

CLINICAL SCIENCE

High prevalence of chronic pelvic pain in women in Ribeirão Preto, Brazil and direct association with abdominal surgery

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INTRODUCTION: Chronic pelvic pain is a disease that directly affects the social and professional lives of women.

OBJECTIVE: To estimate the prevalence of this clinical condition and to identify independent factors associated with it in women living in Ribeirão Preto, Brazil.

METHODS: A one-year cross-sectional study was conducted in a population sample of 1,278 women over the age of 14 years. The target population was predominantly composed of women who are treated by the public health system. The questionnaire was administered by interviewers who were not linked to the city health care programs. The prevalence of the morbidity was estimated. First, we identified the significant variables associated with pelvic pain ($p < 0.10$) and then we attributed values of 0 or 1 to the absence or presence of these variables. Logistic regression analysis was used to identify and estimate the simultaneous impact of the independent variables. The results were expressed by odds ratio and their 95% confidence interval with $p < 0.05$.

RESULTS: The disease was found in 11.5% (147/1,278) of the sample. The independent predictors were dyspareunia, previous abdominal surgery, depression, dysmenorrhea, anxiety, current sexual activity, low back pain, constipation, urinary symptoms, and low educational level.

CONCLUSION: The prevalence of chronic pelvic pain in Ribeirão Preto is high and is associated with conditions that can usually be prevented, controlled, or resolved by improvement of public health policies and public education.

KEYWORDS: Chronic Pelvic Pain; Prevalence; Public Health, Abdominal Surgery; Cesarean Section.

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INTRODUCTION

Chronic pelvic pain (CPP) in women is commonly described as continuous or intermittent pain in the anatomic pelvis (anterior abdominal wall at or below the umbilicus) that lasts for at least six months, is not exclusively related to menstruation or sexual intercourse, and is sufficiently severe to cause functional disability or to lead to medical care.¹⁻² CPP may originate from one or more organ systems or pathologies and may have multiple contributing factors.³

The prevalence may vary from country to country. In primary care, the prevalence of CPP is found to be comparable to that of asthma and back pain, with values of 3.7%, 3.8%, and 4.1%, respectively.⁴ In a US study, the prevalence among women of reproductive age reached 24%,⁴⁻⁸ whereas in New Zealand, Grace, and Zondervan identified a prevalence of 25.4% when considering a three-month duration of symptoms.⁹ This elevated prevalence was confirmed by Latthe et al. in a recent review of this condition.¹⁰ The direct and indirect costs of this condition amount to over two billion dollars per year, and the condition is responsible for 10% of all gynecologic visits, 40 to 50% of all gynecologic laparoscopies and 12% of all hysterectomies.⁵ CPP has a direct impact on marital status as well as on the social and professional lives of women, and it thus constitutes an important public health problem. In

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Brazil, the prevalence of CPP is not well known. International studies have demonstrated a high prevalence of persistent pain in women from Brazil, including approximately 36% in Rio de Janeiro.¹¹ According to the Health Ministry of Brazil, in 1997 there were 1.8 million gynecologic visits and approximately 300,000 hospital admissions of women aged 15 to 69 with complaints associated with CPP.¹² In a survey of diseases and/or health problems among working women in São Paulo, Gomes & Tanaka¹³ reported that 13% of them mentioned abdominal and pelvic pain among their major complaints. Recently, some studies have concluded that drug or alcohol abuse, abortions, inflammatory pelvic disease, cesarean sections, and psychological diseases are associated with CPP.¹⁴ The etiology of CPP in women is not clear, and CPP usually involves a complex interaction between the gastrointestinal, urinary, gynecologic, musculoskeletal, and neurologic and endocrine systems. It is also influenced by psychological and sociocultural factors.⁶ Several other factors may be associated with the condition, including (1) neuroplastic changes occurring in the posterior horn of the spinal cord as a consequence of electrophysiological, biochemical, and metabolic changes promoted by the initial noxious stimulus, (2) cross-sensitivity between viscera that share the same innervation, and (3) development of a visceromuscular reflex that may culminate not only in dysfunctional repercussions but also in the development of myofascial syndrome and the generation of new pain points.¹⁵⁻¹⁶ Although there is a consensus that CPP has a high prevalence among women, there are a limited number of studies in our country, which can be attributed to the lack of a precise diagnosis, the heterogeneity of the group of diseases that result in CPP, and the variation of primary diseases in different populations.¹⁷ Considering that knowledge about the magnitude and the demographic and socioeconomic characteristics of CPP contributes to its prevention, control, and treatment, the aim of the present study was to estimate the community prevalence of CPP in women living in Ribeirão Preto (a southeastern city in the state of São Paulo, Brazil with a population of about 700,000 people), as well as to identify independent factors associated with it.

MATERIALS AND METHODS

Study design and participants

A one-year cross-sectional study was conducted. The study was approved by the Research Ethics Committee of the University Hospital, Faculty of Medicine of Ribeirão Preto, University of São Paulo (HCFMRP-USP). Women were recruited from the Western district of Ribeirão Preto between April 2008 and March 2009 for two particular reasons: first, the region presents the same social and demographic patterns as those of the major parts of the city (socioeconomic level, distribution of age, sex, and ethnicity), and second, the university hospital provides medical evaluation and treatment for women with a diagnosis of CPP. The target population consisted of working-class women treated by the public health system. A total of 1,306 women over 14 years of age were contacted, but 38 of them refused to participate. Therefore, 1,278 women were included in the present study. The women who were contacted were selected randomly from the population using their residential address. All subjects (or those

responsible for the subjects) gave written informed consent to participate in the study.

Questionnaire

We chose a questionnaire as the instrument for data collection because it could be applied to all segments of our population, which is very heterogeneous, consisting of both illiterate and literate people, and also because it allowed us to explain the objectives of the research and to answer any questions. The variables investigated were age; body mass index (BMI); number of pregnancies; parity; having been subjected to episiotomy, to forceps delivery, or to cesarean-section delivery; abortions; abdominal surgery; umbilical and laparoscopy incisions; oblique, longitudinal, and transverse incisions; perineal surgery; sedentary lifestyle (women who engaged in activities such as running, walking, pedaling, dancing, or other sport activity for at least three hours a week were considered active); previous sexual activity; current sexual activity; contraception; sexual desire; lubrication; orgasm; per capita income; employment status; dysmenorrhea; dyspareunia; having been a victim of violence (physical and sexual); stable marital relationship; educational level (schooling was stratified as low when women had completed the eighth grade in primary school); mood (depression or anxiety based on previous medical diagnosis or criteria for the detection and diagnosis of psychiatric disorders in primary medical care settings)¹⁸ and comorbid health conditions (e.g., migraine and low back pain); constipation (Roma III criteria);¹⁹ urinary symptoms (bladder irritation: increased voiding episodes per day, urgency, pain); nocturia; alcoholism (excessive intake during the weekend with frequent drunkenness and/or daily consumption with or without drunkenness); smoking (current or former daily smoker); excessive coffee intake (more than 6 cups a day); illicit drug use; menstrual status; pain intensity (visual analogue scale); pain duration (in months) and pain frequency (at least once a week); and self-medication for pain relief. Because our population is racially diverse, it is difficult to determine the ethnicity accurately, and therefore, we did not perform an ethnic analysis because of the high probability of misclassification. Interviewers who were not linked to the city health care programs were trained and selected by the researcher responsible for the study. The data collected by the interviewers were entered during the interview and sent to an electronic database. The personal identification data were coded and kept confidential. All women with CPP were evaluated by experts, and their diagnosis was confirmed before inclusion in the database. Five percent of the subjects were selected at random and re-interviewed to check data consistency.

Definitions and grouping

CPP in women has been described as continuous or intermittent pain in the anatomic pelvis (anterior abdominal wall at or below the umbilicus) that lasts for at least six months, is not exclusively related to menstruation or sexual intercourse, and is sufficiently severe to cause functional disability or lead to medical care. For this study, we defined CPP as having at least one weekly episode with an intensity higher than 3 cm on a 10-cm visual analog scale. Women who had been pregnant in the previous 12 months were excluded from the analyses. Dysmenorrhea was defined as pelvic pain during or shortly before/after menstruation. The

intensity of dysmenorrhea was classified according to its effect on the ability to work, the coexistence of systemic symptoms, and the need to use any kind of analgesic medication. Classifications included absence (absence of pain during the periods); mild (occasional pelvic discomfort that does not impair daily activity, occasional need for medication), moderate (pain lasting almost throughout the menstrual period that impairs daily activity and is responsive to the use of medication), and intense (pain lasting throughout the menstrual period, with significant limitation of daily activity, frequent use of potent analgesics, and without effective improvement). For analysis, we considered only moderate and intense dysmenorrhea to be positive. Dyspareunia was defined as pelvic pain during sexual intercourse or during a period of 24 hours after sexual intercourse. The intensity of dyspareunia was classified according to the disruption of sexual activity during intercourse, as follows: absence (absence of pain during sexual contact), mild (tolerable pain, does not lead to the interruption of sexual contact), moderate (intense pain sufficient to lead to the interruption of sexual contact), and intense (pain that hinders sexual contact). For analysis, we considered only moderate and intense dyspareunia to be positive. The clinical measurement of pain severity was made using a 10-cm visual analog pain scale ranging from 'least possible pain' to 'worst possible pain'.

Statistical analysis

The D'Agostino and Pearson test was used to determine whether data followed a Gaussian distribution. Data with and without a normal distribution were represented respectively by the mean (standard deviation) and median (range). Data were analyzed using the Fisher exact test or Chi-square test (qualitative variable) and the unpaired t test after confirmation of normal distribution (quantitative variables). We first selected only the significant variables identified ($p < .10$) and then assigned values of 0 or 1 to the absence or presence of these variables in each case. Logistic regression was used to identify the significant independent variables and to estimate the simultaneous impact of these factors on the assessment of CPP. The results were expressed as the odds ratio (OR) and 95% confidence interval (95% CI), with the level of significance set at $p < .05$.

RESULTS

The prevalence of CPP was 11.5% (147/1,278). Considering only women of reproductive age, the prevalence was 15.1%

Table 1 - Characteristics of the subjects included in the present study.

Parameters	Controls (n = 1,131)	Cases (n = 147)	p
Age (mean \pm SD)	43.0 \pm 15.6	40.4 \pm 15.0	0.25
BMI (mean \pm SD)	24.7 \pm 4.5	24.5 \pm 5.0	0.84
Parity (median [range])	1 [0-15]	1 [0-9]	0.71
Age at menarche (mean \pm SD)	12.7 \pm 1.7	12.5 \pm 2.0	0.23
Menopause (n [%])	388 [34.3]	49 [33.3]	0.85
First sexual intercourse (mean \pm SD)	19.3 \pm 6.7	18.3 \pm 3.8	0.11
Duration of pain (mean \pm SD [range])	---	51.8 \pm 61.2 [6-360]	---
VAS (mean \pm SD)	---	58.5 \pm 23.4	---

Age in years; BMI: body mass index; Duration of pain in months; VAS: visual analogue scale, in millimeters; SD: standard deviation.

(127/841). The characterization of associated history elements is presented in Table 1. In total, 82.4% of healthy women (932/1,131) and 90.5% of women with CPP (133/147) stated that they make regular clinic visits at basic health centers (at least two appointments per year). Only 4.1% of women with the disease, however, knew their diagnosis before the interview ($n = 6/147$). The average duration of the pain was 51.8 ± 61.2 [6-360] months: 6-12 months in 34.0% of the women (50/147), 13-36 months in 28.6% (42/147), and over 36 months in 37.4% (55/147). The mean intensity of pain obtained with a visual analogue scale (VAS) was 58.5 ± 23.4 mm. The intensity was 30-50 mm in 52.4% of the women (77/147), 51-70 mm in 17.7% (26/147), and 71-100 mm in 29.9% (44/147). In total, 44.9% of the women reported a spontaneous onset of pain (66/147); in 3.4% (5/147), the pain was related to food intake; in 8.5% (9/106 – excluding those who were not sexually active), the pain was related to intercourse; in 21.8% (32/147), the pain was related to physical activity; in 30.6% (30/98 – excluding those who were menopausal), the pain was related to menstruation; in 2.0% (2/98), the pain was related to ovulation; in 0.7% (1/147), the pain was related to stress; and in 1.4%, it was related to other factors (2/147). The frequency of self-medication was 1.4% (16/1131) and 24.5% (111/147) among healthy and CPP women, respectively. The common occupations were maid-servant, hairdresser, and seamstress, with no possibility of grouping the women according to their occupations.

A univariate analysis of the variables investigated is presented in Table 2. In the logistic regression, the factors independently associated with CPP were dyspareunia, previous abdominal surgery, depression, dysmenorrhea, anxiety, current sexual activity, low back pain, constipation, urinary symptoms, and low educational level. These results are detailed in Table 3.

DISCUSSION

In the present study, we detected a one-year prevalence of 11.5% for CPP among women from Ribeirão Preto and a prevalence of 15.1% in women of reproductive age. To our knowledge, this is the first time that a high prevalence of this disease has been reported in Brazil. The presence of chronic pain was found to be 48.4% in women from Salvador, Brazil.²⁰ Although that study described pain at various sites, it made no reference to abdominal or pelvic pain. A recent review published by Latthe et al.¹⁰ has shown that the worldwide prevalence of this condition ranges from 2% to 24%, which places Brazil among the countries with a higher prevalence of CPP. Zondervan et al., for example, observed a community prevalence of 24.0% in women between 18 and 49 years of age.⁷ In that study, the questionnaire response rate was 74%. A higher response rate is natural among women with the disease, which may explain the difference in prevalence compared with our study, which had a response rate of 97.9% (1,278/1,306). We believe that our data are representative of the entire Ribeirão Preto community because the social-demographic indicators of the covered area are similar to those of the general population of the city (socioeconomic level, age distribution, sex, and ethnicity).

A notable result was that only 4% of the women with CPP stated that they had previously received a specific diagnosis, even though 90% of them attended a basic health center. Three different factors may have contributed to this

Table 2 - Variables related to chronic pelvic pain (univariate analysis).

	Control	CPP	p
Number of subjects	1,131	147	---
Stable marital status % (n)	44.6 (499/1,120)	56.9 (82/144)	0.01*
Single % (n)	35.5 (398/1120)	27.1 (39/144)	0.05
Separated % (n)	19.9 (223/1120)	16.0 (23/144)	0.31
Married % (n)	44.6 (499/1120)	56.9 (82/144)	<0.01*
Occupation (paid work) % (n)	43.3 (490/1,131)	48.3 (71/147)	0.29
Per capita income <R\$450.00 [¥] % (n)	43.6 (491/1,126)	54.8 (80/146)	0.01*
Low educational level	27.0 (302/1,118)	37.1(53/143)	0.01*
Sedentary lifestyle [§] % (n)	56.7 (642/1,131)	68.0 (100/147)	0.01*
Prior sexual intercourse % (n)	91.4 (1,002/1,096)	97.8 (135/138)	0.01*
Current sexual activity % (n)	60.1 (602/1,002)	76.3 (103/135)	<0.01*
Contraception % (n)	47.1 (533/1,131)	49.0 (72/147)	0.73
Sexual appetite % (n)	49.2 (557/1,131)	43.5 (64/147)	0.22
Vaginal lubrication % (n)	34.2 (387/1,131)	35.4 (52/147)	0.78
Orgasm % (n)	54.4 (514/1,131)	47.6 (70/147)	0.66
Victim of violence % (n)	1.6 (18/1,131)	2.7 (4/147)	0.31
Alcoholism % (n)	5.2 (59/1,131)	5.4 (8/147)	0.85
Smoking % (n)	4.7 (53/1,131)	8.8 (13/147)	0.04*
Coffee intake % (n)	9.3 (105/1,131)	17.7 (26/147)	<0.01*
Illicit drugs % (n)	1.9 (21/1,131)	3.4 (5/147)	0.21
Depression % (n)	16.9 (191/1,131)	46.9 (69/147)	<0.01*
Anxiety % (n)	15.1 (171/1,131)	30.6 (45/147)	<0.01*
Migraine % (n)	18.0 (204/1,131)	31.3 (46/147)	<0.01*
Low back pain % (n)	15.3 (173/1,131)	29.2 (43/147)	<0.01*
Episiotomy % (n)	28.7 (325/1,131)	38.8 (57/147)	0.02*
Forceps delivery % (n)	5.6 (63/1,131)	10.9 (16/147)	0.03*
Abortion % (n)	16.4 (186/1,131)	27.9 (41/147)	<0.01*
>2 Abortions % (n)	5.6 (63/1,131)	14.3 (21/147)	<0.01
Abdominal surgery % (n)	37.0 (418/1,131)	66.0 (97/147)	<0.01*
>2 Abdominal surgeries % (n)	20.8 (235/1,131)	37.4 (55/147)	<0.01
Longitudinal incision % (n)	7.6 (86/1,131)	17.0 (25/147)	<0.01
Transverse incision % (n)	24.8 (281/1,131)	47.6 (70/147)	<0.01
Oblique incision % (n)	7.1 (80/1,131)	10.2 (15/147)	0.18
Umbilical incision/laparoscopic % (n)	1.6 (18/1,131)	2.7 (4/147)	0.31
Cesarean section % (n)	23.1 (261/1,131)	43.5 (64/147)	<0.01
>2 Cesarean sections % (n)	13.8 (156/1,131)	23.8 (35/147)	<0.01
Perineal surgery [#] % (n)	5.2 (59/1,131)	6.1 (9/147)	0.70
Dysmenorrhea % (n)	21.5 (160/743)	38.8 (38/98)	<0.01*
Dyspareunia % (n)	2.8 (17/602)	19.4 (20/103)	<0.01*
Constipation % (n)	22.7 (249/1,099)	34.0 (50/147)	<0.01*
Urinary symptom (bladder irritation) % (n)	19.0 (211/1,108)	39.0 (57/146)	<0.01*
Nocturia % (n)	9.4 (106/1,131)	19.0 (28/147)	<0.01*

[#]not including episiotomy;

[¥]minimum wage in the country during the study (approximately USD \$ 276.07);

[§]<300 minutes of physical activity per week.

finding: whether the physician is able to provide the correct diagnosis; whether the relationship between the patient and the physician enables effective communication and explanation of the diagnosis (which other studies have commented

Table 3 - Variables independently related to chronic pelvic pain identified by logistic regression.

	OR	95% CI	p
Dyspareunia	11.0	5.1 to 23.8	<0.01
Abdominal surgery	2.9	1.9 to 4.5	<0.01
Depression	2.8	1.9 to 4.4	<0.01
Dysmenorrhea	2.6	1.6 to 4.2	<0.01
Anxiety	2.1	1.3 to 3.3	<0.01
Current sexual activity	1.9	1.2 to 3.0	<0.01
Low back pain	1.7	1.1 to 2.7	0.02
Constipation	1.6	1.0 to 2.5	0.03
Urinary symptoms	1.6	1.0 to 2.4	0.04
Low educational level	1.6	1.0 to 2.4	0.05

OR: odds ratio; CI: confidence interval.

on²¹); and whether the women complain about their clinical conditions to physicians. Studies have shown that gender is an important determining factor of pain complaints in women and might be the reason for diagnosis underestimation at primary care centers.²² The frequency of self-medication was also a notable finding. Approximately one quarter of the women used some kind of medication (especially analgesics and anti-inflammatory drugs) for the relief of their symptoms in an indiscriminate way. This self-medication predisposes them to side effects and requires financial expenditures that do not guarantee clinical improvement, especially over the long term.²³ We believe that this percentage may be underestimated because people responding to an interviewer may not want to report the use of their pain medication. Additionally, more than one third of the women had symptoms consistent with a diagnosis of CPP for over three years, and the same proportion had symptoms that are considered severe (VAS>70 mm). Although we have no data to support this speculation, it is plausible that the high prevalence of CPP is associated

with high rates of absenteeism (about half of these women have paid employment outside the home), which has a direct impact on social and economic life.

We identified the following as factors independently associated with chronic pelvic pain: dyspareunia, previous abdominal surgery, depression, dysmenorrhea, anxiety, current sexual activity, low back pain, constipation, urinary symptoms, and low educational level.

Dyspareunia is an important element of sexual dysfunction that ranges in prevalence from 7% to 75% depending on the diagnostic criteria and the associated clinical conditions, such as CPP.²⁴⁻²⁹ In a recent study, we observed that dyspareunia was associated with pelvic muscle tenderness.³⁰ Although pelvic muscle tenderness may be a primary cause of CPP,³¹ we hypothesize that it is more often secondary to cross-talk communication between the viscera and muscles³² through neurogenic inflammation caused by the release of inflammatory mediators at the periphery in response to the antidromic stimulus over time.³³ Similarly, current sexual activity may be linked in some way to dyspareunia, although this relationship is still unclear. Dysmenorrhea is a condition that is frequently concomitant with CPP. Its association with endometriosis or adenomyosis may explain the relationship to CPP. Another hypothesis is that women with dysmenorrhea have a lower pain threshold, which may favor the onset of illness.³⁴ Moreover, mechanisms of viscerovisceral hyperalgesia between organs probably involve the sensitization of visceroviscero-somatic convergent neurons.³⁵

The most notable factor observed in the present study is the association of CPP with abdominal surgery, particularly because we observed that two-thirds of the women studied had undergone a previous abdominal surgery, and more than 40% of the women had previously undergone a cesarean section surgery. Considering the high rates of cesarean section surgery in our country³⁶⁻³⁷ (including this sample of our community), and the previous detection of an association with CPP by our group³⁸ and by Latthe et al. in a recent systematic review,¹⁴ we stress the need for detailed studies regarding this possible causal relationship between CPP and cesarean section. Some studies suggest the possibility of an association between CPP and adhesions.³⁹ However, the correlation between pelvic pain and adhesions is uncertain because adhesiolysis has not been shown to be effective in achieving pain control.⁴⁰ Thus, we emphasize the importance of recognizing abdominal myofascial syndrome as a differential diagnosis.⁴¹

Anxiety and depression disorders are frequently concomitant with chronic pain, particularly in women, in both developed and developing countries.⁴²⁻⁴³ We have also observed a direct relationship between depression, anxiety, chronic pelvic pain, and quality of life.⁴⁴ In addition to being a risk factor for CPP, mood disorders may make it more difficult for a women to engage in cognitively or emotionally demanding rehabilitation.⁴⁵ Because the individual experience of pain is personal and subjective, it is probably affected by emotional states and, therefore, by psychosocial factors. There is some evidence that it is the stress of living with chronic pain, and not personal or family predisposition, that causes depression in these patients.⁴⁶ The idea that pain, particularly chronic pain, can lead to feelings of frustration, worry, anxiety, and depression seems obvious. There is also evidence, however, for reverse causality, in which negative moods and emotions can lead to or exacerbate pain.⁴⁷ It

therefore remains uncertain whether depression/anxiety precedes or is a consequence of chronic pain.⁴⁸

Low back pain is usually comorbid with CPP. This association probably reflects the same pathophysiological mechanisms,⁴⁹ although each can reduce the thresholds and thus contribute to the development of the other. We believe that both are the consequence of some other factors. Urinary and intestinal symptoms are common in women with CPP. Painful bladder syndrome and constipation are nongynecologic conditions that may cause or exacerbate CPP (level of evidence A).² The prevalence of constipation identified in our sample of healthy women (22.7%) was similar to that observed by Oliveira et al.⁵⁰ Because the women reported that constipation was present before CPP, we may infer that this condition may at least contribute to the development of CPP. Though this was beyond the scope of our study, some studies indicate that constipation may be secondary to the dysfunction of the levator ani muscle,⁵¹⁻⁵² which is a common condition in CPP.

Several studies in the literature have shown that a lower educational level is linked to a higher prevalence of chronic pain.^{20,53} Because CPP increases with age and most education takes place in early life, it is likely that a lower educational level increase the risk for the development of CPP, or that both are the consequences of some other undescribed factors.

Our study has identified several factors as independent predictors for CPP. We have not, however, reached final conclusions about the causal relationship between these factors and CPP. A thorough investigation and other different types of studies are necessary to corroborate our results.

CONCLUSIONS

We conclude that the prevalence of CPP in women from Ribeirão Preto is very high, even though only 4% sufferers are aware of their diagnosis. This clinical condition is related to several independent predictors. Specifically designed studies are necessary to confirm our hypothesis. This confirmation is crucial for the prevention, early diagnosis, control, and resolution of CPP.

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