

## Attachment Styles, Pain, and the Consumption of Analgesics During Labor: A Prospective Observational Study

José Manuel Costa-Martins,<sup>\*</sup> Marco Pereira,<sup>†</sup> Henriqueta Marques,<sup>‡</sup> Mariana Moura-Ramos,<sup>†</sup> Rui Coelho,<sup>§</sup> and Jorge Tavares<sup>||</sup>

<sup>\*</sup>Department of Anaesthesiology, Maternity Hospital Alfredo da Costa, University of Porto, Porto, Portugal.

<sup>†</sup>Faculty of Psychology and Educational Sciences, University of Coimbra, Portugal.

<sup>‡</sup>Instituto Superior de Psicologia Aplicada, University Institute, Lisbon, Portugal.

<sup>§</sup>Department of Clinical Neurosciences and Mental Health, Hospital de São João, Faculty of Medicine, University of Porto, Porto, Portugal.

<sup>||</sup>Department of Anaesthesiology, Hospital de São João, University of Porto, Porto, Portugal.

**Abstract:** Individuals with less secure attachment styles have been shown to experience more pain than people with more secure attachment styles; however, attachment styles have not yet been examined in the context of labor pain and analgesic consumption. The purpose of this prospective observational study was to assess the influence of the mother's attachment style on the perception of labor pain, as assessed by a visual analog scale and analgesic consumption. Eighty-one pregnant women with a mean age of 32 years (standard deviation = 5.1) were assessed during the third trimester of pregnancy and during labor. The physical predictors of labor pain were recorded, and the adult attachment style was assessed with the Adult Attachment Scale–Revised. For labor analgesia, a low dose of patient-controlled epidural analgesia protocol (ropivacaine .6 mg/mL plus sufentanil .5 µg/mL) was used. Women with a secure attachment style reported significantly less labor pain ( $P < .001$ ) and a significantly lower analgesic consumption during labor ( $P < .001$ ) than insecurely attached women. These findings suggest that women's attachment style was associated with labor pain and analgesic consumption, and support the relevance of the attachment theory as a promising conceptual framework for understanding labor pain.

**Perspective:** This study shows that women with an insecure attachment style were more likely to report higher pain before patient-controlled epidural analgesia and higher analgesic consumption and to request supplemental analgesia during labor. The assessment of adult attachment has the potential to identify women at high risk of poorly coping with pain during childbirth.

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**Key words:** Attachment styles, analgesic consumption, labor pain, patient-controlled epidural analgesia.

Labor pain is a complex, multidimensional, and dynamic phenomenon, being associated with a range of sociodemographic and physical variables<sup>8,16,21,30</sup>; however, the psychological factors are also of

considerable importance.<sup>16,24,26,30,38</sup> In recent years, there has been growing interest in examining the influence of attachment in the context of pain<sup>18,31,37,41</sup>; nevertheless, to our knowledge, there is no empirical research investigating this association in the context of labor pain.

The study of attachment on the experience of labor pain is important for a variety of reasons. First, pregnancy and the birth of a child constitute a transition that implies physical and psychological changes, where the identity and roles of mothers are redefined and maternal attachment becomes activated.<sup>15</sup> Second, childbirth is considered to be one of the most intense and painful experiences of women's life. As pain is often perceived by women as a form of physical and emotional stress, they may elicit attachment behaviors as a means to adapt to pain or achieve a state of security. Accordingly,

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Address reprint requests to José Manuel Costa-Martins, MD, MSc, Rua Major Neutel de Abreu, no. 13, 10<sup>o</sup>-A, 1500-409 Lisbon, Portugal. E-mail: [hcostamartins@gmail.com](mailto:hcostamartins@gmail.com)

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the individual differences in the pain experience may reflect the woman's attachment needs and her ability to regulate negative emotions,<sup>14</sup> and the understanding of these differences may be crucial to the prevention and treatment of pain.<sup>35</sup> Third, labor pain has been shown to contribute to lower childbirth satisfaction and to encompass potential adverse consequences on maternal health.<sup>26,36</sup> Fourth, most research on attachment was conducted in the context of chronic pain and only recently has been extended to studying attachment regarding acute pain.<sup>32</sup> Labor pain is a special case of acute pain, and unlike other acute pain experiences, is not associated with pathology but with a significant life experience, the birth of a child.<sup>26</sup>

Attachment style is determined by infancy and early childhood interactions with primary caregivers and is considered to be a stable trait throughout the life span. Attachment styles determine how individuals relate to each other and are particularly important to emotion regulation and coping strategies for managing stress-inducing situations.<sup>4</sup> Attachment styles are predicated on variations in internal working models, which are represented in 2 dimensions: anxiety and avoidance.<sup>5</sup> On the basis of the intersection of these dimensions, 4 attachment styles were proposed: 1 secure style and 3 insecure styles—preoccupied, fearful, and dismissing.<sup>2</sup> When exposed to a stressful event, individuals with secure styles tend to use more adaptive coping strategies—to appraise the events as less threatening, to view themselves as more capable of coping with the events, and to seek support. In contrast, insecure individuals tend to rely on less effective ways of coping—to be excessively concerned with their own distress, to seek distance from the stress-inducing event, and to avoid seeking support.<sup>25,34</sup>

In healthy populations, an insecure attachment style has been associated with elevated pain-related fears,<sup>27</sup> reduced pain threshold,<sup>32</sup> reduced ability to self-manage pain,<sup>27,31</sup> and higher pain disability.<sup>30</sup> In the context of chronic pain, insecure styles have been associated with the impaired ability to cope with pain<sup>33</sup> and more negative appraisals of pain.<sup>9</sup> There are conflicting results regarding pain intensity, and some studies report no association with attachment style.<sup>9,12,33</sup> Analgesic consumption also has been used as a surrogate measure of the pain experience.<sup>37</sup> Although prior research has suggested the association between analgesic consumption and psychological factors (eg, anxiety, personality traits, coping),<sup>22</sup> there is no empirical research examining this association pertaining to attachment styles.

The purpose of this study was to assess the extent to which attachment styles are associated with labor pain and analgesic consumption. We hypothesized that women with an insecure attachment style would report more pain compared to secure women. Regarding analgesic consumption, given that insecure styles have been associated with less effective emotion-regulation strategies, we expected that insecure women would have a lower pain tolerance and a reduced ability to control pain and, accordingly, would have higher labor analgesic requirements.

## Methods

### Participants and Procedures

This prospective and observational study was carried out in compliance with the Helsinki Declaration. Ethical approval to conduct the study was obtained from the ethics committee of the Maternity Alfredo da Costa (Lisbon, Portugal) and was also approved by the National Commission of Data Protection. All participants were informed of the purpose of the study, and those who agreed to participate provided written informed consent. The concealment of data to researchers and participants was ensured. Participants received no compensation for their participation in the study.

General inclusion criteria for the study were as follows: age  $\geq 18$  years, healthy and singleton pregnancy, nulliparous or parous (second or third pregnancy), absence of obstetric indices of problems (eg, cephalopelvic disproportion and absence of history of cesarean for dystocia), absence of psychiatric disorders and substance abuse, absence of contraindications to epidural techniques and prior analgesia with opioids, and American Society of Anesthesiologists (ASA) Physical Status lower than III (according to the ASA's Physical Status Classification System).

The same collection took place between April 2010 and November 2011. A combined convenience and consecutive sampling approach was used. Women were recruited in the general obstetrics appointment of the maternity department on the basis of the researchers' convenience; however, when the research team was present, women were consecutively recruited in an effort to obtain a better representation of the pregnant population. Participants were assessed at 2 different times: in the third trimester of pregnancy (26 weeks or more) and during labor. In the first assessment, data were obtained regarding sociodemographic and obstetric-gynecologic factors, and participants completed the Adult Attachment Scale–Revised. The second assessment took place during labor, before and after the administration of the patient-controlled epidural analgesia (PCEA) protocol, and included the collection of data regarding labor, delivery, the newborn's weight and Apgar score, analgesic technique, and pain assessment.

All participants had received the standard PCEA protocol adopted in the institution, at their request and during the first stage of labor (cervical dilatation 3–4 cm), with ropivacaine .6 mg/mL plus sufentanil .5  $\mu$ g/mL. Based on women's height, after an initial dose (10–12 mL), the epidural catheter was connected to an infusion pump (Smart Pump CADD–SOLIS; Smiths Medical MD, Inc, St. Paul, MN), programmed with a background infusion of 3 mL/h, a 5-mL patient-controlled bolus, a lockout of 15 minutes, and an hourly limit of 20 mL/h. This regimen was maintained in both early and later stages of labor. Parturients who experienced inadequate analgesia during the early stages of labor received supplemental doses, varying from 6 to 8 mL or 8 to 10 mL, of a solution of ropivacaine .06% (without sufentanil). During the second stage of labor, whenever necessary, a perineal dose of 6 to 8 mL of the same solution was administered, according to the same height intervals.

All procedures were done by anesthesiologists from the research/clinical team (J.M.C.-M. and others).

After epidural analgesia was established, all parturients received an oxytocin infusion (10 U/1000 mL) according to the obstetric institutional protocol, with an initial dose of 4 mU/min and increments of 4 to 5 mU/min every 2 h, until a maximum dose of 15 mU/min, adjusted to ensure a medium progression of 1 cm/h in cervical dilatation.

## Measures

### Sociodemographic and Clinical Information

Sociodemographic, obstetric-gynecologic history, physical variables, and data about childbirth preparation classes were gathered by an interview undertaken in the third trimester of pregnancy. Additional data were collected during the second assessment, including gestational age, cervical dilatation at the beginning of analgesia, the oxytocin use before analgesia (pharmacologic induction of labor), and the duration of labor (length of time since the onset of regular uterine contractions and cervical dilatation of 3 cm and birth [delivery or caesarean]). Regarding duration of labor, 2 periods were considered: the first stage, time from epidural catheter placement until full cervical dilatation, and the second stage, time between full cervical dilatation and delivery or time of decision for caesarean delivery. After birth, the newborn's weight and Apgar scores at 1 and 5 minutes were also collected.

### Assessment of Pain

The perceived intensity of labor pain was measured using the visual analog scale (VAS), with one anchor at 0 mm, which represented "no pain at all," and a second anchor at 100 mm, which represented "the worst pain imaginable." The first measurement was obtained before the administration of the PCEA at 3 cm of cervical dilatation (VAS initial), and the second measurement was taken at the beginning of analgesia (VAS induction—defined as the moment when a woman first requests analgesia). Both VAS assessments were obtained after consecutive uterine contractions (mean of the 2 scores). After the PCEA, pain was also indirectly assessed through the analysis of the hourly consumption of ropivacaine and sufentanil. For local anaesthetic requirements, the duration of analgesia (defined as the time between the beginning of analgesia and delivery), the total volume of anaesthetic solution (mL), the total dose of ropivacaine (mg), the hourly dose of ropivacaine (mg/h), the total dose of sufentanil ( $\mu\text{g}$ ), the hourly dose of sufentanil ( $\mu\text{g}/\text{h}$ ), the number of PCEA-delivered boluses, and the ratio of PCEA demands/PCEA delivered were obtained from the PCEA recordings. All records of the PCEA pump were transcribed as individual reports, through CADD software (Solis Medication Safety software—administrator, part number 97-0442-25C, version 2.0.24, database version 7.7; Smiths Medical MD, Inc).

### Adult Attachment

Adult attachment was assessed with the Portuguese version of the Adult Attachment Scale-Revised.<sup>7</sup> This scale

consists of 18 items answered on a scale of 5 points (from 1 = not at all characteristic of me to 5 = extremely characteristic of me) organized into 2 dimensions (*Anxiety*, which describes the extent to which one worries about being unloved and abandoned, and *Avoidance*, which describes the extent to which one avoids the closeness to others).<sup>11</sup> Participants were assigned to their respective attachment styles based on whether their scores on attachment-related anxiety and avoidance were above or below the scale midpoint. Specifically, each participant's attachment style was categorized as secure (lower anxiety and lower avoidance), preoccupied (higher anxiety and lower avoidance), fearful (higher in anxiety and avoidance), or dismissing (higher in anxiety and higher in avoidance). In the current sample, Cronbach's alpha values were .87 (*Avoidance*) and .89 (*Anxiety*).

### Statistical Analysis

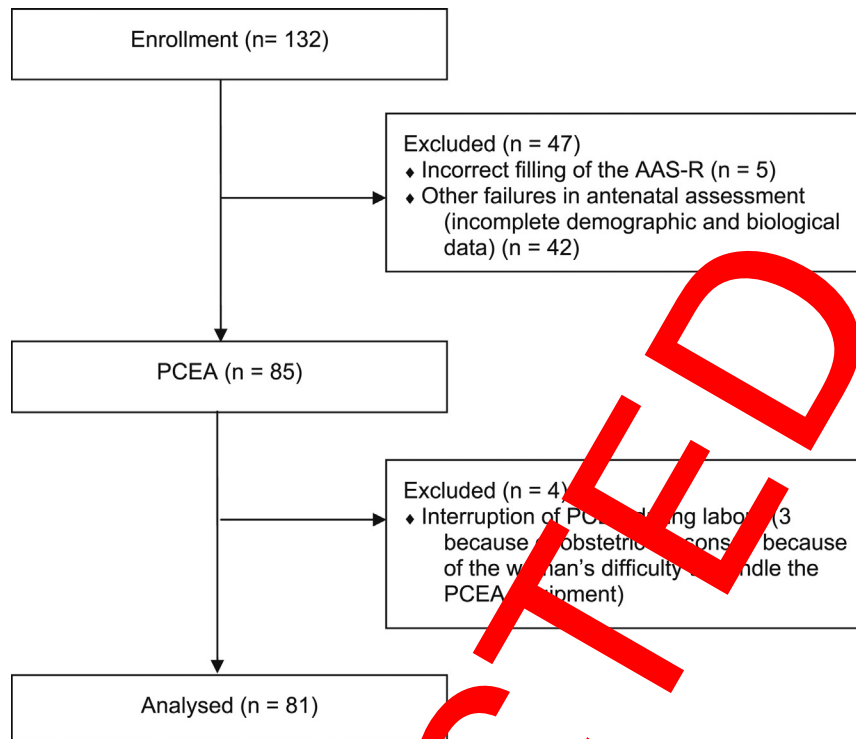
Data analyses were conducted with IBM SPSS, version 20.0 (SPSS, Inc, Chicago IL). Descriptive statistics with means and standard deviations or standard errors were reported for continuous variables, and frequencies for categorical variables. Our independent variable was attachment style and our primary dependent variables were labor pain (VAS initial and VAS induction) and analgesic consumption (hourly dose of ropivacaine [mg/h], hourly dose of sufentanil [ $\mu\text{g}/\text{h}$ ], number of PCEA delivered boluses and ratio of PCEA demands/PCEA delivered). Independent samples t-test was used to assess differences between attachment styles in the continuous variables and chi-square analysis was used to examine the relationship between attachment style and categorical variables. Associations among study variables were examined using Pearson's correlations. Multivariate analysis of covariance was performed to test for group differences (attachment style as between-subjects factor) in pain scores and analgesic consumption. Subsequent univariate analyses of variance were conducted to identify the source of the multivariate effect. Bonferroni post hoc tests were performed to assess significant group differences in dependent variables. Potential confounders, identified as those significantly correlated with the dependent variables at  $P < .05$  in univariate analyses, were entered as covariates.

Cohen's<sup>10</sup> estimates were used to assess the statistical power of the analyses. According to the G\* Power program,<sup>13</sup> post hoc power calculations made for all statistical analyses performed demonstrated that with a significance level of .05 and power  $\geq .80$ , the achieved sample size allowed for the detection of medium to large effects. Effect sizes are presented for all analyses (small effects: Cohen's  $d \geq .20$ , Cramer's  $V \geq .01$ ; medium effects: Cohen's  $d \geq .50$ , Cramer's  $V \geq .03$ ; large effects: Cohen's  $d \geq .80$ , Cramer's  $V \geq .05$ ).<sup>10</sup> The level of significance was set at .05 ( $P < .05$ ).

## Results

### Participant Characteristics

A total of 132 pregnant women, who were consecutively recruited during antenatal obstetric visits,



**Figure 1.** Flow diagram of the study. Note: Three women were excluded after starting the PCEA technique because of a change to caesarean section, by obstetric decision, in the first 40 minutes after the beginning of the PCEA. One woman requested early in labor to abandon PCEA, continuing analgesia with top-ups administered by the anesthesiologist.

accepted the invitation to participate in the study, but 51 were excluded from the final analyses (completion rate = 61.4%). Women who were excluded from the analyses were more likely to be nulliparous,  $\chi^2(1) = 4.3$ ,  $P = .038$ , Cramer's  $V = .18$  (69.6% vs 50.6%). Significant differences were found in the remaining variables, as well as on attachment style,  $\chi^2(1) = .2$ ,  $P = .891$ , Cramer's  $V = .01$ . A flow diagram showing parturient enrollment and progression throughout the study is displayed in Fig 1.

The final study sample consisted of 81 pregnant women in the third trimester of pregnancy

**Table 1. Demographic and Obstetric-Gynecologic Characteristics by Attachment Style (N = 81)**

	ATTACHMENT STYLE		T(79)	COHEN'S D
	SECURE (N = 43)	INSECURE (N = 38)		
Age (years)	31.1 (4.7)	33.1 (5.3)	1.78	.39
BMI prepregnancy (kg/m <sup>2</sup> )	23.1 (4.2)	24.1 (3.3)	-.77	.17
	N (%)	N (%)	$\chi^2$	CRAMER'S V
Nulliparous	23 (53.5)	18 (47.4)	.30	.06
Low back pain	12 (27.9)	10 (26.3)	.03	.02
Dysmenorrhea	4 (10.5)	6 (14.0)	.22	.05
Childbirth training program	37 (86.0)	30 (78.9)	.71	.09

Abbreviation: SD, standard deviation.

NOTE. No statistically significant differences were found between the 2 groups.

### Attachment Styles

Concerning the distribution of adult attachment styles, 43 women (53.1%) were classified as secure, 29 (35.8%) as fearful, 3 (3.7%) as preoccupied, and 6 (7.4%) as dismissing. Because so few participants were identified as having dismissing and preoccupied attachment styles, the participants were categorized into 2 attachment styles: secure and insecure (the latter comprising preoccupied, fearful, and dismissing participants).

### Attachment Styles and Sociodemographic and Obstetric-Gynecologic Characteristics

No significant differences were found between parturients with secure and insecure attachment styles regarding sociodemographic and obstetric-gynecologic characteristics (Table 1).

### Attachment Styles, Labor Characteristics, and Birth Outcomes

The results of a univariate analysis of labor data and neonatal outcomes are shown in Table 2. No significant differences were found regarding the use of oxytocin



**Table 2. Labor and Neonate Outcomes by Attachment Style (N = 81)**

	SECURE (N = 43)	INSECURE (N = 38)	T <sub>(79)</sub>	COHEN'S D
	MEAN (SD)	MEAN (SD)		
Duration of labor (min)	381 (168)	443 (195)	1.52	.33
Duration of first stage (min)*	250 (139)	315 (182)	1.70	.40
Duration of second stage (min)†	64 (18)	67 (23)	.50	.12
Gestational age at delivery (weeks)	39 (1)	39 (1)	.10	.01
Newborn birth weight (kg)	3.160 (.378)	3.23 (.300)	.87	.19
	N (%)	N (%)	χ <sup>2</sup>	CRAMER'S V
Oxytocin use‡	29 (67.4)	27 (71.1)	.12	.04
Mode of delivery				
Vaginal delivery	30 (69.8)	27 (71.1)	2.11	.16
Instrumental delivery	7 (16.3)	9 (23.7)		
Caesarean	6 (14.0)	2 (5.3)		
Apgar score < 7				
At 1 minute	6 (14.0)	2 (5.3)	1.71	.15
At 5 minutes	1 (2.3)	1 (2.6)	.01	.01

Abbreviation: SD, standard deviation.  
 NOTE. No statistically significant differences were found between the 2 groups.  
 \*Time from epidural catheter placement until full cervical dilatation.  
 †Time between full cervical dilatation and delivery or time of decision for caesarean delivery.  
 ‡N and percentage of patients receiving oxytocin before epidural administration.

before analgesia, gestational age at delivery, the mode of delivery, the total length of labor and the durations of the first and second stages of labor, the newborn's weight, and the Apgar scores at 1 and 5 minutes.

**Correlations Among Variables**

A range of preliminary analyses was conducted to explore associations between pain scores, anesthetic consumption, and the sociodemographic and obstetric-gynecologic variables (see Supplementary Table). Age was positively associated with VAS induction ( $r = .25, P < .05$ ), the hourly consumption of ropivacaine ( $r = .31, P < .01$ ) and sufentanil ( $r = .31, P < .01$ ) and the ratio PCEA demands/PCEA delivered ( $r = .33, P < .05$ ). No significant correlations were found with the remaining variables. Therefore, age was included as a covariate in the multivariate model.

**Attachment Style and Labor Pain**

Regarding the initial VAS scores, 5 women rated their peak pain at 100 mm (all from the insecure group). With respect to VAS induction, 14 (17.3%) women from the insecure group and 2 (2.5%) from the secure group rated their peak pain at 100 mm. Controlling for age, the comparison of pain scores according to attachment style revealed significant differences in VAS scores. Women with an insecure attachment style reported greater labor pain both at 3 cm of cervical dilatation,

Attachment Styles, Labor Pain and Analgesia mean = 75 mm vs mean = 59 mm,  $F(1, 78) = 15.42, P < .001, \eta_p^2 = .17$ , and at analgesic induction, mean = 91 mm vs mean = 78 mm,  $F(1, 78) = 25.26, P < .001, \eta_p^2 = .25$ . Given that only 11 women (2 with a secure attachment style and 9 with an insecure attachment style) requested rescue analgesia (Table 3), the comparison of VAS scores is not presented.

**Attachment Style and Local Anesthetic Requirements**

To test the hypothesis of differences in the analgesic requirements between the 2 attachment styles, a multivariate analysis of covariance was performed. The assumption of equality of variances between the groups was met, as was the assumption of homogeneity of regression slopes for each dependent variable. Results showed a significant multivariate effect: Wilks' Lambda = .47,  $F(1, 75) = 21.45, P < .001, \eta_p^2 = .53$ . Follow-up univariate tests showed significant differences in 4 dependent variables. As can be seen in Table 3, women with an insecure attachment style reported significantly higher analgesic consumption of ropivacaine and sufentanil. The number of PCEA-delivered boluses and ratio of PCEA demands/PCEA delivered were also significantly higher among women with an insecure attachment style. In addition, the proportion of women who requested rescue analgesia was significantly higher in the insecure group ( $P < .05$ ).

**Discussion**

The research question addressed in this paper is whether an insecure attachment style is associated with increased labor pain and higher analgesic consumption. Although there is a growing body of research linking adult attachment and chronic pain,<sup>18,31,37,41</sup> less is known about its association with acute pain, and to our knowledge, no study has investigated the relationship between attachment style and labor pain.

**Table 3. Local Anesthetic Requirements by Attachment Style (N = 81)**

	SECURE (N = 43)	INSECURE (N = 38)	F	η <sub>p</sub> <sup>2</sup>
	MEAN (SE)	MEAN (SE)		
Hourly dose of ropivacaine (mg/h)	5.9 (.3)	7.6 (.3)	19.93‡	.20
Hourly dose of sufentanil (μg/h)	4.8 (.2)	6.0 (.3)	11.48‡	.13
Number of PCEA delivered boluses	3.1 (.4)	7.5 (.4)	68.39‡	.47
Ratio PCEA demands/PCEA delivered	1.8 (.1)	2.4 (.1)	23.89‡	.23
	N (%)	N (%)	χ <sup>2</sup>	CRAMER'S V
Women requesting rescue analgesia	2 (4.7)	9 (23.7)	6.23*	.28

Abbreviation: SE, standard error.  
 \* $P < .05$ .  
 † $P < .01$ .  
 ‡ $P < .001$ .

The main findings of this study offer preliminary support for the concept that there is a relationship between attachment styles and the intensity of pain experienced during labor and analgesic requirements. Specifically, our findings support the idea that women with secure working models tend to cope better with labor pain than women with insecure working models.

The distribution of attachment styles in our sample (46.9% had an insecure attachment style) closely resembles the distribution observed in previous studies.<sup>9,12,32</sup> No significant differences were found concerning demographic and physical variables for either attachment style. Given that both demographic and physical factors have been associated with labor pain in prior research,<sup>21,29,30</sup> the similarity of the groups is noteworthy and is a basic condition for assigning the relevance of the psychological component of pain, which is a central aspect of our study.

Our results suggest that attachment is strongly associated with labor pain. Women with an insecure attachment style reported significantly higher labor pain at both 3 cm of cervical dilatation and before the administration of analgesia. Regarding the initial pain scores, this finding is particularly relevant and suggests that when compared with secure women, insecure women report more intense pain when facing a concrete organic event (3 cm of cervical dilatation) that was common to all participants,<sup>6</sup> but also when their pain exceeds their individual limit of tolerance (VAS induction), which relates to their response in the context of intense psychobiological events such as labor.<sup>8,29,30,38</sup> This finding is consistent with previous studies reporting greater pain among those with this attachment style<sup>9,12,28</sup> and appears to depict attachment insecurity as an important factor for vulnerability to pain. In addition, these results support the idea that attachment security is an important individual resource in the presence of pain during labor.

As stated, to our knowledge, there is no empirical research investigating the association between attachment styles and analgesic consumption. We have found highly significant differences in the consumption of ropivacaine and sufentanil, the number of PCA-delivered boluses, and the ratio of PCA demands/delivered, which were all significantly higher among the women with an insecure attachment style. A significantly higher proportion of women in the insecure group also requested supplemental analgesia, suggesting that insecure women have a greater need for analgesia and have lower levels of self-efficacy for the management of pain. These results are in agreement with previous results concerning pretreatment pain scores, which were also significantly higher among the insecure parturients, and are in line with a recent meta-analysis that showed that psychological variables and coping skills are predictive of analgesic consumption.<sup>22</sup> Request for supplemental analgesia, as suggested in earlier studies,<sup>21</sup> may depend on the individual characteristics of the women, such as emotional state and interpersonal variables. Therefore, attachment style may lead to supplementary requests for analgesia, despite pain relief measures that otherwise would be acceptable.

Overall, these results are consistent with our hypothesis and the premise that secure individuals tend to have more realistic appraisals of stressors (such as pain) and possess greater self-efficacy regarding the management of pain. This link between attachment and analgesic consumption is particularly important because it allows us to consider the role of attachment style in the prediction of pain expression and assist in the identification of women at risk for a potentially traumatic experience of childbirth. As suggested by Nielsen et al,<sup>35</sup> understanding the causes underlying individual differences in the experience of pain may be essential to the prevention, assessment, and treatment of pain. It would be important that women with insecure attachment style representations be the focus of specialized interventions that seek to modify the appraisal of pain (in order to see it as less threatening), to develop positive pain attitudes, and to develop more adaptive pain coping skills. In this context, the Coping with Labor Algorithm, a recently developed pain assessment tool for laboring women, may be useful to identify whether women need intervention, and to individualize care with a variety of coping strategies.

Some limitations should be considered when interpreting the findings of our study. First, non-probability sampling methods were used, and the available participants may not be representative of the pregnant population. Second, the sample size may limit the strength of our conclusions considering the statistical test applied and its power to detect small but potentially important differences. In fact, according to Cohen,<sup>10</sup> post hoc power calculations demonstrated that the achieved sample size allowed for the detection of only moderate to large effects. In addition, our sample size did not allow for an analysis using the individual subtypes of insecure attachment. Therefore, although these findings are potentially important, more research is needed to replicate and extend our results. Third, adult attachment was assessed using a self-report measure. Because attachment reflects the person's subjective perceptions of her close relationships, it is possible that participants may be vulnerable to reporting bias. Replication of this study with other methods of data collection, such as the Adult Attachment Interview,<sup>20</sup> would strengthen the validity of the findings. Fourth, the combining of styles into secure and insecure was done for pragmatic reasons, particularly because of the small number of women with preoccupied and dismissing styles. Further studies on large samples may indicate more specific associations between each of the styles and the experience of pain during labor. Thus, the generalizability of our findings may be limited. Finally, other factors that might influence the perception of labor pain and analgesic consumption were not assessed. Further research should incorporate other variables, such as coping and emotion-regulation strategies, in order to examine the possible mechanisms by which attachment affects pain and analgesic consumption.

Despite these limitations, this study has several strengths and offers an important contribution to the literature. First, PCEA is a technique that gives the user sufficient autonomy to trigger a bolus to avoid intense

nociceptive peaks.<sup>3,19</sup> In our study, we chose not to interfere in this environment and opted to indirectly but objectively measure pain using the quantity of epidural drugs necessary to achieve comfort. Second, PCEA represents an advance in the obstetric anesthesiology,<sup>17,42</sup> is recognized as an effective approach<sup>3,19</sup> that does not substantially influence the physiological dynamics of childbirth,<sup>19,42</sup> and is associated with increased satisfaction, autonomy, and sensation of control.<sup>17,40</sup> In addition, PCEA allows an accurate record of the individual variability.<sup>3</sup> These characteristics are particularly important in studies that aim to characterize profiles in diverse populations. Additionally, PCEA allows the registration of objective data, which are recorded in real time. The subsequent transcription by software also makes it a rigorous instrument for research. Finally, the assessment of adult attachment during pregnancy (and the underlying longitudinal design of this study) allowed us to clarify the directionality of the association between attachment and our main outcomes.

It can be concluded from our study that among women with an insecure attachment style, the direct and indirect indicators of labor pain assessed before and after analgesia are higher than in women with secure attachment styles. The assessment of attachment style during pregnancy represents a promising area of research in the context of obstetric analgesia, has important implications for the understanding of pain intensity and analgesic consumption during childbirth, and has also important clinical implications. The effective management of labor pain requires not only the use of phar-

Attachment Styles, Labor Pain and Analgesia cologic agents but also careful attention to interpersonal factors that may account for variability in pain experience. Therefore, an understanding of women's attachment style, and an increased awareness of the psychological variables and the individual experiences and perspectives, will allow more effective interventions and better pain management, including women's expectations and fears regarding labor pain, but also pain relief.<sup>1</sup> In this context, prenatal preparation could increase women's satisfaction with childbirth by providing information that yields realistic expectations about labor pain, educating patients about the variety of available pain management options and by providing different strategies for increasing self-efficacy and control. This is particularly important, as a recent systematic review<sup>23</sup> suggested that most women are not prepared for the intensity of the pain experience during labor and usually have inaccurate or unrealistic expectations.

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## Supplementary Data

Supplementary data related to this article can be found at <http://dx.doi.org/10.1016/j.jpain.2013.12.004>.

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