

Original Article

Labour is still painful after prepared childbirth training

RONALD MELZACK, PH D
PAUL TAENZER, B SC
PERLE FELDMAN, MD
ROBERT A. KINCH, MD

Labour pain was measured with the McGill Pain Questionnaire in 87 primiparas and 54 multiparas. The average intensity of labour pain ranked among the most intense pains recorded with the questionnaire. However, the pain scores had a wide range and were influenced by several medical and social variables. They were significantly higher for the primiparas than for the multiparas. Moreover, high pain levels were associated with a history of menstrual difficulties and lower socioeconomic status. The primiparas who had received prepared childbirth training had lower pain scores than those who had received no such training. Nevertheless, the effects of prepared childbirth training were relatively small, and most patients (81%) who received it requested epidural anesthesia. Because many women who received training suffered severe pain during labour, prepared childbirth training and epidural anesthesia should be regarded as compatible, complementary procedures.

Les douleurs de l'accouchement ont été mesurées à l'aide du questionnaire McGill sur la douleur chez 87 primipares et 54 multipares. L'intensité moyenne des douleurs de l'accouchement s'est placée parmi les douleurs les plus intenses qui ont été enregistrées avec ce questionnaire. Toutefois, les cotes de la douleur étaient très étalées et elles montraient l'influence de plusieurs variables médicales et sociales. Elles ont été significativement plus élevées pour les primipares que pour les multipares. De plus, les cotes élevées étaient reliées à des antécédents de problèmes menstruels et à un statut socioéconomique moins élevé. Les primipares qui avaient reçu des cours prénatals ont présenté des cotes de la douleur moins élevées que celles qui n'avaient pas eu de tels cours. Néanmoins, l'effet des cours prénatals a été relativement modeste, et la plupart des patientes (81%) qui les avaient reçus ont nécessité une anesthésie épidurale. Parce que plusieurs femmes qui ont reçu ces cours ont enduré une douleur intense durant l'accouchement, les cours prénatals et l'anesthésie épidurale devraient être considérés comme des mesures compatibles et complémentaires.

Pain is a complex perceptual experience that is profoundly influenced by psychologic variables, such as

fear, attention and suggestion, as well as by injurious or potentially harmful stimulation.^{1,2} It is not surprising, therefore, that clinical pain is often substantially reduced by psychologic procedures that decrease anxiety and tension.³

Women in labour are subject to intense fears and anxieties related to their ability to bear the pain, to the possibility of medical complications and to the baby's health.^{4,5} Methods such as prepared childbirth training^{4,6,7} that are designed to reduce fear, anxiety and tension should, theoretically, also decrease pain. Yet the effects of such training are still controversial. While several studies have shown that the relaxation, distraction and other components of this training diminish pain,⁸⁻¹⁰ others have found that it has no demonstrable effect on the pain itself but simply decreases the emotional reaction to the pain.¹¹⁻¹³

A major cause of this controversy has been the lack of adequate methods to measure pain. Some studies used simple pain-intensity scales,^{9,11} while others used complex indices based on interviews.^{5,12} Several other studies investigated the effects of prepared childbirth training on experimentally induced pain because of the lack of reliable methods to study clinical pain.^{8,10} However, the McGill Pain Questionnaire provides a different approach to the measurement of the intensity and qualities of pain.^{2,14}

The McGill Pain Questionnaire^{2,14} consists of 20 sets of words describing the sensory, affective and evaluative dimensions of the experience of pain. Recent studies have shown that the questionnaire is reliable,¹⁴ is sensitive to the effects of different therapies on chronic pain¹⁵⁻¹⁷ and discriminates between different pain syndromes, including labour pain.^{18,19} Furthermore, the validity of the sensory and affective classes of words in the questionnaire²⁰⁻²² as well as that of the evaluative class have been confirmed.²³ For this study we used the questionnaire to examine the subjective qualities of labour pain and to determine the effects

From the department of psychology, McGill University and the department of obstetrics, Montreal General Hospital

Reprint requests to: Dr. Ronald Melzack, Department of psychology, McGill University, 1205 Dr. Penfield Ave., Montreal, PQ H3A 1B1

The cover of this issue of the Journal depicts Paul Taenzer and his wife, Judith Kinghorn-Taenzer, practising the breathing exercises that form an integral part of prepared childbirth training.

of prepared childbirth training and other variables on the intensity and qualities of the pain.

Patients and methods

The patients were 141 women ranging in age from 14 to 38 (mean 26.2) years in the obstetric unit of the Montreal General Hospital.

An experimenter interviewed successive patients as each met the criteria of cervical dilation of at least 2 to 3 cm and contractions at intervals of 5 minutes or less. After the patient consented to take part in the study she was asked to answer the McGill Pain Questionnaire to obtain a measure of her pain. Only 5% of the patients refused to take part in the study; therefore, the remainder constituted a representative sample of women in labour. The questionnaire was completed once for each patient, so that information about pain related to the progress of labour was obtained at random as women entered the study at different stages of labour.

One day after delivery 110 of the patients were asked the questions in the unit's postpartum information form (Table I) regarding variables considered to be possible determinants of labour pain. Some patients were reluctant to answer questions about religion, socioeconomic status or other personal information and were not pressed to do so. As the study progressed, more questions were added; therefore, the samples for some variables were smaller than those for others. A second group of 31 patients took part in a study of the effects on pain of an epidural block; the McGill Pain Questionnaire was completed before and 30 and 60 minutes after administration of the epidural anesthetic. These patients were asked only selected questions from the postpartum information form after consent was obtained.

The McGill Pain Questionnaire

The McGill Pain Questionnaire (Fig. 1) was completed between and not during contractions. The patients were instructed as follows: "This is a questionnaire that allows us to get a measure of the amount of pain you are feeling *during contractions*. The questionnaire consists of 20 lists of words that describe feelings and sensations. I will read each list, or category, to you. If any of these words describe what you feel, please tell me and I will make a mark at the side of the appropriate word. Choose only one word in each category, the one that best expresses your feeling or sensation. If the words in any category do not describe what you feel, we will leave the category blank."

Two major indices can be obtained from the questionnaire:¹⁴ First is a pain rating index (PRI), which is the sum of the rank values of the words chosen, based on the positions of the words in each category or "subclass"; the PRI can be computed separately for the sensory (subclasses 1 to 10), affective (subclasses 11 to 15), evaluative (subclass 16) and miscellaneous (subclasses 17 to 20) words, as well as provide a total score (subclasses 1 to 20). Second is an index of present pain intensity (PPI), a measure of the overall pain

intensity on a scale of 0 to 5: 0 represents no pain and 1 represents mild, 2 discomforting, 3 distressing, 4 horrible and 5 excruciating pain.

Statistical procedures

An analysis of each variable was carried out with the use of *t*-tests. To determine which of the variables assessed with the postpartum information form were predictors of the pain experienced during labour, Pearson correlation matrices were calculated for each measure from the McGill Pain Questionnaire. Those for which significant correlations were obtained were then analysed by step-wise multiple regression²⁴ to determine the statistically reliable predictors. The multiple regressions were done with pair-wise deletion of missing values because of the small number of patients responding to some items in the postpartum information form.

Results

A total of 141 women (87 primiparas and 54 multiparas) were tested. Of the 110 women who were asked all the questions in the postpartum information form, 61 had completed secondary school and 49 had completed college; 102 were white, 3 were black, 1 was Asian and 4 did not answer the question; and 41 were Catholic, 35 Protestant and 11 Jewish, and 23 were "other" or did not answer the question. Socioeconomic status was self-rated as follows by the 62 patients who answered the questions: lower class, 3; lower middle class, 8; middle middle class, 40; up-

Table I—Questions on the postpartum information form of the Montreal General Hospital's obstetric unit

General information

Patient's age?
Occupation?
Education level?
Place of birth?
Country of parents' origin?
Ethnic origin?
Religion?
Are you a religious person?
Socioeconomic level (patient's evaluation)?
Menstrual difficulties?
Any serious illnesses or operations?

Previous delivery/deliveries

Number of earlier pregnancies and births?
Any complications of labour or pregnancy?
Any earlier anesthetic procedures?

Present birth

Was the pregnancy planned?
How did your husband feel about the pregnancy?
Did you have any complications during pregnancy?
What fears did you have about labour and delivery?
What symptoms did you have during pregnancy, and were they early or late?
Do you plan to breast- or bottle-feed?

Preparation

Did you attend any classes?
If so, what kind?
Did you practise the exercises prescribed?
Do you feel the classes helped prepare you?

Location of husband during labour

Present in the case room?
Outside the case room but in the hospital?
At home?
Elsewhere?

McGILL PAIN QUESTIONNAIRE

Patient's Name _____

Date _____ Time _____

1 FLICKERING _____	11 TIRING _____
QUIVERING _____	EXHAUSTING _____
PULSING _____	12 SICKENING _____
THROBING _____	SUFFOCATING _____
BEATING _____	13 FEARFUL _____
POUNDING _____	FRIGHTFUL _____
2 JUMPING _____	TERRIFYING _____
FLASHING _____	14 PUNISHING _____
SHOOTING _____	GRUELLING _____
3 PRICKING _____	CRUEL _____
BORING _____	VICIOUS _____
DRILLING _____	KILLING _____
STABBING _____	15 WRETCHED _____
LANCINATING _____	BLINDING _____
4 SHARP _____	16 ANNOYING _____
CUTTING _____	TROUBLESOME _____
LACERATING _____	MISERABLE _____
5 PINCHING _____	INTENSE _____
PRESSING _____	UNBEARABLE _____
GNAWING _____	17 SPREADING _____
CRAMPING _____	RADIATING _____
CRUSHING _____	PENETRATING _____
6 TUGGING _____	PIERCING _____
PULLING _____	18 TIGHT _____
WRENCHING _____	NUMB _____
7 HOT _____	DRAWING _____
BURNING _____	SQUEEZING _____
SCALDING _____	TEARING _____
SEARING _____	19 COOL _____
8 TINGLING _____	COLD _____
ITCHY _____	FREEZING _____
SMARTING _____	20 NAGGING _____
STINGING _____	NAUSEATING _____
9 DULL _____	AGONIZING _____
SORE _____	DREADFUL _____
HURTING _____	TORTURING _____
ACHING _____	PPI _____
HEAVY _____	0 No pain _____
10 TENDER _____	1 MILD _____
TAUT _____	2 DISCOMFORTING _____
RASPING _____	3 DISTRESSING _____
SPLITTING _____	4 HORRIBLE _____
	5 EXCRUCIATING _____

FIG. 1—McGill Pain Questionnaire. Classes of words: sensory, 1 to 10; affective, 11 to 15; evaluative, 16; and miscellaneous, 17 to 20. Rank value for each word is based on position in word set. Sum of rank values is pain rating index (PRI). Index of present pain intensity (PPI) is based on scale of 0 to 5.

per middle class, 11. Of the 141 women 61 primiparas and 30 multiparas had received prepared childbirth training in specialized training units in hospitals or private clinics. The other 50 women had received no training, although some had read books on childbirth.

Some women were reluctant to use the words associated with the numbers on the PPI scale. Women who said that their pain was at level 4 or 5 sometimes refused to use the accompanying words "horrible" or "excruciating" because the positive experience of giving birth prevented them from using words with such negative connotations. Consequently, the PPI-number and PPI-word scores were recorded separately and not used for routine analyses of the data.

Relative intensity of labour pain

The mean total PRI scores for primiparas and multiparas are shown in Fig. 2A. It is evident that labour was significantly more painful for the first birth than for later births ($t = 2.1$, $P = 0.03$). Statistically significant differences ($P < 0.05$) were also found between the primiparas and multiparas for each of the four classes of words describing their pain.

Since the total PRI score provides an index of overall pain intensity, we can compare labour pain with other pain; Fig. 2A shows the mean total PRI scores for several pain syndromes obtained in an earlier study at an outpatient pain clinic in a general hospital.¹⁴ Since the mean PRI scores for labour pain are higher than those for clinical pain syndromes we can conclude that labour pain ranks among the most intense pains recorded with the McGill Pain Questionnaire.

While the average intensity of labour pain is extremely high, there is a wide range in pain scores. Fig. 2B shows the percentages of women whose pain scores fell into each of six intervals within the range of PRI scores recorded in this study (2 to 62). These data are consistent with those for the PPI index in that 25% of the primiparas and 9% of the multiparas reported their pain as horrible or excruciating, and 23% of the primiparas and 11% of the multiparas had pain scores in the top third of the range (42 to 62); in contrast, 24% of the multiparas and 9% of the primiparas had PRI scores in the lower third of the range (2 to 21).

Qualities of labour pain

The words chosen by 33% or more of the women to describe their pain are listed in Table II. The list is strikingly similar to that obtained in an earlier study,¹⁸ indicating the consistency with which these words are chosen. Interestingly, in both studies more than 80% of the women chose a word from the affective subclass (i.e., tiring or exhausting).

Some determinants and predictors of labour pain

Table III shows the variables of the postpartum information form that correlated significantly with measures from the McGill Pain Questionnaire. Among the primiparas, prepared childbirth training and practice were associated with lower pain scores for the sensory, affective, miscellaneous and total PRI measures. Com-

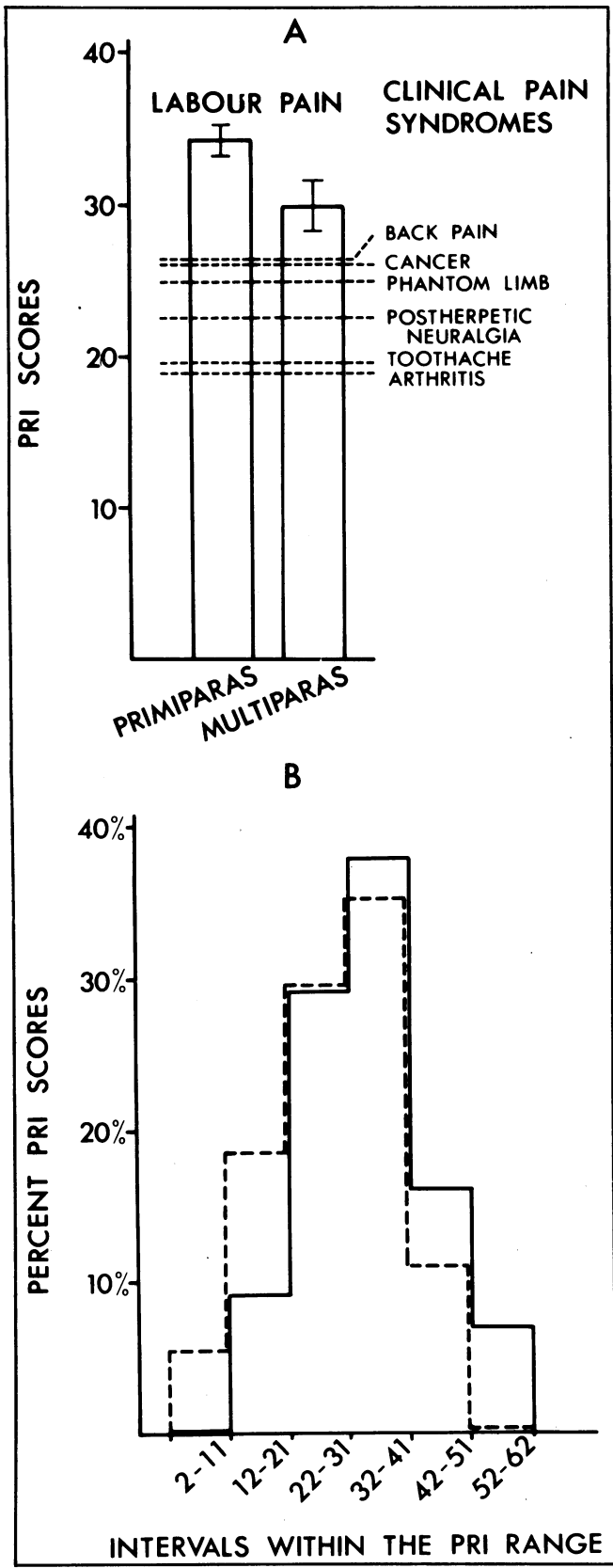


Table II—Qualities of labour pain: words used by 33% or more of 141 women

Class	% of women
Sensory	
Sharp	62
Cramping	54
Aching	45
Throbbing	43
Stabbing	40
Hot	36
Shooting	33
Heavy	33
Affective	
Tiring	49
Exhausting	36
Evaluative	
Intense	52
Miscellaneous	
Tight	44

Table III—Correlation between postpartum information and scores in subclasses of the pain rating index (PRI) obtained during labour for the 141 women

Subclass and variable	Pearson correlation coefficient	P value
Primiparas		
Sensory		
Prepared childbirth practice	-0.30	0.008
Complications (this pregnancy)		
Prepared childbirth training	-0.19	0.04
Affective		
Complications (this pregnancy)		
Intend to breast-feed	-0.20	0.05
Prepared childbirth training	-0.18	0.04
Menstrual difficulties	+0.28	0.009
Religious	+0.22	0.03
Evaluative		
Cervical dilation	-0.18	0.052
Miscellaneous		
Socioeconomic status	-0.45	0.002
Age	-0.31	0.002
Prepared childbirth practice	-0.24	0.03
Total		
Prepared childbirth practice	-0.32	0.005
Socioeconomic status	-0.29	0.04
Complications (this pregnancy)		
Age	-0.22	0.02
Prepared childbirth training	-0.19	0.04
Multiparas		
Sensory		
Socioeconomic status	-0.42	0.02
Felt prepared by childbirth training	-0.37	0.02
Affective		
Contraction frequency	-0.37	0.04
Evaluative		
Felt prepared by childbirth training	-0.32	0.03
Miscellaneous		
Complications (previous pregnancy)		
Menstrual difficulties	-0.27	0.05
Total		
Socioeconomic status	-0.42	0.02
Felt prepared by childbirth training	-0.34	0.03
Menstrual difficulties	+0.29	0.04

FIG. 2—A: Mean total PRI scores during labour for primiparous and multiparous women and, for comparison, those for several pain syndromes observed in outpatient pain clinic.¹⁴ **B:** Percentages of PRI scores for primiparas (solid line) and multiparas (broken line) in six intervals of total PRI range recorded in this study.

plications during pregnancy were also correlated with lower pain scores, and age and socioeconomic status were negatively correlated with pain scores. In contrast, a history of menstrual difficulties was associated with higher pain scores and, surprisingly, women who described themselves as religious had higher scores in the affective subclass. With some exceptions a similar pattern of correlations was found among the multiparas. Increasing cervical dilation in the primiparas and increasing frequency of contractions in the multiparas were associated with lower pain scores. However, these results need to be treated cautiously since the scores were obtained from small samples of women at different stages of labour. More reliable results will be obtained from a study now under way in which the

McGill Pain Questionnaire is administered hourly as labour progresses.

The results of the multiple regression analysis to determine statistically reliable predictors of labour pain are shown in Table IV. Prepared childbirth training and practice, menstrual difficulties and socioeconomic status were the main predictors for the primiparas, and socioeconomic status and menstrual difficulties were the main predictors for the multiparas. However, although these predictors are statistically significant, they accounted for only a fraction of the variance of each pain measure. For the primiparas, prepared childbirth practice, for example, was a statistically significant predictor, but it accounted for only 8% of the variance for the PRI sensory scores and 10% for the total PRI scores; in fact, it was only marginally significant as a predictor of the total PRI scores. Prepared childbirth training and menstrual difficulties together accounted for only 13% of the variance of the PRI affective scores. The most substantial predictors for the multiparas — socioeconomic status and menstrual difficulties — accounted for 36% of the total PRI variance.

Prepared childbirth training

Table V shows the mean PRI scores of primiparas who received prepared childbirth training and those who did not. The results of training by individual instructors are also shown. In all cases the training consisted of a series of classes that included instruction in obstetric physiology, breathing exercises and relaxation techniques. Clearly there was considerable variability in the scores obtained during labour among different instructors' groups. Discussions with some of the women on the day after labour suggested that this was partly due to differences in the instructors' enthusiasm about prepared childbirth training and partly to a selection factor: some instructors specifically chose women who were in top physical condition, enthusiastic about training and "good bets" to succeed. Because of this bias, statistical analysis was carried out on the data for the trained group as a whole.

Primiparas who elected to have prepared childbirth

Table IV—Results of multiple regression analysis to determine statistically reliable predictors of pain for primiparas and multiparas

Subclass and variable	F	P value	% of variance explained
Primiparas			
Sensory			
Prepared childbirth practice	6.01	0.02	8
Affective			
Menstrual difficulties			
Prepared childbirth training	5.1	0.008	13
Evaluative			
No significant variables			
Miscellaneous			
Socioeconomic status	8.73	0.006	20
Total			
Prepared childbirth practice	3.85	0.058	10
Multiparas			
Sensory			
Socioeconomic status	4.35	0.05	17
Affective			
No significant variables			
Evaluative			
No significant variables			
Miscellaneous			
Menstrual difficulties	5.92	0.02	14
Total			
Socioeconomic status			
Menstrual difficulties	5.52	0.01	36

Table V—Effects of prepared childbirth training on pain in primiparas

Variable	Mean PRI scores					Women given an epidural (%)
	Total	Sensory	Affective	Evaluative	Miscellaneous	
Women with no training, n = 26	37.2	22.6	4.0	3.3	6.3	82
Women with prepared childbirth training, n = 61	32.9	20.3	3.3	3.3	6.3	81
P values*	0.05	0.05	0.05	NS	NS	NS
Instructor no.						
1, n = 6	26.1	16.1	3.2	2.7	4.2	83
2, n = 3	27.3	18.6	1.3	2.0	5.3	100
3, n = 15	31.7	20.0	2.6	3.3	5.8	79
4, n = 12	32.3	18.4	3.2	3.5	5.5	89
5, n = 5	33.6	20.2	2.8	3.8	4.8	100
6, n = 20	37.0	23.0	3.5	3.3	6.4	79

*For significance of difference from means for women with no training; based on one-tailed *t*-tests; NS = not significant.

training had significantly lower pain scores than those who received no training (Table V). Not only the total mean PRI score but also the sensory and affective scores were significantly lower. However, the average scores of the women who received training were still very high. For example, the training by instructor 1 was clearly the most effective, yet the mean total PRI score for the six patients in her group was about the same as those for outpatients with chronic back pain and cancer (Fig. 2A). Most important is the fact that although instructor 1 strongly encouraged her patients to forego an epidural block five of the six women specifically requested one late in labour.

There were no statistically significant differences between the trained and untrained multiparas for any of the PRI measures.

Socioeconomic status, age and educational level

Among the primiparas the trained and untrained groups did not differ in socioeconomic status, age or education level ($P = 0.40, 0.15$ and 0.13 respectively). The trained and untrained multiparas did not differ in socioeconomic status or age ($P = 0.10$ and 0.09 respectively), but the trained multiparas had a higher average level of education ($P = 0.002$).

Epidural block

The effectiveness of an epidural block was measured in 31 women with the McGill Pain Questionnaire, completed before and after administration of the anesthetic. The block was judged to be ineffective by only three (10%) of the patients. In those in whom the block was effective (eliminating the sharp, shooting qualities of the pain) the mean total PRI score was 27.9 before the block and 8.0 and 7.6 respectively 30 and 60 minutes after administration of the anesthetic. Only three words were used by 33% or more of the patients after administration of the anesthetic: numb (50%), pressing (34%) and tingling (34%). In the women in whom the block was ineffective the mean score before administration of the anesthetic was 32.6; the score dropped to 12 after 30 minutes but then rose to 35 half an hour later despite continued administration of the agent.

Discussion

According to the results of our study labour pain ranks among the severest forms of pain recorded with the McGill Pain Questionnaire. However, the intensity of the pain ranges from mild to excruciating. Analyses of the data revealed the relative contributions of several factors to the individual variability of the pain.

In our study the multiparas reported significantly less pain than the primiparas. This may be due to physical changes in the mother's pelvis resulting from the first birth, although there is no evidence for such changes, and to the fact that multiparas generally have shorter labour.⁹ Another reason may be the decreased fear and anxiety in multiparas because they have given birth before and know what to expect. This is supported by the observation in our study that the multiparas who "felt prepared by childbirth training" had

significantly lower levels of pain.

The positive correlations between several PRI measures of labour pain and menstrual difficulties are particularly interesting. There is strong evidence that women who have dysmenorrhea produce excessive amounts of prostaglandins, which trigger uterine contractions.²⁵ Drugs that inhibit prostaglandin synthesis also diminish menstrual pain. Because of the positive correlation between menstrual and labour pain, it is conceivable that women who suffer severe labour pain may also produce excess prostaglandins during labour.

In our study complications during pregnancy were associated with lower pain scores during labour. This relationship is difficult to understand, but it is possible that women with complications expected difficult and painful labour and, when labour progressed normally, were relieved and perceived less pain.

Prepared childbirth training, including practising the procedures and feeling prepared by them, was consistently associated with lower levels of pain. However, the training did not produce dramatic reductions in pain, even though the women elected to have the training and therefore represented a self-selected sample with positive attitudes. The most effective training in our study — by an instructor who uses the orthodox Lamaze technique — was associated with an average pain reduction of about 30%, but most of the patients in her group still found the pain so intense that they requested an epidural block despite the instructor's bias against it. These results show that the title of Lamaze's book, "Painless Childbirth",⁶ is misleading. Although the pain is diminished, the reduction is not nearly as large as the title suggests.

Our observations should be interpreted in a positive sense, however. The fact that the current training procedures have statistically significant effects on pain is encouraging and indicates that psychologic preparation is valuable. That the pain reduction is relatively small indicates a need for further development of these obviously useful procedures.

Our results emphasize the need for a balanced view of the roles of prepared childbirth training and epidural block in labour. The desirability of delivery without an epidural block is self-evident. Epidural anesthesia is associated with a higher rate of forceps delivery^{6,26} and is occasionally complicated by inadvertent entry into the subarachnoid space and consequent severe headache.²⁶ Moreover, although the claim that epidural anesthesia may affect the later development of the infant is now in dispute,²⁷ the possibility cannot be ruled out. Furthermore, if the epidural block is ineffective (as in 10% of the women given one in our study) the woman is generally disappointed, angry and fearful. The value of prepared childbirth training is clear: women who have had training are less likely to receive narcotics and epidural anesthetics during labour and to have complications during delivery than women who have not had such training.^{28,29}

However, despite the desirability of delivery without an epidural block, other facts must be kept in mind. Our results show that many women have intense pain and request an epidural block even when the training

instructor has advised against it. If this happens the woman may feel that she has failed herself, her husband and her instructor. Furthermore, if the woman is not psychologically prepared for the possibility of needing an epidural block she may be emotionally disturbed by the sudden prospect of this procedure. Obviously anesthetics may not be necessary for women who have low levels of pain (9% of the primiparas and 24% of the multiparas in our study), but most have high levels. There are many causes of pain during childbirth, such as intense muscle contraction and stretching and tearing of cervical, vaginal and other tissues.²⁶ Astbury³⁰ recently reported a major reason why women should be prepared for the possibility of intense pain during childbirth: those whose expectations of labour are violated by the actual labour experience report more severe pain.

The decision to administer and receive an epidural block must be based on full awareness of all these considerations. Because so many women have severe pain and request an epidural block it seems reasonable that information on anesthetic procedures should be included in prepared childbirth training. Fortunately the training philosophy does not preclude epidural or pudendal blocks²⁶ and therefore could be used to prepare the mother for anesthetic procedures, which are often a source of fear and anxiety (as are many medical procedures). The purpose of the dialogue between mother, instructor and physician is to provide the most comfortable and safest labour for both mother and infant. Prepared childbirth training and obstetric anesthesia are compatible, complementary procedures aimed at assisting women in childbirth to suffer less fear, anxiety and pain.

Our results show that labour pain is caused by many interacting factors. Earlier studies^{11,12,31} have revealed that socioeconomic status, age and education level are negatively correlated with complications in pregnancy and labour. Moreover, all these factors are interrelated and are negatively correlated with pain scores.^{11,12,31} However, it is important to note that the factors observed in our study account for only a small part of the total variance related to pain. It is obvious that other factors — for example, weight and position of the baby in utero and physical characteristics of the mother — play a more important role in labour pain. A study is now under way to examine these factors.

We are grateful to Lucy Melzack, Elizabeth Carswell, Dr. Peter Gillett and the caseroom nurses at the Montreal General Hospital for their valuable assistance.

This study was supported by grant A7891 from the Natural Sciences and Engineering Research Council of Canada.

References

- MELZACK R: *The Puzzle of Pain*, Basic, New York, 1973
- MELZACK R, TORGERSOHN WS: On the language of pain. *Anesthesiology* 1971; 34: 50-59
- WEISENBERG MI: Pain and pain control. *Psychol Bull* 1977; 84: 1008-1044
- DICK-READ G: *Childbirth Without Fear*, Harper, New York, 1944
- MATTHEWS AEB: Reflections on the pain of labour. *Nurs Mirror* 1964; 118: 550-554
- LAMAZE F: *Painless Childbirth: Psychoprophylactic Method*, Regnery, Chicago, 1970
- BECK NC, GEDEN EA, BROUDER GT: Preparation for labor: a historical perspective. *Psychosom Med* 1979; 41: 243-258
- STONE CI, DEMCHIK-STONE DA, HORAN JJ: Coping with pain: a component analysis of Lamaze and cognitive-behavioral procedures. *J Psychosom Res* 1977; 21: 451-456
- NORR KL, BLOCK CR, CHARLES A, MEYER S, MEYERS E: Explaining pain and enjoyment in childbirth. *J Health Soc Behav* 1977; 18: 260-275
- STEVENS RJ, HEIDE F: Analgesic characteristics of prepared childbirth techniques: attention focusing and systematic relaxation. *J Psychosom Res* 1977; 21: 429-438
- DAVENPORT-SLACK B, BOYLAN CH: Psychological correlates of childbirth pain. *Psychosom Med* 1974; 36: 215-223
- NETTELBLADT P, FAGERSTRÖM CF, UDDENBERG N: The significance of reported childbirth pain. *J Psychosom Res* 1976; 20: 215-221
- JAVERT CT, HARDY JD: Measurement of pain intensity in labor and its physiologic, neurologic, and pharmacologic implications. *Am J Obstet Gynecol* 1950; 60: 552-563
- MELZACK R: The McGill Pain Questionnaire: major properties and scoring methods. *Pain* 1975; 1: 277-299
- MELZACK R, PERRY C: Self-regulation of pain: the use of alpha-feedback and hypnotic training for the control of chronic pain. *Exp Neurol* 1975; 46: 452-469
- FOX EJ, MELZACK R: Transcutaneous electrical stimulation and acupuncture: comparison of treatment for low-back pain. *Pain* 1976; 2: 141-148
- MELZACK R, OFIESH JG, MOUNT BM: The Brompton mixture: effects on pain in cancer patients. *Can Med Assoc J* 1976; 115: 125-129
- DUBUISSON D, MELZACK R: Classification of clinical pain descriptions by multiple group discriminant analysis. *Exp Neurol* 1976; 51: 480-487
- READING AE, NEWTON JR: A comparison of primary dysmenorrhoea and intrauterine device related pain. *Pain* 1977; 3: 265-276
- CROCKETT DJ, PRKACHIN KM, CRAIG KD: Factors of the language of pain in patient and volunteer groups. *Pain* 1977; 4: 175-182
- LEAVITT F, GARRON DC, WHISLER WW, SHEINKOP MB: Affective and sensory dimensions of back pain. *Pain* 1978; 4: 273-281
- VAN BUREN J, KLEINKNECHT RA: An evaluation of the McGill Pain Questionnaire for use in dental pain assessment. *Pain* 1979; 6: 23-33
- PRIETO EJ, HOPSON L, BRADLEY LA, BYRNE M, GEISINGER KF, MIDAX D, MARCHISELLO PJ: The language of low back pain: factor structure of the McGill Pain Questionnaire. *Pain* 1980; 8: 11-19
- NIE NH, HULL CA, JENKINS JG, STEINBRENNER K, BENT DH: *Statistical Package for the Social Sciences*, McGraw, New York, 1970
- MARX JL: Dysmenorrhea: basic research leads to a rational therapy. *Science* 1979; 205: 175-176
- BONICA JJ: *Principles and Practice of Obstetric Analgesia & Anesthesia*, Davis Co, Philadelphia, 1967
- KOLATA GB: Scientists attack report that obstetrical medications endanger children. *Science* 1979; 204: 391-392
- HUGHEY MJ, McELIN TW, YOUNG T: Maternal and fetal outcome of Lamaze-prepared patients. *Obstet Gynecol* 1978; 51: 643-647
- SCOTT JR, ROSE NB: Effect of psychoprophylaxis (Lamaze preparation) on labor and delivery in primiparas. *N Engl J Med* 1976; 294: 1205-1207
- ASTBURY J: Labour pain: the role of childbirth education, information and expectation. In PECK C, WALLACE M (eds): *Problems in Pain*, Pergamon, London, 1980: 245-252
- KUBISTA E, KUCERA H, SALZER, H, REINOLD E: Einfluss des Sozialstatus auf Schwangerschaft, Geburt und Wochenbett. *Wien Med Wochenschr* 1977; 127: 341-346