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Gastrointestinal symptoms in abused nonpatient women

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Abstract

Background Severely abused nonpatient women report a high number of gastrointestinal (GI) symptoms and GI syndromes. Little is known about whether the abuse–symptom relationship varies across different life, social, and community conditions.

Objective To comparatively assess the timing, type and severity of physical and/or sexual abuse and GI symptoms of nonpatient women who contacted a lawyer for legal support with those who sought shelter in antiviolence centers.

Subjects and methods Forty-six lawyer controls (LCs) (aged 29–80 years) and 67 women (aged 18–58 years) sheltered in antiviolence (V) centers completed an identical anonymous questionnaire with medical and abuse sections. The severity of abuse was assessed with the 0–6 Abuse Severity Measure (ASM). The associations between abuse characteristics and the number of symptoms were assessed with the Poisson regression model.

Results Among the LC women, 65% experienced physical and/or sexual abuse in childhood and/or adulthood, whereas 100% of the V women did. In both groups, most women experienced combined sexual and physical abuse in childhood and adulthood. The ASM was < 2 in 57% of the LC and 18% of the V women. LC and V women reported an average of 4.9 and 4.6 GI symptoms, respectively. In both groups, women who had been both sexually and physically abused reported a greater number of GI symptoms. Childhood and adulthood abuse were associated with more GI symptoms only in V women. LC women with ASM > 2 reported more GI symptoms than those with an ASM < 2 (median; IQR: 6.5; 3–11 vs 3; 1–7, $p=0.002$). V women with ASM > 5 reported significantly more GI symptoms than control women with ASM < 5 (median; IQR: 6; 4–8 vs 4.5; 2–8, $p<0.001$).

Conclusions In abused “nonpatient” women, the combination of physical and sexual abuse, childhood and adulthood abuse and higher severity scores were associated with a greater number of GI symptoms, irrespective of the social and economic setting.

Keywords Chronic gastrointestinal disorders, DGBI, Gastrointestinal symptoms, Health, Sexual abuse, Physical abuse, Abuse severity measure

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Introduction

Violence against children and adults has spread worldwide (1). Abuse has been linked to a variety of adult psychiatric and physical chronic diseases, and it is generally more common in patients than in the general population and in tertiary vs. primary care patients [1–4]. Negative childhood experiences are strongly linked to chronic pain conditions in adulthood according to a recent systematic review [5]. To date, several studies have investigated the associations between the timing, type and severity of physical and/or sexual abuse and chronic medical complaints in patient populations [4–10] and few in "non-clinical" or "non-patient" subjects, i.e., subjects belonging to the general population neither refer nor refer to a physician [11–15]. We reported [15] that in severely abused "nonpatient" women forced to apply for shelter in antiviolence centers, the severity of abuse assessed by the abuse severity measure (ASM) score [16] was associated with a greater number of GI symptoms and GI syndromes.

It remains a subject of considerable debate [1, 12, 13] whether the abuse–symptom relationship varies with different life, social, and community conditions and among the different types of abuse the role of severity.

The objectives of this study were to comparatively assess a sample of nonpatient women referred to lawyers for nonspecific legal assistance, excluding abuse, and of those who sought shelter in antiviolence centers:

1. the prevalence of reported gastrointestinal (GI) symptoms and GI syndromes
2. the presence of a lifetime history of physical and/or sexual abuse
3. the associations, if any, between the time of perpetration of abuse, its type and severity, and the number of reported GI symptoms and GI syndromes,

Subjects and methods

Five Italian antiviolence associations were contacted, three of which agreed to participate in this study: "Artemisia" (Florence), "Differenza Donna" (Rome), and "UDI Casa delle Moire" (Palermo). In antiviolence centers, victimized women receive shelter, legal advice, and psychosocial support from female operators.

Six lawyers were contacted, four of whom agreed to participate (SC, VL, RS, YZ).

As previously described [15] to preserve privacy, the questionnaire was mailed to the antiviolence centers and handled exclusively by specifically trained female operators. The questionnaire was submitted to women who had already received counseling from in-house operators.

Women referred to lawyers for legal assistance were asked to fill out the questionnaires after providing them with a complete explanation of the study objectives.

All the women provided undersigned informed consent.

The anonymous standardized questionnaire consists of two separate sections, a medical and an abuse one, with the same identification code. The medical section includes five items on past and chronic diseases, past surgery, health care use in the past year, chronic drug use, seven sociodemographic items and 32 items for GI symptoms divided into six categories (i.e., esophageal, gastroduodenal, intestinal, anorectal, biliary symptoms, and abdominal pain). GI symptoms were evaluated and analyzed using the validated Italian version of the Rome II Modular Questionnaire [17], www.theromefoundation.org. GI symptoms were considered both individually and when they constituted a clinical syndrome that matched the Rome II criteria (dyspepsia, irritable bowel syndrome [IBS], chronic abdominal pain, functional diarrhea, fecal incontinence and functional constipation).

The abuse section consists of the Italian version of the Sexual and Physical Abuse History Questionnaire [18]. A proper understanding of the questions was previously verified by a gastroenterologist (NP), who matched interviews with ten control subjects and responses to the questionnaire. The reliability of the test–retest method [19] was verified by resubmitting the questionnaire to the same control subjects three weeks later. An abuse severity measure (ASM) was derived based on the abuse questionnaire items [16]. The ASM quantifies the severity of sexual and physical abuse on a scale of 0 to 6, assessing the history of sexual abuse (score of 0 = none, 1 = touch, 2 = rape), serious injury during sexual abuse (score of 0 = no injury or minor injury, 2 = serious physical injury), and the number of life threats derived from physical attack (score of 0 = none, 1 = from one to three life threats, 2 = four or more life threats). The ASM has been shown to correlate with health status within each of the above dimensions [16].

Informed consent was obtained from each subject and the study protocol was approved in accordance with the Declaration of Helsinki by the local ethics committee of Sapienza University of Rome.

Statistical analysis

Continuous variables are summarized as medians, interquartile ranges (IQRs), means (M), and standard deviations (SDs); categorical variables are summarized as absolute and percentage values. Differences in baseline characteristics were determined using Pearson's chi-square test and Fisher's exact test.

A Poisson regression model was used to assess the associations between the number of reported GI symptoms and variables such as the time of perpetration of the abuse (childhood (≤ 13 years) vs. no abuse and vs. adulthood and childhood), its type (physical vs. physical plus sexual) and severity (defined according to ASM: ordinal, that is, 0–6 [results not shown], or dichotomous, that is, $ASM \geq 2$ vs. $ASM < 2$ and $ASM \geq 5$ vs. $ASM < 5$), and sociodemographic characteristics (i.e., age, level of education, economic self-sufficiency, body mass index [BMI], smoking habit, alcohol consumption, known pathologies, car accidents).

In the model, if only one variable is considered, univariate results are obtained; if more variables are considered, to evaluate their independent effect having simultaneously adjusted for the effects of the other variables, multivariate results are obtained.

Significance was established at $p < 0.05$. All p values were two-tailed [20].

Results

Study samples

The questionnaires were administered to 67 women receiving shelter in three antiviolence centers (violence group) and to 48 women requiring lawyer assistance (lawyer control group). The completed questionnaires were returned by all 67 women at violence centers and by 46/48 of the women referred to lawyer offices; three questionnaires were incomplete; therefore, 43 women were included in the analysis. Table 1 shows the main sociodemographic and abuse characteristics of the study samples. Compared with women who received shelter in antiviolence centers, those referred to lawyer offices (i.e., the control group) were older (median age 47 years, vs. 33 years, $p < 0.01$), had a higher level of education ($p = 0.003$), had greater economic self-sufficiency ($p = 0.04$), and reported more alcohol consumption ($p < 0.007$). Compared with controls, women who received shelter in antiviolence centers reported more car accidents (34.3% vs 2.3%, $p < 0.001$). More than half of the control women (60.5%) and a minority (16%) of severely abused women reported non-GI chronic diseases ($p < 0.001$), mainly cardiovascular and endocrinologic, and chronic treatment for them. Cholecystectomy for symptomatic gallstones was performed in one woman.

None reported healthcare use in the past year. Non-steroidal anti-inflammatory drugs (NSAIDs) and/or herbal medicines were occasionally used by 15/67 shelter and 12/43 control women, respectively.

Abuse history

All women referred to antiviolence centers and 28/43 (65%) of those referred to lawyers' offices were victims

of abuse (Table 1). Tables 2 and 3 show the distribution of the women according to the type and the time of perpetration of abuse. In the shelter and control groups, 41/67 (61%) and 12/28 (43%) women, respectively, experienced abuse during childhood and adulthood, and in this subgroup, the majority (30/41 and 9/12) reported sexual and physical abuse.

The distribution of women according to ASM and the type of abuse is reported in Tables 4 and 5. Four out of 28 control women (14.3%) had an $ASM < 1$, half (12/24) scored 1 on the ASM, 25% (6/24) scored 2, 16.7% (4/24) scored 3, and two women scored 4 and 6, respectively. The mean ASM was 1.92 ± 1.3 ($M \pm SD$), and the median was 1.5.

Eighteen percent of women referring to antiviolence centers (12/67) scored 1 on ASM, 18% (12/67) scored 2, 10% (7/67) scored 3, 13% (9/67) scored 4, 5% (3/67) scored 5, and 36% (24/67) scored 6. The mean ASM was 3.76 ± 1.9 ($M \pm SD$), and the median was 4.

All women reporting lifetime only sexual abuse had an ASM of 1–3, all women reporting only physical abuse had an ASM of 1–4, and an ASM of 5–6 was found exclusively in women reporting both sexual abuse and physical abuse.

The perpetrator of the abuse was indicated to be the current or former partner or a relative by 21 (87.5%) and 58 (86.6%) of the women who were referred to lawyer offices and antiviolence centers, respectively. More specifically, childhood abuse was perpetrated by a relative in 90.8% and 75%, and adulthood abuse by a partner in 82.5% and 69% of anti-violence centers and LC women, respectively.

Prevalence of GI symptoms and GI syndromes

The control women reported a mean of 4.9 GI symptoms (range = 0–13; median = 4; IQR = 2–8). Four (9%) women did not report any GI symptoms, 18 (42%) reported 1–4, 11 (26%) 5–7, and 10 (23%) 8–13 GI symptoms. Women referred to antiviolence centers reported a mean of 4.6 GI symptoms (range = 0–13; median 4, IQR 2–7). Five (7%) women did not report any GI symptoms, 23 (34%) reported 1–4, 15 (22%) 5–7, 24 (36%) 8–13 GI symptoms.

Fourteen percent of lawyer control women met the Rome criteria for fecal incontinence and functional diarrhea, and 39.5% met the Rome criteria for functional constipation. Three percent of severely abused women met the Rome criteria for fecal incontinence, 4.5% for functional diarrhea, and 16% for functional constipation. The prevalence of individual GI symptoms and GI syndromes is shown in Tables 6 and 7.

Table 1 Sociodemographic characteristics of the study samples

Variables	Lawyer Controls				Anti-violence center				N	p
	N	%	Median	IQR	N	%	Median	IQR		
Age (years)	35		47	37–53	67		33	28–38	102	< 0.01
BMI	38		20	19–23	67		21.2	19.8–23.6	105	0.24
Level of education										0.003
Primary school	6	14.0			30	44.8			36	
Secondary school	23	53.5			26	38.8			49	
University	14	32.6			11	16.4			25	
Abuse										< 0.001
Childhood	8	18.6			5	7.5			13	
Adulthood	8	18.6			21	31.3			29	
Childhood and adulthood	12	27.9			41	61.2			53	
No	15	34.9			0	0.0			15	
Type of abuse										< 0.001
Physical	9	20.9			12	17.9			21	
Sexual	7	16.3			9	13.4			16	
Physical and sexual	12	27.9			46	68.7			58	
No	15	34.9			0	0.0			15	
Smoking habit										
No	24	55.8			27	40.3			51	
Yes	19	44.2			40	59.7			59	0.11
Alcohol consumption										0.007
No	19	44.2			47	70.1			66	
Yes	24	55.8			20	29.9			44	
Car accidents										< 0.001
No	42	97.7			44	65.7			86	
Yes	1	2.3			23	34.3			24	
Economic status										0.04
Not self-sufficient	12	27.9			32	47.8			44	
Self-sufficient	31	72.1			35	52.2			66	
Drugs use										
No	31	72.1			52	77.6			83	0.51
Yes	12	27.9			15	22.4			27	
Chronic non-GI diseases										< 0.001
No	17	39.5			59	88.1			76	
Yes	26	60.5			8	11.9			34	

Associations between abuse and symptoms

For the associations between the severity of abuse (ASM < 2 vs ≥ 2 e ASM < 5 vs ASM ≥ 5) and the number of GI symptoms, lawyer control women with an ASM score ≥ 2 reported significantly more GI symptoms than those with an ASM score < 2 (median 6.5; IQR 3–11 vs median 3; IQR 1–7, $p=0.002$) (Fig. 1 A, Table 8). Similarly, women referred to antiviolence centers with an ASM score ≥ 5 reported significantly more GI symptoms than those with an ASM score < 5 (median 6, IQR 4–8 vs 3.5, IQR 1–5, $p<0.001$; Fig. 1 B, Table 8). Women referred to anti-violence centers with an ASM score ≥ 5 reported significantly more GI symptoms than lawyer

controls did (median 6; IQR 4–8 vs median 4.5; IQR 2–8, $p=0.02$) (Fig. 1 B). Tables 8 and 9 show the results of the univariate and multivariate analyses. In the multivariate analysis, the time of perpetration of the abuse (childhood and adulthood vs. adulthood only) was significantly ($p=0.012$) associated in V women with the number of reported GI symptoms. In both groups, the presence of physical plus sexual abuse and an ASM score ≥ 2 were significantly associated ($p<0.03$) with a greater number of GI symptoms. Furthermore, in control women, an association was found between the number of GI symptoms and the increase in BMI, whereas an association was found between the number of GI symptoms and the

Table 2 Distribution of the lawyers control women by the type and the time of the perpetration of abuse

		Childhood ≤ 13 yrs	Adulthood > 13 yrs	Childhood and adulthood	N
Sexual	N	3	2	2	7
	%	42.8	28.6	28.6	16.3
Physical	N	3	5	1	9
	%	33.3	55.5	11	20.9
Physical & Sexual	N	2	1	9	12
	%	16.7	8.3	75	27.9
Total	N	8	8	12	28

Table 3 Distribution of the women referring to anti-violence centers by the type and the time of the perpetration of abuse

		Childhood ≤ 13 yrs	Adulthood > 13 yrs	Childhood and adulthood	N
Sexual	N	2	2	5	9
	%	22.2	22.2	55.5	13.4
Physical	N	1	5	6	12
	%	8.3	41.7	50	17.9
Physical & Sexual	N	2	14	30	46
	%	4.3	30.4	65.2	68.7
Total	N	5	21	41	67

presence of chronic non-GI diseases in women referred to antiviolence centers.

No associations were found between age, economic self-sufficiency, smoking, alcohol consumption, self-perceived stress, education level, and the number of reported GI symptoms.

Discussion

Violence has long-term detrimental effects on health, even when it has ended. A history of abuse can lead to psycho-physical impairment, lower quality of life, and therefore greater utilization of public health services [5, 7–9, 21]. The

lifetime prevalence of physical and sexual victimization and the clinical impact of violence vary widely depending on the population studied and the methods used to assess the history of abuse, such as self-report questionnaires or interviews. Although interviews may be considered the gold standard, the prevalence of abuse is underrepresented in medical records compared with self-report questionnaires in a population-based cross-sectional study [11], as well as in abuse questionnaires where identity was not adequately masked in a GI outpatient study [6]. In a previous study [15], we assessed the prevalence of chronic symptoms among severely abused 'nonpatient' women requiring shelter in dedicated centers. The relationships between the number of GI and extra-GI symptoms, DGBI, and the different characteristics of abuse, i.e., physical and/or sexual abuse, the time of perpetration, i.e., childhood and/or adulthood, and the severity of abuse according to ASM [16], have also been evaluated [15]. However, we did not perform a comparison that included analyses in a sample of 'nonpatient' controls not subjected to severe abuse and not sheltered in an antiviolence center.

In the present study, we administered the same anonymous questionnaire to 'nonpatient' women, referred to lawyers for nonspecific legal assistance, except for abuse. More than two-thirds (65%) of the control women reported having suffered physical and/or sexual abuse in childhood and/or adulthood, which is higher than the prevalence of abuse reported in population studies, which ranges between 14 and 55% [7]. The reporting of violence against women varies widely among studies due to several factors, including cultural context, definitions of violence, age distribution within the study population, and the duration of observations. We utilized in both group of women a validated questionnaire, which enhances the reliability and comparability of our data. Including women seeking legal aid as a control group we aimed to assess "nonpatient" healthy women, without a known history of abuse. It is important to recognize that individuals, including women, seek legal assistance for a variety of legitimate reasons, such as workplace issues, economic challenges, or housing problems. We provided clear instructions to the lawyers to exclude women with

Table 4 Distribution of the lawyers control women according to Abuse Severity Measure (ASM) and type of abuse

		ASM 1	ASM 2	ASM 3	ASM 4	ASM 5	ASM 6	Total
Sexual abuse	N	3	3	2	0	0	0	8
	%	25	50	50				
Physical abuse	N	3	1	0	0	0	0	4
	%	25	17					
Sexual plus physical abuse	N	6	2	2	1	0	1	12
	%	50	33	50	100		100	
Total	N	12	6	4	1	0	1	24

Table 5 Distribution of the women referring to anti-violence centers according to Abuse Severity Measure (ASM) and type of abuse

		ASM 1	ASM 2	ASM 3	ASM 4	ASM 5	ASM 6	Total
Sexual abuse	N	5	4	0	0	0	0	9
	%	41.7	33.3	0	0	0	0	
Physical abuse	N	3	4	2	3	0	0	12
	%	25	33.3	28.6	33.3	0	0	
Sexual plus physical abuse	N	4	4	5	6	3	24	46
	%	33.3	33.3	71.4	67	100	100	
Total	N	12	12	7	9	3	24	67

known abuse histories from the questionnaires, ensuring that our data would reflect the intended population. Nevertheless, even if the questionnaires were administered to women referring to four different law offices, owing to the lawyer's guaranteed anonymity, we acknowledge that some women in the control group may still have sought assistance with family law matters like separations, divorces, or child custody issues, which introduces a potential for inclusion bias and overestimate of abuse prevalence. Only four of the lawyers we approached agreed to participate, which accounts for the small number of control women included. Therefore, the small number of women in the control group limits our ability to generalize the findings or to make meaningful comparisons with a larger and more representative sample from the community.

In both groups of women, in approximately 90% of cases, childhood abuse was perpetrated by a relative and adulthood abuse by a partner, confirming that violence occurs in a private, often occulted, context. Compared with more than half of the women referred to antiviolence centers ($p < 0.001$), one-third of the lawyer control women experienced physical and/or sexual abuse both in childhood and adulthood, suggesting that the experience of abuse during childhood increases the risk of abuse during adulthood.

As expected, most (73%) control women had a lower abuse severity score ($ASM < 2$) than did a minority (18%) of women sheltered in antiviolence centers, and more than half reported at least five GI symptoms. Confirming our previous findings [15], control women with an ASM score of two or more reported a greater number of GI symptoms than women who had not experienced violence or who had an ASM score less than two. Furthermore, combined physical and sexual abuse as well as the combined timing of childhood and adulthood abuse are associated with more GI symptoms than either one alone is. A recent study revealed that sexual abuse in childhood and adulthood was significantly associated with greater severity of GI symptoms and extra-GI symptoms,

whereas no association was found for physical abuse only in adulthood, emphasizing that sexual abuse in childhood may be relevant for the severity of symptoms in adults [22]. It has been shown that adverse childhood events, such as childhood abuse, may induce changes in brain structure regions and brain function [23–25]. Childhood abuse is associated with specific alterations in the regions and pathways of the CNS that transmit unpleasant experiences [23–26]. These molecular pathways may affect pain inhibitory pathways and therefore influence visceral sensitivity and anxiety. In the present study, in both groups, most women experienced abuse in both childhood and adulthood, and most of them reported combined sexual and physical abuse. Accordingly, these women had higher ASM scores and reported more GI symptoms. These findings are consistent with those of previous studies, which reported a direct association between the number of episodes of violence experienced and the number of GI and extra-GI symptoms [14, 15], as well as a significant association between diverse types of violence and poorer individual health [9].

In patients with IBS, a potential cumulative effect of various types of abuse has been suggested that can increase the severity of IBS and additional GI symptoms through psychological distress [27, 28]. Melchior et al. recently confirmed the link between overall abuse history and the severity of GI and extra-GI symptoms but did not confirm the cumulative effect of different types of violence on the severity of symptoms [22]. However, in the Melchior study, they did not assess the number of episodes of exposure to abuse and its severity, defining abuse history by the presence of at least one act of physical or sexual abuse in childhood or adulthood. Furthermore, the questionnaire used did not assess the time lapse since the last episode of abuse; thus, potential recall bias was not excluded.

In contrast, in the present study, we assessed the severity of abuse according to a standardized measure in both groups of women [16], and at least in women referred to antiviolence centers, recall bias

Table 6 Number and proportion of lawyers control women reporting GI symptoms and GI syndromes N=43

	Chest pain	Abd. Pain	Heartburn	Dysphagia	Acid regurgitation	Globus	Belching	Upper discomfort	Early satiety	Nausea	Vomiting	Bloating	Ano- rectal pain	Fecal incontinence	Diarrhea	Constipation
N	6	26	8	5	12	16	15	20	17	16	8	32	8	6	6	17
%	13.9	60.4	18.6	11.6	27.9	37.2	34.9	46.5	39.5	37.2	18.6	74.4	18.6	13.9	13.9	39.5

Table 7 Number and proportion of women referring to anti-violence centers reporting GI symptoms and GI syndromes N = 67

	Chest pain	Abd. Pain	Heartburn	Dysphagia	Acid regurgitation	Globus	Belching	Upper discomfort	Early satiety	Nausea	Vomiting	Bloating	Ano-rectal pain	Fecal incontinence	Diarrhea	Constipation
N	18	39	12	22	33	18	18	35	16	20	8	36	12	2	3	11
%	26.9	58.2	17.9	32.8	49.2	26.9	26.9	52.2	23.9	29.9	11.9	53.7	17.9	3	4.5	16.4

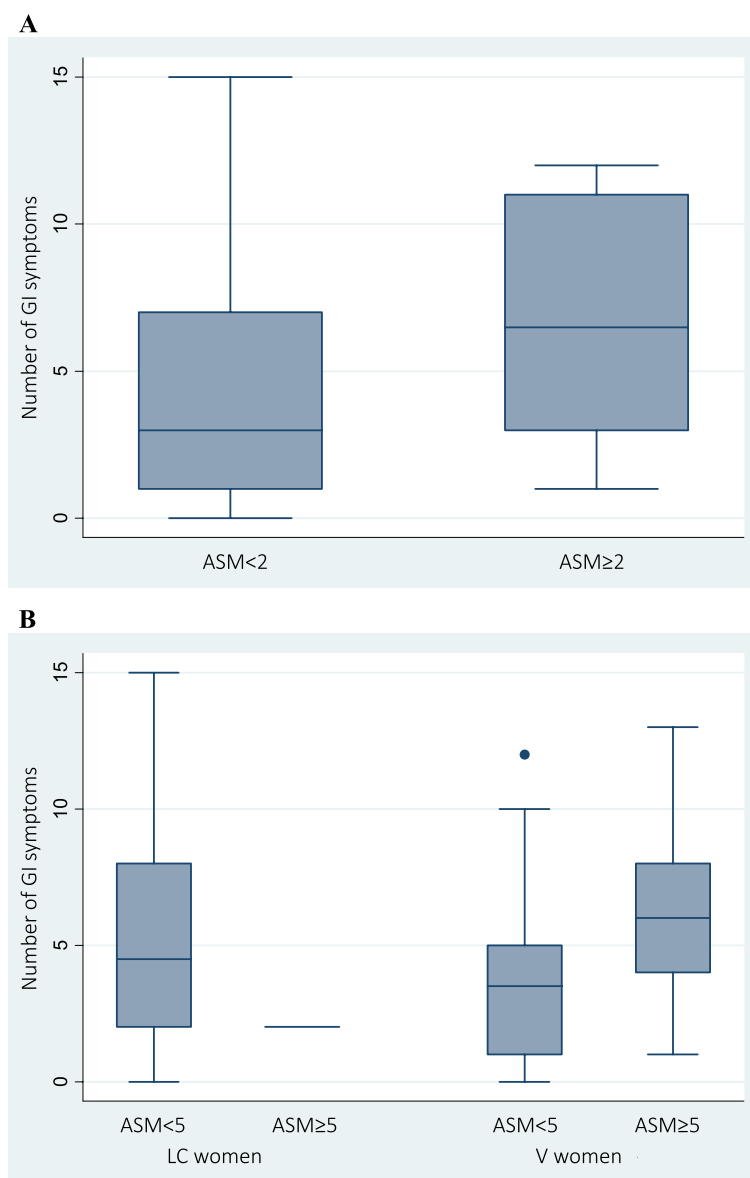


Fig. 1 **A** Box-and-whisker plots of the number of gastrointestinal (GI) symptoms according to the abuse severity measure (ASM) in lawyer control women. The boxes at each score extend from the 25th percentile ($x_{[25]}$) to the 75th percentile ($x_{[75]}$) [i.e., the interquartile range (IQ)]; the lines inside the boxes represent the median values. The line emerging from the boxes (i.e., the “whiskers”) extends to the upper and lower adjacent values. The upper adjacent value is defined as the largest data point $\leq x_{[75]} + 1.5 \times \text{IQR}$, and the lower adjacent value is defined as the smallest data point $\geq x_{[25]} - 1.5 \times \text{IQR}$. The observed values that are more extreme than the adjacent values, if any, are individually plotted (circles). * $p < 0.05$ for all comparisons. **B** Box-and-whisker plots of gastrointestinal (GI) symptoms according to the abuse severity measure (ASM) in lawyer control women (left) and women sheltered in antiviolence centers (right). The boxes at each score extend from the 25th percentile ($x_{[25]}$) to the 75th percentile ($x_{[75]}$) [i.e., the interquartile range (IQR)]; the lines inside the boxes represent the median values. The line emerging from the boxes (i.e., the “whiskers”) extends to the upper and lower adjacent values. The upper adjacent value is defined as the largest data point $\leq x_{[75]} + 1.5 \times \text{IQR}$, and the lower adjacent value is defined as the smallest data point $\geq x_{[25]} - 1.5 \times \text{IQR}$. The observed values that are more extreme than the adjacent values, if any, are individually plotted (circles). * $p < 0.05$ for all comparisons

was minimized since violence has been ongoing until their escape. The severity of abuse, other than the type of abuse, may explain the different results of different studies. Several studies [10, 16, 21] indeed reported that the difference in terms of health status between abused

and non-abused female patients was particularly striking in those with severe forms of violence, i.e., rape and life-threatening events.

In our study, multivariate analysis revealed that a high severity of abuse was significantly associated with a high

Table 8 Association between sociodemographic characteristics, abuse history, and the total number of reported gastrointestinal (GI) symptoms. Univariate analysis

	Lawyers Control group					Women referring to A-V centers				
	Coef	SE	P > z	95% CI		Coef	SE	P > z	95% CI	
Age	0.006	0.006	0.279	−0.005	0.018	−0.015	−2.190	0.028	−0.029	−0.002
Level of education										
Secondary vs. primary school	0.069	0.211	0.743	−0.344	0.482	−0.321	−2.510	0.012	−0.571	−0.070
University vs. primary school	0.055	0.224	0.807	−0.385	0.494	−0.154	−0.950	0.344	−0.471	0.164
Economic self-sufficiency	−0.155	0.148	0.296	−0.446	0.136	0.060	0.520	0.602	−0.164	0.283
Yes vs. no										
BMI	0.076	0.016	0.000	0.044	0.108	−0.007	−0.400	0.690	−0.039	0.026
Smoking habit	0.234	0.137	0.089	−0.036	0.503	0.271	2.260	0.024	0.036	0.507
Yes vs. no										
Alcohol consumption	0.090	0.139	0.518	−0.183	0.363	0.132	1.090	0.276	−0.106	0.370
Yes vs. no										
Drugs use	0.133	0.149	0.372	−0.159	0.425	0.748	6.380	0.000	0.518	0.978
Yes vs. no										
Car accidents	0.832	0.310	0.007	0.225	1.439	0.140	1.190	0.235	−0.091	0.370
Yes vs no										
Chronic non-GI diseases	0.116	0.142	0.414	−0.163	0.395	0.616	4.340	0.000	0.337	0.894
Yes vs. no										
Time of perpetration of abuse	−0.435	0.208	0.037	−0.843	−0.027	−0.389	−2.910	0.004	−0.652	−0.127
Adulthood (> 13) vs adulthood plus childhood (≤ 13)										
No abuse vs childhood abuse	−0.168	0.152	0.268	−0.465	0.129	-	-	-	-	-
Type of abuse	−0.530	0.170	0.002	−0.863	−0.197	−0.519	−3.740	0.000	−0.791	−0.247
Physical vs physical plus sexual										
No abuse vs. physical plus sexual	−0.330	0.164	0.044	−0.650	−0.009	-	-	-	-	-
AMS (≥ 5 vs. < 5)	−0.916	0.710	0.197	−2.309	0.476	0.529	0.114	0.000	0.306	0.753
AMS (≥ 2 vs. < 2)	0.448	0.142	0.002	0.171	0.726	0.412	0.171	0.016	0.077	0.748

Coef. coefficient; SE standard error; BMI body mass index; ASM abuse severity measure

Table 9 Association between sociodemographic characteristics, abuse history and the total number of reported gastrointestinal (GI) symptoms. Multivariate analysis

	Coef	SE	P>z	95% CI	
Lawyers Control group					
BMI (value increment of 1)	0.044	0.019	0.022	0.006	0.082
Abuse	−0.441	0.190	0.020	−0.814	−0.068
Physical vs Physical plus Sexual					
Abuse	−0.113	0.194	0.562	−0.494	0.268
None vs Physical plus Sexual					
AMS (≥ 2 vs < 2)	0.478	0.189	0.012	0.107	0.849
Women referring to A-V centers					
Chronic non-GI diseases (yes vs no)	0.559	0.146	<0.001	0.273	0.844
Abuse	−0.350	0.139	0.012	−0.622	−0.077
Adulthood vs adulthood plus childhood					
Abuse	−0.370	0.146	0.011	−0.657	−0.084
Physical vs Physical plus Sexual					
AMS (≥ 2 vs < 2)	0.404	0.183	0.027	0.046	0.762

Coef. coefficient; SE standard error; BMI body mass index; ASM abuse severity measure

number of GI symptoms. On average, the number of symptoms did not differ significantly between the two groups of women. However, when we assess the number of symptoms in women with an abuse severity score of more than five, we find that the women in antiviolence centers have more symptoms than those in the lawyer control group do, which points to the possible role of violence as a factor influencing the severity of symptoms. These findings are consistent with those of a Norwegian study involving 2700 “nonpatient” women aged 18–40 years [14], which revealed a significant correlation between the increasing number of episodes of violence exposure and an increasing number of somatic symptoms. Women who had suffered both sexual and physical violence reported more symptoms on average than those who reported only one act of violence did, and the impact of violence on symptoms remained after adjusting for depression and sociodemographic factors.

Compared with women who received shelter in antiviolence centers, those referred to lawyer offices (i.e., the control group) were older, had higher levels of education, and had greater economic self-sufficiency. In a population-based study, Bytzer et al. [29] reported that socially disadvantaged individuals reported more gastrointestinal symptoms than non-disadvantaged individuals did. Like a Norwegian study [14] in multivariate analysis, we did not find any association between sociodemographic factors (i.e., age, BMI, smoking, alcohol, socioeconomic status, and self-perceived stress), the number of GI symptoms, or history of abuse. Our study is not, however, directly comparable with the previously mentioned studies since the women included in the present study are not at all representative of the general population.

In both groups, most women reported lower abdominal pain and bloating. Several studies suggest that abuse can lead to anxiety and mood disorders in gastrointestinal patients due to elevated levels of neuroticism (i.e., a long-term tendency toward a negative emotional state). These disorders increase the reporting of abdominal pain, which, in a ‘vicious circle,’ increases GI symptoms over time [30].

To date, the importance of psychological factors in patients with DGBI is well established, but whether this is a feature of the disorders or of disease-induced behavior is still debated [31]. Compared with outpatients with organic disorders, IBS patients are more likely to have psychiatric disorders, suggesting that this is not only a reflection of the severity of abdominal symptoms [32, 33]. However, in community samples, IBS patients do not differ psychologically from healthy controls or from subjects with IBS who have not consulted a physician, that is, IBS nonpatients [33, 34]. Alternatively, abuse may determine biological

alterations in addition to, or instead of psychological alterations. Abdominal pain could be explained by the stress-mediated release of substances through the brain–gut axis/neuroendocrine system, such as catecholamines, corticotrophin-releasing factor, and prostaglandins, which modify the sensory–motor function of the GI tract [35]. Indeed, it has been recently shown that in women who have experienced severe sexual abuse in childhood and/or adulthood, the severity of pelvic pain is not associated with histologically proven endometriosis [36].

In patients with gastrointestinal symptoms, mainly IBS-like ones, with a history of abuse, the left middle and postcingular cortex are increasingly activated during painful rectal distension, emphasizing the importance of gut–brain interactions for the link between abuse and IBS symptoms. However, the findings of different studies showed an association between abuse history and either higher or lower rectal pain thresholds [37, 38]. In patients with IBS, GI specificity anxiety (GSA) has been suggested to mediate the relationship between general psychological distress scores and the severity of GI symptoms [33, 39, 40]. GI-specific anxiety may be one of the mediators of this hypothesized link. Melchior et al. [22] explored in combined analyses the association and interaction among abuse history, higher GI and extra-GI symptom severity, levels of anxiety and depression, altered rectal pain thresholds, and GI-specific anxiety in IBS patients. They confirmed the association between experiencing at least one type of abuse and greater severity of symptoms and showed that GI-specific anxiety, a lower rectal pain threshold and, to a lesser extent, depressive symptoms mediated the effect of abuse. However, as already stated, the study design did not allow us to draw definitive conclusions.

In the present study, we did not analyze the associations between life abuse history and the number of extra-GI symptoms or the presence of GI syndromes because of the relatively small number of control women. Thus, we do not confirm our previous findings in both patients and nonpatient women, which revealed a positive association between abuse history and the number of extra-GI symptoms [6, 15]. In addition, we did not assess the severity of symptoms.

The association between abuse and GI symptoms could also reflect the relationship between abuse history and somatization [8, 9]. A significant limitation of the present study is the lack of standardized psychological assessments for the women evaluated. This prevents us from fully understanding the role of mental health in the association between abuse and gastrointestinal (GI) symptoms. Numerous studies highlight the high prevalence of child sexual and physical abuse

and its detrimental effects on mental health. Specifically, child sexual abuse is linked to conditions such as post-traumatic stress disorder (PTSD), depression, anxiety, suicide attempts, substance abuse, sexual risk-taking, health problems, and dependence on welfare in adulthood [41]. PTSD symptoms are present in both abused and post-abused women and are positively correlated with the severity of the abuse and the risk of homicide that these women may have faced. The likelihood of developing PTSD is particularly high among adolescents, with prevalence rates ranging from 31% for physical abuse to 41% for rape. Given the severity of physical and sexual abuse, including rape, experienced both in childhood and adulthood, we cannot dismiss the potential impact of PTSD and related health issues among women in the V group. We did not assess this issue, as the questionnaire was administered exclusively by trained female operators. These operators provided the questionnaire only to women who had previously received counseling from shelter staff, intentionally avoiding overwhelming these women with multiple questionnaires to protect their psychological well-being.

We cannot rule out the influence of PTSD and post-abuse mental disorders in women from the V group, but we can reasonably exclude this in women from the LC group. Research shows a strong dose-response relationship between the number of types of violence and both depressive symptoms and physical symptoms, after adjusting for demographic factors and substance abuse. Moreover, further analysis indicates that the association between intimate partner violence (IPV) or community violence and physical symptoms persists, even after adjusting for depression and PTSD. This finding suggests that depression and PTSD should be recognized as significant comorbid conditions that affect the health of violence survivors, yet they do not completely account for physical symptoms [42].

Additionally, as expected, our results indicate that women seeking legal assistance presented lower severity scores than those in the V group. However, within the LC control group, a lower severity of abuse is associated with fewer or no symptoms, supporting the findings from the V group.

An unexpected finding of the present study is the higher prevalence of car accidents in women housed in antiviolence centers than in the control group (34.3% vs 2.3%). While we cannot definitively ascertain the type or severity of accidents from our questionnaire, the potential link between serious violence endured and self-injurious or careless behavior cannot be ignored [43]. Due to the absence of an assessment of mental disorders, we can only present the data as it is. However, given the limited

sample size, our multivariate analysis does not identify a significant association with abuse's presence, type, or severity.

Another limitation of our study relies on the lack of investigation of emotional and psychological abuse which is known to affect health not differently from sexual and physical abuse. Emotional and psychological abuse is often an overwhelming, hidden, and subtle aspect of various forms of abuse. Nonetheless, the term "subtle or covert abuse" (SCA) has not yet been defined, and little research has been conducted to enhance our understanding of these types of abuse. Subtle psychological abuse can be more damaging than overt physical or non-physical abuse; however, some recent typologies of abuse fail to include SCA or to provide a definition of the experience [44]. Victims of psychological abuse may face additional challenges in having their experiences acknowledged compared to those who suffer from sexual or physical abuse. Currently, there are no standardized questionnaires to assess the severity of psychological abuse. Psychological coercion can manifest as a lack of economic independence. In the V group, although not statistically associated with abuse, women demonstrate lower levels of economic independence.

Multivariate analysis showed an association between a greater number of GI symptoms and an increase in BMI in control women and chronic non-GI disorders in women housed in antiviolence centers. The influence of diet and BMI on GI symptoms remains controversial. It has been shown that reflux symptoms are significantly associated with high BMI in women [45], whereas PDS, but not EPS symptoms, are significantly associated with low BMI [46]. Owing to the small number of women, we cannot analyze the associations in detail, although the BMI values of the control women were within the normal range. There is no obvious explanation for the association between a high number of symptoms and chronic non-GI disorders in women who were housed in antiviolence centers, except that the eight women who reported one of the disorders had both a high ASM score and a high number of symptoms (nine on average).

The strength of the present study lies in the use of standardized questionnaires designed to assess gastrointestinal (GI) symptoms, a history of abuse and its severity among two groups of women. This approach enhances the reliability and comparability of the data collected. The Italian version of the Sexual and Physical Abuse History Questionnaire provides detailed information on various aspects of abuse, including age at which the abuse occurred, type, duration, and frequency of both physical and sexual abuse. An Abuse Severity Measure

(ASM) was derived from the items within the questionnaire, allowing for a nuanced analysis of the data.

Comparing women seeking legal assistance with those seeking support from anti-violence centers offers a new perspective on how abuse severity and social context impact women's health and well-being. Healthy women are less likely than patients to exaggerate their disorders or associate negative life experiences with their health issues. In our study, particularly concerning women referred to anti-violence centers, we minimized the potential for recall bias since the violence they experienced was ongoing until they found a way to escape. While we cannot completely dismiss the possibility of recall bias in the control group of women consulting lawyers, the association observed between the number of GI symptoms and the severity of abuse in both groups likely reduces the risk of this bias.

However, this study has several limitations due to the population studied. Although it was specifically designed to examine the relationship between abuse and GI symptoms in a control group, rather than to determine the power of the evaluated variables, the study sample did not allow for consideration of all potential confounding factors that could affect the results and the power of our analysis. Our sample is not representative of all women who contact anti-violence centers, as not all contacted centers agreed to participate in the study, and only women who had already received counseling were included. Thus, we cannot rule out selection bias that may have influenced the results. Additionally, we did not collect complete medical histories. While substance abuse was addressed in the questionnaire, we cannot rule out its impact.

Furthermore, we did not evaluate psychological abuse, which is known to affect health similarly to sexual and physical abuse, and it is often difficult to separate the different types of abuse. Since all participants were women, our results are not generalizable to men, preventing us from assessing the role of gender in the experiences of abuse and the onset of symptoms. Therefore, the results of this study need to be confirmed and expanded upon in future studies that assess the complete spectrum of abuse, including psychological abuse.

Despite these limitations, the present study emphasizes the role of abuse in women's health and well-being. Notably, the data reveal that abused women primarily report gastrointestinal symptoms, particularly abdominal ones, and that there is a correlation between higher abuse scores and an increasing number of GI symptoms, which confirms findings from previous studies.

Conclusions

In summary, our data support the importance of inquiring about a history of abuse in patients presenting with multiple chronic GI complaints. Asking patients about their experiences of abuse is crucial to providing comprehensive care. In this context, the ASM appears to be a useful and reliable tool that should be employed in future studies to assess experiences of violence and to identify individuals who have suffered severe abuse and may be at greater risk for health issues, regardless of whether they seek medical attention.

Abbreviations

GI	Gastrointestinal
BMI	Body mass index
ASM	Abuse severity measure
DGBI	Disorders of the gut–brain interaction

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Author contributions

N.P. and E.S.C. contributed equally to this work; N.P., F.B. and E.S.C. designed research; N.P., F.B., B.C., M.R. and E.R. performed research; P.P. analyzed data; N.P., E.R. and E.S.C. wrote the paper.

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Data availability

Authors agree to make data and materials supporting the results presented in this research available upon reasonable request.

Declarations

Ethics approval and consent to participate

Informed consent was obtained from each subject and the study protocol was approved in accordance with the Declaration of Helsinki by the local ethics committee of Sapienza University of Rome.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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