < 0{\cdot}0001$). Fully 30% of the variance in health care visits was explained by severity of abuse history, number of medical symptoms and functional disability.

DISCUSSION

Among women patients with GI disorders, those with abuse history report many non-GI somatic symptoms including those related to panic, depression, musculoskeletal disorders, genito-urinary disorders, skin disturbance and respiratory illness. Symptoms most associated with abuse history (e.g. pelvic pain, painful intercourse, vaginal symptoms, frequent headaches and difficulty sleeping) are some of the symptoms most often reported in previous studies (Rapkin *et al.* 1990; Felitti, 1991; Springs & Friedrich, 1992; Moeller *et al.* 1993).

We must caution that the generalizability of our study may be very limited since our response rate was relatively low. Furthermore, generalizability may not extend beyond women with gastrointestinal disorders who attend referral based tertiary care clinics. This study is also limited by not focusing on a more comprehensive list of medical symptoms, and the possibility that these symptoms overlapped with patients' GI disorders. In addition, without using a longitudinal design, we cannot demonstrate a causal connection between abuse history and symptom or functional disability reporting. It is also possible that current psychological state may have affected abuse reporting.

The question arises, do women with abuse history simply have a tendency to report more symptoms of any kind as a function of psychological disturbance or is there some specificity to the types of symptoms that women report? It appears that abuse history is associated with a wide variety of symptoms, perhaps indicating a low threshold in reporting symptoms or a hypervigilance to symptoms. One study among patients with gastro-oesophageal reflux found that abused women tended to report lower cutaneous sensation thresholds and thus were described as hypervigilant in the labelling of stimuli as painful (Scarinci *et al.* 1994). Low sensation threshold was explained primarily by the tendency to set low standards for judging stimuli as noxious (response bias, a psychological factor) rather than by differences in cutaneous discriminating capability (nociception, a physiological factor). This hypervigilance to pain was accompanied by abused women's tendency to report more non-GI related pain, to cope poorly with pain (e.g. self-blame, catastrophizing), to have more psychiatric morbidity, and psychosocial functional disability.

Our findings also indicate that there may be some specificity to the types of symptoms associated with abuse. Women with abuse history appear to report symptoms associated with panic, genito-urinary disorders, depression, and some musculoskeletal problems (headaches) more consistently than other symptoms (e.g. cough, excessive sweating, menstrual difficulties, backaches). Given that more severe abuse includes physical injury, often battering in the face or head and vaginal or anorectal penetration, symptoms such as headaches, muscle

aches, and GI and genito-urinary pain may be a long-term consequence of such abuse.

Preliminary hypotheses concerning the mechanisms underlying these relationships are consistent with neurophysiological studies showing that physical and psychological trauma up-regulate symptom perception at the gut or brain level. Injury or inflammation peripherally (e.g. as may occur with prolonged genito-urinary trauma) may produce visceral hypersensitivity with transient or semi-permanent changes (neuroplasticity) in afferent receptors, or spinal sensitization at the dorsal horn (Mayer & Gebhart, 1994; Drossman *et al*. 1995). Furthermore, memory loss, dissociation, and other psychological effects from severe abuse may result from stress-effects on controlling areas of the brain (Bremner *et al*. 1995*a*). For example, patients with abuse-associated post traumatic stress disorder (PTSD) had significant decreases in hippocampal volume (an area regulating the encoding and retrieval of memory) (Bremner *et al*. 1995*b*). Similarly, increased symptom reporting (somatization) among abused patients may result from stress-mediated effects on brain structures that subserve somatic or visceral perception. Patients with severe Irritable Bowel Syndrome (IBS), a disorder associated with a high frequency of abuse history, somatization and hypervigilance to bodily sensations, are distinguished from normals by having selective changes in regional brain perfusion resulting from rectal distention (Silverman *et al*. 1997). Compared to control subjects, patients with IBS activate the prefrontal cortex, an area associated with hypervigilance, and not the anterior cingulate gyrus, an opioid-rich region which down-regulates pain input.

Physical symptoms associated with panic (e.g. palpitations, shortness of breath) and depression (e.g. fatigue, weight loss) are consistent with PTSD. From a psychiatric perspective, the association between abuse history and certain psychiatric diagnoses, including the anxiety and somatoform disorders (Briere & Runtz, 1988; Loewenstein, 1990; Reiter *et al*. 1991; Walker *et al*. 1995), may lead to communicating psychological distress via bodily symptoms. Ultimately, this may lead to more physician visits, as we found among the women patients in the current study.

Abuse history, somatic symptoms and health related functional disability predicted 30% of the variance in health care visits during year following study entry. Furthermore, women with more severe abuse had greater subsequent health care use because they reported more symptoms and worse functional disability. Among tertiary care patients with GI disorders, abuse may be associated with the reporting of more symptoms and health related disability, ultimately leading to the use of more health care services. These findings must be interpreted with caution because we were unable to control for other factors which might have affected the number of health care visits (e.g. type of insurance coverage). These relationships are noteworthy, however, given that the vast majority of abuse occurred $\geqslant 5$ years before the current study. Furthermore, we were able to demonstrate associations of abuse, symptom reporting and functional disability with a prospective measure of health care visits.

Women with severe sexual and/or physical abuse in our study had on average eight more medical visits in 1 year than women without abuse history. We have previously reported an association between abuse history and more lifetime surgeries (Leserman *et al*. 1996). If our study is generalizable beyond referral-based GI practices, then we might expect considerable medical costs associated with abuse history, in addition to the physical and emotional consequences.

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