Health Status by Gastrointestinal Diagnosis and Abuse History

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See editorial on page 1301.

Background & Aims: Standardized assessment of health status by diagnosis (functional vs. organic) and the relative influence of abuse history on health status have not been studied previously. The aim of this study was to estimate the health status and abuse history for gastrointestinal diagnoses among patients seen in a tertiary-care gastroenterology clinic and to evaluate the relative predictive effects of diagnosis and abuse history on health status. *Methods:* Standardized measures of sexual and physical abuse history and six health status measures were estimated for the patients by diagnosis. Analysis of covariance was performed to determine the relative contributions of diagnosis type and abuse history on the health status measures. *Results:* Patients with functional gastrointestinal diagnoses had poorer health status and a higher frequency of severe types of abuse than patients with structural diagnoses. Independent of abuse history, functional diagnosis was significantly associated with greater pain severity and psychological distress and poorer daily function. Independent of diagnosis, abuse history significantly contributed to greater pain severity, more days in bed, more psychological distress, and poorer daily function. *Conclusions:* The type of diagnosis and abuse history independently contributed to the health status of this population. Therefore, medical symptoms alone may not be sufficient to understand patients' health status. Attention must also be paid to contributing psychosocial factors.

Evaluation of health status (defined in terms of symptoms, psychological status, daily function, and health care use) in medical populations has gained recent attention, and the resulting data may have implications in health policy decisions and resource allocation.[1] In gastroenterology, few studies go beyond evaluating symptoms as measures of health status or outcome; those that do are confined primarily to the study of inflammatory bowel disease.[2–7]

Despite the paucity of data within gastroenterology addressing this important issue, certain clinical assumptions have been made regarding the poorer health status of patients seen in referral (compared with primary care or nonclinical) populations or with functional compared with structural ("organic") diagnoses. Also, in light of recent data supporting an association of abuse history with functional gastrointestinal (GI) diagnosis[8,9] and with poorer health status,[10–12] we do not know the degree to which abuse history, relative to specific diagnosis, affects health status. In other words, it is possible that the poor health status of irritable bowel syndrome (IBS) may relate not to the condition itself but to the high association of abuse history found with this diagnosis in a referral practice.

The study had two aims. First, using standardized measures, we estimated health status for each GI diagnosis among female patients seen in a tertiary-care gastroenterology clinic. Second, we evaluated the relative predictive effects of diagnosis and abuse history on health status.

We attempted to answer the following questions. (1) What is the health status for patients in a referral GI clinic? (2) Does GI patients' health status differ by their diagnosis? We hypothesized that patients with functional GI disorders will do worse in all of the health status measures independently of the effect of abuse history. (3) Does GI patients' abuse history affect their health status? We hypothesized that patients with a history of sexual and/or physical abuse will do worse in all of the health status measures independently of the effect of GI diagnosis.

Materials and Methods

Study Sample

Between February 1992 and April 1994, we conducted a survey of female patients attending the University of North Caro-

Abbreviations used in this paper: ANCOVA, analysis of covariance; 95% CI, 95% confidence interval; GI, gastrointestinal; GSI, Global Symptom Index; HMO, health maintenance organization; IBS, irritable bowel syndrome; SIP, Sickness Impact Profile.

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lina Gastroenterology Clinics. All English-speaking female patients between 18 and 70 years of age were asked to fill out a brief questionnaire and to enroll in a comprehensive assessment and outcome study. The study was approved by our Institutional Review Board, and all subjects signed a written informed consent before participating in the study. At the same time, separate forms were also given to each patient's GI physician to obtain a medical diagnosis. Patients who agreed to the complete study returned for a full-day visit during which time they filled out questionnaires and were administered a structured interview concerning sexual and physical abuse history. Of the 731 female patients who met eligibility requirements (the clinic population), 506 (69% of the clinic population) completed the brief questionnaire (the clinic sample) and 239 (33% of the clinic population) returned for a full-day visit during which the data for the study were obtained (study sample).

Because participation in the study was voluntary, there could be differences in some patient characteristics between the study sample (n = 239) and the clinic population (n = 731). To determine what characteristics were different, we compared the 239 women who completed the study (study sample) with the 267 women who filled out only the brief screening questionnaire (the nonstudy subject clinic sample) using the information we obtained from the screening questionnaire. There were 506 subjects (=239 + 267) who filled out the screening questionnaire, 69.2% of the eligible clinic population (n = 731). We considered 69% as a reasonable approximation of the clinic population. When the study population was compared with the nonstudy subject clinic population, we found no differences on race (white, 83.3% vs. 82.0%; $\chi^2 = 0.135$; $P = 1.71$; n = 506), diagnosis of functional vs. organic disorder (functional, 38.5% vs. 45.0%; $\chi^2 = 2.06$; $P = 0.15$; n = 470), self-reported global health status (rated from 1 [poor] to 5 [excellent], 2.59 ± 1.00 vs. 2.56 ± 1.02 [mean ± SD]; $t = 0.53$; $P = 0.70$; n = 503), or general well-being (rated from 1 [poor] to 5 [excellent], 3.43 ± 0.90 vs. 3.34 ± 0.92 [mean ± SD]; $t = 1.11$; $P = 0.27$; n = 497). The study sample patients were on average 4 years younger ($t = 3.30$; $P = 0.001$; n = 506) and had 1 more year of education ($t = 3.99$; $P = 0.0001$; n = 505) than nonstudy subject clinic patients. The study sample did report a higher frequency of sexual abuse based on our screening questionnaire (49.4% vs. 38.2%; $\chi^2 = 6.4$; $P = 0.011$; n = 506), suggesting greater motivation of those with abuse history to participate in the study or a tendency of those not willing to discuss their abuse history to refuse participation.

Because our study sample was different from the clinic sample in the composition of age, years of education, and the frequency of sexual abuse history, to estimate the unbiased measures of health status for the clinic sample, we adjusted for the differences. See Statistical Analysis for the estimation methods.

Measurement

Physician's diagnosis. Using a Physician Diagnosis Form, each patient's physician was asked to check only one of the precategorized GI diagnoses as the patient's main GI complaint. If a diagnosis was ambiguous, clarification was obtained by one of the authors' (D.A.D.) discussion with the physician or by chart review. The diagnoses were grouped into two major categories: functional and organic. According to the Rome diagnostic criteria,[13] functional GI disorders were classified into 17 diagnoses and collapsed into five categories based on their frequency in the patient sample (esophageal, functional dyspepsia, IBS, other functional bowel, and functional abdominal pain). Organic diagnoses were precategorized into six major categories (ulcerative colitis, Crohn's disease, acid peptic, liver, pancreatic/biliary, and other).

Sexual and physical abuse history. Based on the work of Kilpatrick et al.,[14] Jacobson et al.,[15] Russell,[16] Koss et al.,[17,18] and others, we developed a structured interview to assess the presence of sexual and physical abuse history as well as details about the nature of the abuse.[19,20] The structured interview was conducted by two female psychology graduate students trained by the principal investigators (D.A.D., J.L., and C.T.T.) to administer and score the interview. Abuse history was noted if the patient experienced any of the sexual or physical abuse criteria defined in Appendix 1.[19]

Health status. We identified the following six health status measures that have previously been used by our research group.

Current pain. On completion of the day-long study visit, the patient was instructed to fill out a diary card daily for 14 days. She was instructed to "place a vertical mark that indicates the amount of pain you felt today" on a 100-mm visual analogue scale with the left end marked "none" (0) and the right end marked "very severe" (100). The scores from 14 days were averaged to create the current pain score used in this study.

Bed disability days. The number of bed disability days was obtained by asking "How many days during the past 3 months did you stay in bed (more than half of the day) because of illness? Include any days you stayed in the hospital." This question was adapted from the Epidemiological Catchment Area survey for North Carolina.[21]

Psychological distress. This was measured using the Global Symptom Index (GSI) of the SCL-90-R,[22] a 90-item questionnaire including eight subscales. For this study, we used the summary raw score (GSI), which was derived from averaging the raw scores of 90 items, each rated as 0 (not at all), 1 (a little bit), 2 (moderately), 3 (quite a bit), or 4 (extremely).

Daily function. Daily function measured using the overall scale of the Sickness Impact Profile (SIP).[23] The SIP has become the standard assessment of daily function in many health care studies.

Number of visits to physicians and number of lifetime surgeries. These were used as measures of health care use. During the study visit days, subjects were asked "How many times have you been to see the doctor for medical problems in the last 6 months?" and "How

many surgeries have you had in your lifetime?" These questions have been used in our previous research.[3,10,24]

Statistical Analysis

Data were entered and analyzed using SAS (SAS Institute, Cary, NC). First, we obtained information from the study sample on the demographics, GI diagnosis, and abuse history. Second, we computed the estimates and their 95% confidence interval (95% CI) for the prevalence of abuse history and all six measures of health status for the clinic sample (n = 506). For this purpose, we used logistic regressions for abuse history and ordinary least square regressions for the health status measures, adjusting for the variables that were different (age, years of formal education, and sexual abuse based on our screening questionnaire). These methods permit direct multivariate adjustment (standardization) of prevalence and means across the characteristics in the models.[25]

Third, we used analysis of covariance (ANCOVA) to evaluate the effect of diagnosis, the effect of abuse history, and the interaction effect of the two on patients' health status while controlling for the effect of demographic variables. Although there was a difference between the study sample and the clinic sample in the frequency of patients' reporting sexual abuse in the screening questionnaire, we did not control this variable because it is highly correlated to a similar measurement based on our structured interview. This does not lead to bias estimates because the purpose in this study was to evaluate the association between abuse and health status rather than to estimate the frequencies of abuse for the clinic sample. Beside controlling for the demographic variables, the ANCOVA models also allowed the mutual control of diagnosis and abuse history while evaluating the net effect of each of them.

All tests were two tailed. Because there were six measures of health status, we used an α level of 0.008 (=0.05/6) to determine the statistical significance in an effort to adjust for multiple comparisons (Bonferroni adjustment). Because of the small sample sizes for some of the GI diagnoses, we did not test the differences between specific GI diagnostic groups. Data for the specific GI diagnostic groups were listed only for readers' interest.

Results

Diagnostic and Demographic Composition of the Study Sample

The majority of the study population was white (84%), with a mean age of 39.4 years (±12.3 SD) and with 14.0 years (±2.7 SD) of education. The study sample was grouped into 11 diagnostic categories. Table 1 lists the frequency and proportion for these categories.

Functional GI disorders were the primary diagnosis for 39% of the sample. The largest of this group was patients with IBS (18%). For subjects with organic GI illness (61.5%), the largest group was inflammatory bowel disease (28%), comprising Crohn's disease (19%) and ulcerative colitis (9%), followed by acid peptic diseases (12%) and liver diseases (12%).

Table 1. Diagnosis and Abuse History of the Study Population

	Total		Abuse history	
Diagnosis[a]	n	%	n	%
Functional	**92**	**39**	**62**	**67**
Esophageal[b]	5	2	2	40
Dyspepsia	6	3	4	67
IBS	43	18	29	67
Other functional bowel[c]	19	8	11	58
Functional abdominal pain	19	8	16	84
Organic	**147**	**61**	**82**	**56**
Ulcerative colitis	21	9	8	38
Crohn's disease	46	19	27	59
Acid peptic	29	12	16	55
Liver	29	12	21	72
Pancreatic/biliary	7	3	4	57
Other organic[d]	15	6	6	40
Total	239	100	144	60
P value for abuse history[e]			0.074	

[a]Using χ^2 test; difference between 11 diagnostic groups was not tested because of insufficiency of sample size.
[b]Including 1 globus, 1 rumination, 1 chest pain, and 2 dysphagias.
[c]Including 7 constipation, 7 diarrhea, 1 incontinence, 1 obstructed defecation, and 3 unspecified functional bowel disorders.
[d]Including 2 polyps, 1 anemia, 2 Schatzki's rings, 1 scleroderma, 1 diverticular abscess, 1 bulimia, 1 food allergy, 2 cancers, 1 weight loss, 1 Behçet's syndrome, 1 fissure, and 1 small bowel obstruction.
[e]Functional vs. organic.

Abuse History

We calculated the frequency and percentage of abuse history for the total study sample, for patients with functional or organic diagnoses, and for the 11 diagnostic subgroups (Table 1). Sixty percent of the overall study sample population reported a history of sexual or physical abuse, ranging from 38% for patients with ulcerative colitis to 84% for patients with functional abdominal pain. The prevalence of abuse history among subjects with functional GI disorders tended to be higher than that among those with organic GI illness (67% vs. 56%; $P = 0.074$). The estimated prevalence for the clinic sample, by logistic regression adjusted for age, education, and sexual abuse reported in the screening questionnaire, was 64%, with a 95% CI between 56% and 72%.

In addition, we analyzed type of abuse history between patients with functional and organic diagnoses. Patients with functional disorders tended to have more severe types of abuse than patients with organic disorders (rape, 33% vs. 20%, $P < 0.034$; life-threatening physical abuse, 37% vs. 23%, $P < 0.021$). No differences for less severe abuse were noted between functional and organic

Table 2. Health Status: Total by Diagnosis and by Abuse History Controlling for Demographics

Diagnosis	Pain (0–100 visual analogue scale)	Days in bed/3 mo	Psychological distress	Daily function	No. of physician visits/6 mo	No. of lifetime surgeries
Total observed from study sample (n = 239)	26	8.9	0.78	9.0	7.7	4.3
Total estimated for clinic population (n = 506)[a]						
Estimated mean	26	8.6	0.78	9.1	7.5	4.5
95% CI	23–29	6.5–10.7	0.70–0.85	8.0–10.2	6.5–8.4	4.0–5.1
Functional[b]	**34**	**8.3**	**0.90**	**10.0**	**8.6**	**4.9**
Esophageal	34	7.3	0.78	7.4	9.1	3.0
Dyspepsia	27	8.8	0.78	8.6	9.6	6.2
IBS	35	9.8	1.02	12.2	9.5	5.4
Other functional bowel	34	4.0	0.80	7.1	5.3	3.8
Functional abdominal pain	33	9.6	0.83	11.0	9.8	5.2
Organic[b]	**20**	**8.1**	**0.64**	**7.3**	**6.7**	**3.7**
Ulcerative colitis	13	5.7	0.40	5.0	4.8	3.3
Crohn's disease	21	8.8	0.65	7.4	8.6	5.0
Acid peptic	20	8.5	0.77	8.3	5.1	3.1
Liver	22	8.5	0.70	8.3	7.5	3.0
Pancreatic/biliary	23	9.7	0.65	8.3	9.4	2.8
Other organic	17	7.7	0.61	5.9	4.2	3.6
P value, functional vs. organic[c]	0.0001	0.9499	0.0004	0.0050	0.0389	0.0206
Abuse history[d]						
Yes	33	11.9	0.95	11.5	8.7	4.9
No	20	4.5	0.60	6.1	6.7	3.8
P value, abuse vs. no abuse[c]	0.0001	0.0007	0.0001	0.0001	0.0312	0.0342

[a]Estimated means and 95% CIs for the clinic population adjusted for age, education, and sexual abuse history based on the screening questionnaire.
[b]Least-square means adjusted for all abuse history and controlling for race, age, and education using ANCOVA.
[c]Significance of the *P* values for the six health status variables is determined by 0.008 (=0.05/6) to adjust for multiple comparisons. Differences between 11 specific diagnoses were not tested because of insufficiency of sample size.
[d]Least-square means adjusted for GI diagnosis (functional vs. organic) and controlling for race, age, and education using ANCOVA.

disorders (sexual abuse by touch, 12% for functional vs. 19% for organic, $P = 0.15$; physical abuse by hitting, kicking, or beating, 21% for functional vs. 20% for organic, $P = 0.86$).

Health Status Measures

The results of health status measures for the total sample and for each diagnosis are shown in Table 2. For all measures, 0 would be considered normal health status.

Estimates for the clinic population. For each of the six health status measures, we computed the estimate and its 95% CIs for the clinic sample adjusted for age, education, and sexual abuse history. Overall, the estimated means of the six health status measures for the clinic population were very similar to the observed means from the study sample (n = 239). This suggested that the sample is very similar to the clinic sample in terms of health status.

Test of interaction effect between diagnosis and abuse history. If the relationship between GI diagnosis and health status is different for patients with or without abuse history or between abuse history and health status for patients with different diagnoses (such as functional vs. organic), an interaction exists. In a multiple regression, the interaction between two variables can be expressed as a product of the two variables. We can test the statistical significance of the interaction variable in the same manner as we test other main effect variables. In this study, we used general linear regression models controlling for demographics (race, age, and education), GI diagnosis (functional vs. organic), and abuse history. The *P* values for the interaction variables were all nonsignificant ($P < 0.10$; range, 0.11–0.77), indicating no interactions between GI diagnosis and abuse history on all six health status measures. Thus, we did not include interactions in further analysis.

Health status by GI diagnosis. We tested the differences between functional and organic diagnoses and between patients with and without abuse history while controlling for race, age, education, and abuse history or diagnosis (functional vs. organic). Patients with functional GI disorders had worse health status for pain, psychological distress, and daily functions and were likely to use health care more than patients with organic diag-

noses. There were no differences in bed disability days between patients with functional and organic diagnoses.

In Table 2, we also provided the least square adjusted means of the six health status measures for each diagnosis. Differences between 11 diagnostic groups were not tested because of the limit of sample size.

Pain. Similar to clinical observations, the highest scores were for patients with IBS (35) and functional abdominal pain (33) and lowest for patients with ulcerative colitis (13) and other organic diagnosis (17). Patients with Crohn's disease reported higher pain scores than those with ulcerative colitis (21 vs. 13); this was similar for patients with liver (22) and pancreatic/biliary disease (23).

Bed disability days. The contrast between patients with ulcerative colitis (mean, 5.7 days) and Crohn's disease (mean, 8.8 days) is noted. There were no differences across other diagnoses.

Psychological distress. These scores were highest for IBS (1.02) and functional abdominal pain (0.83) and lowest for ulcerative colitis (0.40). The latter score can be compared with the score of patients with ulcerative colitis seen in a referral center in Italy (0.54) and a control group of patients with urolithiasis (0.11).[26]

Daily function scores. Daily function scores were highest for patients with IBS (12.2) or functional abdominal pain (11.0) and lowest for patients with ulcerative colitis (5.0) and other organic GI disorders (5.9). These values can be compared with those of health maintenance organization (HMO) enrollees (1.8) and patients with various other diagnoses, including those with moderate obesity (5.1), those undergoing hemodialysis (13.2), and those with amyotrophic lateral sclerosis (32.4).[27]

Number of physician visits in the past 6 months. Patients with functional abdominal pain and functional dyspepsia had the highest number of visits (9.8 and 9.6, respectively), followed by patients with IBS (9.5), pancreatic/biliary diseases (9.4), and esophageal disorders (9.1). Patients with other organic diseases (4.2), ulcerative colitis (4.8), or acid peptic diseases (5.1) had the lowest number of visits. These values can be compared with a nonclinical population with ulcerative colitis by the Crohn's and Colitis Foundation of America (2.6)[3] and with hospitalized patients (8.6).[24]

Number of lifetime surgeries. The highest number were reported by patients with functional dyspepsia (6.2), IBS (5.4), and functional abdominal pain (5.2). Interestingly, patients in the pancreatic/biliary (2.8), liver diseases (3.0), acid peptic (3.1), or ulcerative colitis categories (3.3) had the least number of surgeries. These values can be compared with values of ulcerative colitis in the nonclinical (Crohn's and Colitis Foundation of America) sample (0.51)[3] or who have been hospitalized for this disease (1.2).[24]

Effects of abuse history on health status. Overall, patients with abuse history had significantly worse health status than patients without abuse history for pain (33 vs. 20; $P = 0.0001$), bed disability days (11.9 vs. 4.5; $P = 0.0007$), psychological distress (0.95 vs. 0.60; $P = 0.0001$), and daily function (11.5 vs. 6.1; $P = 0.0001$). Also, there was a trend for increased health care use (number of physician visits in the past 6 months, 8.7 vs. 6.7; $P = 0.0312$) and number of lifetime surgeries (4.9 vs. 3.8; $P = 0.0342$)).

Comparison of effects of GI diagnosis with effects of abuse history. Table 3 lists the percent variance of each health status variable explained by diagnosis (functional vs. organic), by abuse history, and by diagnosis and abuse history jointly while adjusting for the effect of demographic variables. This information allows us to determine the net effect of diagnosis (controlling for abuse history) and of abuse history (controlling for diagnosis) as well as the joint effect of the two in predicting health status.

The independent contribution of abuse history was 8.4% for pain, 4.8% for disability bed days, 7.8% for psychological distress, 8.8% for daily function, 1.9% for number of physician visits, and 1.6% for lifetime surgeries. These findings support the contention that abuse history strongly contributes to poor health status independently of diagnosis.

The independent contribution of diagnosis was 9.2% for pain, 4.6% for psychological distress, 2.9% for daily function, 1.8% for number of physician visits, and 2.0% for lifetime surgeries.

Finally, given the increased frequency of more severe types of abuse (e.g., rape and physical abuse involving life threat) among patients with functional GI diagnoses, we reanalyzed these data using this more severe and restrictive definition of abuse. The results (Table 4) show that severe abuse history increased the variance explaining the health status variables 20% for pain, 63% for days in bed, 6% for daily function, 74% for number of physician visits, and 231% for lifetime surgeries and decreased the variance 63% for psychological distress.

Discussion

Health status addresses certain ''values'' relating to health and illness and, more specifically, to the measurement of the personal impact of illness. Recent interest in this area of assessment has been

Table 3. Percent Variance of Health Status Explained by Abuse and Diagnosis

Diagnosis	Pain (0–100 visual analogue scale)	Days in bed/ 3 mo	Psychological distress	Daily function	No. of physician visits/6 mo	No. of lifetime surgeries
All variables[a]	23.4	5.7	15.7	16.6	6.2	16.0
Diagnosis[b]	9.2	0.0	4.6	2.9	1.8	2.0
Abuse history[c]	8.4	4.8	7.8	8.8	1.9	1.6
Diagnosis/abuse jointly[d]	2.4	0.1	1.5	1.3	0.4	0.4

NOTE. Data were computed as incremental *R* squares.
[a]Including race, age, education, diagnosis (functional vs. organic), and history of abuse (all sexual or physical abuse).
[b]Variance explained by diagnosis only.
[c]Variance explained by abuse history only.
[d]Variance explained jointly by diagnosis and abuse history (shared variance).

bolstered by the efforts of clinicians, investigators, and policy makers to more sensitively measure the effects of various treatments and to obtain data that would permit cost-effective decisions regarding resource allocation.[1,28] To date, few data exist on the health status of patients with specific GI disorders, and published studies have been confined mostly to patients with inflammatory bowel disease.[2–7]

In the last few years, community and clinical surveys have also reported an adverse effect of abuse history on health status in gastroenterology populations, particularly for (but not necessarily limited to) patients with IBS.[10–12,29,30] However, the health status of patients with specific GI diagnoses and the frequencies and predictive effects of abuse history on health status relative to diagnosis have not been studied.

Therefore, the purposes of this study were first to determine the health status as well as the proportions of abuse history for major GI diagnosis and, second, to identify the predictive effects of diagnosis and abuse history on health status. This study improves previous surveys by using a detailed abuse history interview, evaluation of functional and organic diagnoses separately, standardized measures of health status, and sophisticated analytic methods. For the first time, we also provide information on the independent effect of diagnosis and abuse history on health status. We studied women exclusively because of their much higher frequencies of both functional GI diagnosis and abuse history in community[30] and clinical populations.[8]

When comparing diagnoses, the patients did not differ on demographic status. Consistent with a previous survey of gastroenterologists,[31] the functional GI diagnoses comprised almost 40% of the sample (almost half of those with IBS), followed by patients with inflammatory bowel disease (28%) and acid peptic and liver disease (12% of each).

Using data obtained from a detailed semistructured psychological interview, we also evaluated the frequency of sexual and physical abuse history (Table 1). Compared with survey data obtained from GI patients at referral centers,[8,10,29] the frequency of abuse reporting by semistructured interview was in the higher range (60%, other studies ranging from 38% to 84%), possibly because of the increased sensitivity of the interview technique and the inclusion of physical abuse in this study's data. There was a trend for increased abuse reporting among patients with functional GI diagnoses (67% vs. 56%; $P < 0.074$). However, when we used the more restrictive and severe definitions of abuse, i.e., rape (unwanted intercourse) and

Table 4. Percent Variance of Health Status Explained by Severe Abuse and Diagnosis

Diagnosis	Pain (0–100 visual analogue scale)	Days in bed/ 3 mo	Psychological distress	Daily function	No. of physician visits/6 mo	No. of lifetime surgeries
All variables[a]	25.0	8.7	12.6	17.1	7.6	19.7
Diagnosis[b]	8.2	0.0	4.5	2.4	1.4	1.4
Severe abuse history[c]	10.1	7.8	4.8	9.3	3.3	5.3
Diagnosis/severe abuse jointly[d]	3.5	0.1	1.6	1.8	0.8	1.0

NOTE. Data were computed as incremental *R* squares.
[a]Including race, age, education, diagnosis (functional vs. organic), and history of severe abuse (rape and life-threatening physical abuse).
[b]Variance explained by diagnosis only.
[c]Variance explained by severe abuse history only.
[d]Variance explained by diagnosis and severe abuse history (shared variance).

physical abuse involving life threat, abuse was significantly more common among patients with functional diagnoses (rape, 33% vs. 20%, $P < 0.034$; life-threatening physical abuse, 37% vs. 23%; $P < 0.021$). This finding is particularly noteworthy because these more severe abuse categories contribute to poorer health status than milder forms of abuse.[20,32]

Using standardized measures of pain (visual analogue scale), disability (days in bed in previous 3 months), psychological distress (SCL-90-R), daily function (SIP), and health care use (physician visits in previous 6 months and lifetime surgeries), we first estimated measures of health status for the clinic sample (as an approximate of the clinic population), adjusting for the variables that were different between the study sample and the clinic population, using methods by Koch et al.[33–36] As shown in Table 2, the estimates of the six health status measures for the population were very close to the observed values for the sample, suggesting that the sample was very similar to the clinic population in health status.

We then evaluated functional and organic GI disorders and the health status of 239 female patients in the study sample seen at a referral gastroenterology clinic. In general, the health status for patients with functional GI disorders, particularly those with functional abdominal pain, IBS, and functional dyspepsia (Table 2), was poorer than for patients with organic or structural disease. Although clinical[11] and epidemiological[37] studies have previously documented poor health status for these conditions, this is the first time these data can be compared with other GI diagnoses. In fact, patients with functional GI diagnoses averaged 70% more pain, 40% greater psychological distress and poorer daily function, and one-third more physician visits and surgeries than patients with organic diagnoses referred to a medical center. Within the organic categories, health status was poorest for patients with liver disease (including alcohol-related cirrhosis, chronic hepatitis B and C liver diseases, neoplasia, and unexplained abnormal liver chemistries), pancreaticobiliary disease, and Crohn's disease and best for patients with ulcerative colitis.

Because both diagnosis and abuse history have adverse effects on health status, ANCOVAs were performed to determine the relative effects of diagnosis and abuse history controlling for each other and for demographic status. Importantly, we found that diagnosis and abuse history have significant and independent effects on health status.

A large proportion of the variance explaining health status measures was unexplained (our model explained from 5.7% to 23.4% of the variance). Further studies are needed to incorporate other clinically relevant variables likely to have strong predictive effects. These include the biological severity of the condition, personality, coping style, social support, and, with regard to physician visits and surgeries, type practice plan (e.g., HMO, preferred provider organization, fee for service, referral center), socioeconomic factors, and physician judgment.

Certain limitations and qualifications are to be considered in the interpretation of these data. First, because this study was performed at a referral center, the findings are not necessarily generalizable to patients with GI diagnoses seen in other clinical settings, and they may not represent the larger proportion of patients who do not frequently use health care. For example, because it has previously been shown that abuse frequencies among GI patients are lower in primary care (e.g., HMO) than referral settings,[11,12] the impact of abuse history relative to diagnosis on health status in primary care or in nonclinical populations may also be lower.

Second, a primary effort in this study was to evaluate health status by diagnostic category and abuse history. The sample sizes for individual diagnosis, especially for functional esophageal disorders, functional dyspepsia, and pancreatic/biliary disease were small. Therefore, the accuracy of the findings for these diagnoses may be questioned. We chose not to combine these diagnoses into other categories because it would be inconsistent with the biological nature of these conditions and it is not probable that the overall effects of diagnosis and abuse history on health status would be changed. Because of the small sample size for some diagnoses, we did not test the differences between these diagnosis. Future studies involving larger patient samples are needed to evaluate health status and abuse frequencies for these particular diagnoses.

Finally, our interview criteria for abuse history, developed from previous studies,[10,14–18] included both touch and rape and physical abuse with and without life threat. However, our recent work[20,32] indicates that more restrictive and severe abuse criteria (rape and physical abuse with life threat) have a greater impact on health status, which was supported in this study (Tables 3 and 4). Therefore, investigators may choose to use these more restrictive definitional criteria for future studies.

In conclusion, we have found that in a referral GI clinic population, patients with functional GI diagnoses (particularly IBS, functional abdominal pain, and functional dyspepsia) have poorer health status and a higher frequency of severe abuse history than patients with organic diagnoses. Furthermore, diagnosis and abuse his-

tory have significant and independent effects on most measures of health status. These data suggest that diagnosis may not be sufficient for clinicians to fully understand patients' health status in this population. Psychosocial contributions to these illnesses, including a history of abuse, must also be addressed.

Appendix 1. Definitional Criteria for Abuse

A sexual abuse history was indicated if one of the following two experiences was reported independent of any physical abuse experience.

''Touch'' or ''Contact'' Sexual Abuse

Has anyone ever succeeded in touching the sex parts of your body by using force or threatening to harm you? By touch we mean
(a) with their hand, touched or fondled your sexual organs (breast, pubic area, anus);
(b) with their mouth or tongue on your vagina or anus (oral sex); and
(c) putting fingers or objects in your vagina or anus?

Has anyone ever succeeded in making you touch the sex parts of their body by using force or threatening to harm you? By touch we mean
(a) made you touch or fondle their genital area; and
(b) made you put their penis in your mouth (oral sex)?

''Rape'' Sexual Abuse

Has anyone made you have vaginal or anal sex by using force or threatening to harm you? By sex we mean
(a) vaginal intercourse (man putting his penis in your vagina); and
(b) anal intercourse (man putting his penis in your anus)?

A physical abuse history was indicated if one of the following two experiences was reported independent of any sexual abuse experience.

Personal Injury Physical Abuse

Has anyone, including family members or friends, ever beat you up, hit you, kicked you, bit you, or burned you regardless of when it happened or whether you ever reported it or not? (Include experiences that were outside the range of normal ''spanking'' or kids fighting.)

Life Threat Physical Abuse

Has anyone, including family members or friends, ever attacked you with a gun, knife, or some other weapon regardless of when it happened or whether you ever reported it or not?

Has anyone, including family members or friends, ever attacked you without a weapon but with the intent to kill or seriously injure you?

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