Low Back Pain During Labor and Related Factors

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ABSTRACT: A substantial proportion of women in labor suffer from low back pain, yet this issue has only been specifically evaluated in a few Western studies. The purpose of this research was to (1) describe the following characteristics of low back pain during labor: prevalence, anatomic region(s) affected, type, pattern, intensity trend, effective interventions, and exacerbating factors; (2) identify the factors relating to intrapartum low back pain in Taiwan women. A correlational design with repeated measures was used to conduct this investigation. Ninety-three low-risk women in labor were recruited from a medical center in central Taiwan. Low back pain was repeatedly measured during the latent phase (cervix dilated 2–4 cm), early active phase (cervix dilated 5–7 cm), and late active phase (cervix dilated 8–10 cm) of labor. Data were analyzed using descriptive statistics, repeated measurement ANOVA, and logistic regression. The results showed as many as 75.3% of the participants suffered episodes of low back pain during labor. The mean pain scores were 36.66–76.20 in the various stages of labor. Pain intensified as labor progressed. The location of the pain also changed with the progression of labor. The type of low back pain in 54.29% of women in labor was "muscle soreness and pain"; The pattern of pain in 45.71% women was continuous. Massage was chosen as the most effective intervention to alleviate low back pain by 65.3% of women. The women in labor who suffered from low back pain during pregnancy (OR = 3.23; $p < .01$) and had greater body weight when hospitalized (OR = 1.13; $p = .02$) were most likely to be in the low back pain group. In conclusion, our study demonstrates low back pain intensified with the progression of labor, suggesting early prevention is necessary, especially in the case of women who had low back pain during pregnancy and heavier body weight when hospitalized.

Key Words: labor, low back pain, repeated measures.

Introduction

It has been reported that low back pain is one of the main complaints in women in labor (Mårtensson & Wallin, 1999; Mårtensson, McSwiggin, & Mercer, 2008; Melzack & Schaffelberg, 1987), yet studies regarding this obstetric condition are scarce. Low back pain might start with the pregnancy, and the posture during labor, immobility in laboring and fetal position (occipitoposterior) also might cause, or increase the level of, pain (Cunningham et al., 2005; Nicols & Zwelling, 1997). Most of the research involving labor pain has focused on abdominal pain, while the problems associated with low back pain have been largely ignored (Melzack & Schaffelberg, 1987). In fact, there are considerable variances in the intensity and spatial location of pain during labor (Lee & Kuo, 1998; Melzack, 1984; Melzack & Schaffelberg, 1987). The research shows that labor pain did not occur in one anatomic site; the pain was mostly combined in the abdomen and back (Chang, 1994; Lee & Kuo, 1998). Melzack and Schaffelberg reported that as many as 74% of women in labor in their study had low back pain and 44% of the subjects considered the level of discomfort to exceed the pain caused by uterine contractions (Melzack & Schaffelberg, 1987). Some women even described the seemingly endless low back pain as relentless and exhausting (Melzack & Schaffelberg, 1987). Fear of pain is the reason for anxiety regarding labor in many women (Bahasadri, Ahmadi-Abhari, Dehghani-Nik, & Habibi, 2006). Anxiety is known to induce the activation of the

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sympathetic nervous system, resulting in the release of stress hormones that contribute to dysfunctional uterine contractility and prolonged labor (Lederman, Lederman, Work, & McCann, 1985). Obviously, low back pain is a problem that causes distress and negative obstetric experiences in women in labor.

Numerous variables influence low back pain, and some of the variables relevant to childbearing are considered in the current study. The selected factors include: age, parity, work during pregnancy, prenatal childbirth education, a history of dysmenorrhea, a history of back pain during pregnancy, body weight when hospitalized, body weight gained during pregnancy, the length of labor, and the weight of the newborn. The factors related to low back pain during labor have yet to be fully explored. Most research has focused on low back pain during pregnancy, and the results have been inconsistent. Melzack and Belanger (1989) showed that low back pain before pregnancy was not correlated with labor pain. Fast demonstrated that back pain during pregnancy had no significant association with age, weight gain during pregnancy, weight of the newborn, number of pregnancies, or the order of birth (Fast et al., 1987). Ostgaard, Andersson, and Karlsson (1991) indicated that the weight, height, one minute Apgar score, gestational age, and the length of the delivery were not significantly associated with back pain during pregnancy. In contrast, age, education, and history of back pain were significant factors. In their study, a history of low back pain before pregnancy and performance of heavy work were apt to cause back pain in pregnant women (Ostgaard et al., 1991). Kuan, Kuo, Kuo, and Hsueh (1995) also found that a prior history of back pain and low back pain in pregnancy were related. They found that the age of the pregnant woman, gestational age, weight gained during pregnancy, dysmenorrhea, and smoking were related to back pain in pregnancy. Chang (1994) found that levels of labor pain differed, depending on the woman's age and job; the higher the age, the more serious the pain. The pain score for homemakers was higher than those for women holding part- and full-time jobs.

An understanding of the interventions that are helpful in alleviating low back pain during labor, and, conversely, the situations that could aggravate it, will contribute to a lowering in the negative impact of labor pain on women in labor. Some interventions are considered capable of alleviating labor pain, such as: massage, application of heat, relaxation and breathing, and position changes (Labrecque, Nouwen, Bergeron, & Rancourt, 1999; Simkin & Bolding, 2004; Smith, Collins, Cyna, & Crowther, 2006).

Whether such methods are effective for low back pain, however, requires further study. On the basis of practical experience and our consideration of the literature, we considered the following possible aggravating situations in relation to low back pain in labor: progression of labor, uterine contractions, rupture of membrane, continuous fetal monitoring, and vaginal examinations (Cunningham et al., 2005; Melzack & Schaffelberg, 1987; Nicols & Zwelling, 1997; Wu, 2003).

According to our observations, reported herein, women in labor who suffered from low back pain not only experienced an increase in physical and mental discomfort, but were also rendered unable to relax by severe pain, which delayed the progress of their labor. Meanwhile, although there were already some factors thought capable of affecting the low back pain of women in labor, some of them remain unproven by research, some of whose results have been inconsistent. In addition, subjects from Western countries constitute the greatest source of data in the existing literature. For early prevention and management in Taiwan women during labor, it is necessary to improve our understanding of the characteristics of, and factors related to low back pain during labor. The purpose of this study, therefore, was to: (1) describe the prevalence, anatomic site, type, pattern, intensity trend, effective interventions, and aggravating factors regarding low back pain during labor; and (2) identify the factors associated with low back pain during labor.

Methods

Design

A correlational design with repeated measures was adopted for this investigation.

Participants

A convenience sample of low-risk women in labor was recruited from a medical center in central Taiwan. The inclusion criteria were: (1) gestational age between 37 and 42 weeks; (2) low risk pregnancy; (3) no complications during pregnancy; (4) anticipated vaginal delivery; and (5) singleton gestation. In addition, we excluded those

women who received epidural analgesia, which is known to influence the sensation of pain.

Regarding the sample size, Chiu (2008) suggested that 10 samples are needed per one dependent variable for regression analysis. On the basis of this suggestion, we estimated that approximately 100 samples should be collected in this study. One-hundred and six eligible pregnant women volunteered to participate in the study; two women were later excluded because of obstetrical complications. Six women were dismissed from the study because they were progressing rapidly in active labor, and five women declined to continue to participate because of labor discomfort. A total of 93 valid samples comprised the current study.

Phases of Labor

On the basis of the pilot study, we chose three points in time which show greater changes in pain intensity for repeated measurement: the latent phase (cervix dilated 2–4 cm), early active phase (cervix dilated 5–7 cm), and late active phase (cervix dilated 8–10 cm).

Measures

Visual Analogue Scale

The visual analogue scale [VAS] was utilized to repeat measures to assess the intensity of low back pain in various phases of labor. The scale consists of a 100 mm vertical line, with the bottom of the scale labeled, "NO PAIN" and the top labeled "THE MOST SERIOUS PAIN IMAGINABLE." The vertically-oriented VAS is considered more sensitive and easier to use, especially for those under stress (Cline, Herman, Shaw, & Morton, 1992; Gift, 1989). Women were instructed to indicate the intensity of pain they were feeling by marking the appropriate place on the line. Possible scores ranged from 0 to 100. More severe pain was indicated by a higher score.

The VAS is a reliable, valid, self-reported measure for the study of subjective experiences, and appropriate for respondents under high levels of stress (Benfield, Herman, Katz, Wilson, & Davis, 2001; Gift, 1989). It also is easy for measuring and distinguishing levels of pain within a short period of time; it can assess the current pain level of the subjects rapidly. There is evidence to support the reliability and validity of the VAS to measure pain (Melzack, 2005). In our pilot study, concurrent validity for VAS was assessed by determining its correlation with the McGill Pain Questionnaire (r = .68–.82, p < .001). Relative reliability of VAS (Hasson & Arnetz, 2005) observed in this study was .80.

Structured data collection sheet

The structured data collection sheet consisted of three parts. The first part concerned demographic data, including age, parity, educational level, occupation, the body weight when hospitalized, the body weight gained during pregnancy, participation in the prenatal education program, a history of dysmenorrhea, a history of back pain after pregnancy, the length of labor, and the body weight of the newborn. The second part concerned assessment of anatomic site and the type of the low back pain in the various stages of labor. The third part concerned the subjective experience of the subjects, which included a self-evaluation of effective interventions in the alleviation of pain and the situation(s) that aggravated the low back pain.

Five clinical and academic specialists reviewed the structured data collection sheet, and the range of the content validity index was .87–.92.

Procedure

Three senior nursing staff with > 5 years experience in the delivery room carried out the data collection. After the data collection sheet was amended, the pre-test and training for the observers were initiated. The data collection was started only after it was determined that there was 100% unification in data collection.

After admission in the latent phase of labor (cervical dilation < 4 cm), the purpose and procedures were explained to both the participants and their families. All participants gave their informed consent and understood how the data was to be kept confidential, how their anonymity was to be assured, and the fact that they had the right to withdraw from the research at any time without affecting their quality of care.

After confirming willingness to participate, the women were also asked to submit their personal demographic details. A study nurse provided the intrapartum care and also observed the progression of labor. When the cervical dilation was < 4 cm, at 5–7 cm, and at 8–10 cm, the data collector asked the participants to point to the location of the back pain and the level of pain was assessed by the VAS. When the women complained of low back pain, non-pharmacologic intervention was

administered in accordance with an established protocol. Within two hours of delivery, and once it was certain that their recovery had been uneventful, the study nurse asked the participants to complete the third part of questionnaire, which included a self-evaluation of effective interventions in the alleviation of pain and the situation(s) that aggravated the low back pain, and a further confirmation of data was also performed. Data collectors also kept a record of the labor progress and the childbirth outcome.

Statistical Analyses

The statistical methods used were percentage, mean, and standard deviation to assess demographics, low back pain characteristics, and the level of pain experienced. A one-way ANOVA repeated measures analysis of variance was calculated to test the significance of the differences between the self-reported scores for low back pain within the three data collection time frames. The relationships between low back pain and study variables were examined using multivariate logistic regression. The analyses were performed using the Statistical Package for the Social Sciences [SPSS] software for Windows, version 12.0. A p value < .05 was considered statistically significant.

Results

Participant Characteristics

The mean age of the participants was 29.68 ± 3.57 years; the majority was primiparas, (69%; Table 1), 41.9% were educated beyond college level, and 75.3% had a full-time job. The average weight when hospitalized was 66.40 ± 8.05 kgs. The average weight gained during pregnancy was 14.43 ± 3.80 kgs, and 41.9% had participated in a childbirth education program. The length of the first stage of labor, on average, was 537.94 ± 347.25 minutes. The second stage was 25.15 ± 24.65 minutes, and the third was 7.16 ± 7.00 minutes. Dysmenorrhea was reported in 40.9% of the participants and 67.7% of the participants had a history of low back pain during pregnancy. The average weight of the newborns was 3227.45 ± 378.05 grams.

Table 1.
Distributions of Characteristics of Participants (N = 93)

Item	Number of subjects	%	*M* ± *SD*
Parity			
Primiparas	64	69.0	
Multiparas	29	31.0	
Education			
High school	23	24.7	
Junior college	33	34.4	
College and above	37	41.9	
Prenatal Employment	70	75.3	
Childbirth Education	39	41.9	
History of Dysmenorrhea	38	40.9	
Low Back Pain during Pregnancy	63	67.7	
Age (year)			29.68 ± 3.57
Body Weight when Hospitalized (kg)			66.40 ± 8.05
Body Weight Gained during Pregnancy			14.43 ± 3.80
Length of Labor			
First stage (min)			537.94 ± 347.25
Second stage (min)			25.15 ± 24.65
Third stage (min)			7.16 ± 7.00
Birth Weight of the Newborn (gm)			3227.45 ± 378.05

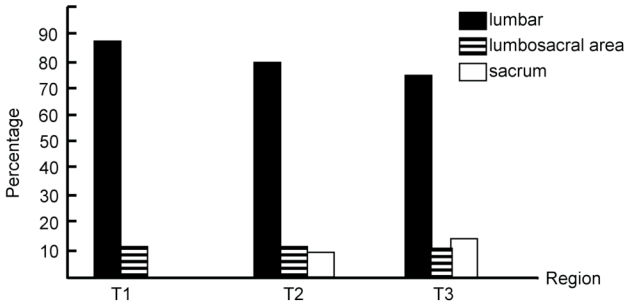

Figure 1. The anatomic region of low back pain during various stages of labor (T1 = time of latent phase [cervix dilated 2–4 cm]; T2 = time of early active phase [cervix dilated 5–7 cm]; and T3 = time of late active phase [cervix dilated 8–10 cm]).

The Prevalence, Anatomic Site, Type, and Pattern of Low Back Pain During Labor

Seventy (75.3%) of the 93 women were bothered by low back pain. Figure 1 shows that the anatomic sites associated with low back pain changed during the various stages of labor. When the cervix was dilated < 4 cm, the spatial location of the pain was confined mostly to the lumbar region (87.1%), followed by the lumbosacral area (11.4%), and the sacrum (0.14%). When the cervix was dilated 5–7 cm, the location of the pain was mostly in the lumbar area (80%), followed by the lumbosacral area (11.4%), and the sacrum area (8.6%). When the cervix was dilated 8–10 cm, the location of the pain was mostly in the lumbar region (74.2%), followed by the sacrum (14.3%), and the lumbosacral area (11.4%).

Regarding the type of low back pain, although some women thought what they felt was mainly a sensation of pain (37.14%), some women characterized the sensation as muscle soreness (8. 57%). For the majority of the women in labor, the sensation was "muscle soreness and pain" (54.29%). The pattern of low back pain was continuous in 45.71% of the subjects, and intermittent in 54.29% of the subjects (Table 2).

The Intensity of Low Back Pain in the Various Labor Stages

The pattern of low back pain changed over time, as depicted in Figure 2. In the latent phase of labor, the mean pain score was 36.66 ± 7.97. When the cervix was dilated to 5–7 cm (early active phase), the mean pain score was 48.60 ± 9.91. When the cervix was dilated 8-10 cm (late active phase), the mean pain score was 76.20 ± 11.02. The intensity of pain gradually increased over time, and low back pain intensified as labor progressed. It became worse as the active phase approached. The highest intensity of pain occurred in the third measurement phase (late active phase).

Table 2.
Type and Pattern of Low Back Pain During Labor (N = 70)

Characteristic	*n*	%
Type		
Pain	26	37.14
Muscle soreness	6	8.57
Muscle soreness and pain	38	54.29
Pattern		
Continuous	32	45.71
Intermittent	38	54.29

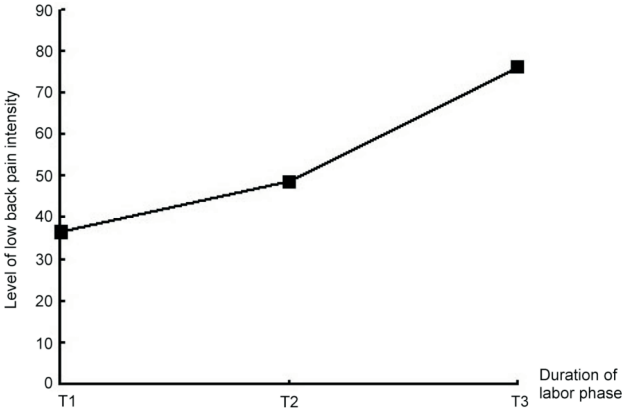

Figure 2. Overall change in intensity of low back pain over time. (T1 = time of latent phase [cervix dilated 2-4 cm]; T2 = time of early active phase [cervix dilated 5-7 cm]; T3 = time of late active phase [cervix dilated 8-10 cm]).

A one-way ANOVA repeated measures analysis of variance was calculated to test the significance of the differences between the self-reported scores of low back pain representing the three data collection timeframes (Table 3). The repeated measures analysis of variance demonstrated a statistically significant difference between the self-reported scores of pain for at least two of the data collection timeframes ($p < .001$).

Post hoc analyses were calculated using the Least Squares Differences (LSD) test. The post hoc analyses demonstrated that there were statistically significant differences in the self-reported pain between the latent phase, early active phase and the late active phase; the

Table 3.
Repeated Measures Analysis of Variance for Low Back Pain During Labor (N = 70)

Item	*M*	*SD*	*F*	*p*	Post hoc
①T1	36.66	7.97	199.57	< .001	③ > ② > ①
②T2	48.60	9.91			③ > ②
③T3	76.20	11.02			③ > ①

Note. T1 = time of latent phase [cervix dilated 2–4 cm]; T2 = time of early active phase [cervix dilated 5–7 cm]; T3 = time of late active phase [cervix dilated 8–10 cm].

Table 4.
Intervention Which Effectively Alleviated and the Situations Which Exacerbated Low Back Pain During Labor (N = 70)

Item	*n*	%	Rank
Intervention Which Effectively Alleviated Pain (multi-choice)			
Massage	62	65.3	1
Position changes	58	61.1	2
Application of heat	37	38.9	3
Relaxation and breathing	26	27.4	4
Others	7	7.4	5
Aggravating Situations (multi-choice)			
Progress of labor	56	80.0	1
Lying supine	52	74.3	2
Uterine contractions	50	71.4	3
Continuous fetal monitoring	29	41.4	4
Vaginal examinations	25	35.7	5
Rupturing of membranes	23	32.9	6
Massage	12	17.1	7
Application of heat	6	8.6	8
Others	2	2.9	9

early active and the late active phases, and the latent and late active phases ($p < .001$).

Effective Interventions and Exacerbating Situations

The interventions that effectively alleviated low back pain included: massage (65.3%), position changes (61.1%), application of heat (38.9%), relaxation and breathing (27.4%), and other maneuvers (7.4%). The situations which exacerbated low back pain included: progression of labor (80.0%), supine positioning (74.3%), uterine contractions (71.4%), continuous fetal monitoring (41.4%), vaginal examinations (35.7%), rupture of membranes (32.9%), massage (17.1%), application of heat (8.6%), and other maneuvers (2.9%; Table 4).

Factors Related to Low Back Pain During Labor

We further divided the participants into groups experiencing low back pain and those who had no low back pain, in order to examine the related factors. Table 5 shows the factors related to low back pain identified by multivariate analysis. The results indicated that women in labor who had greater body weight when hospitalized were most likely to be in the low back pain group (OR = 1.13; $p = .02$). In this sample, those who suffered from low back pain during pregnancy were more likely to be in the low back pain group (OR = 3.23; $p < .01$). The results of estimating the age, parity, worked during pregnancy, childbirth education, effect of body weight gained during pregnancy, length of labor, history of dysmenorrhea, and birthweight of the newborn were not statistically significant ($p > .05$).

Table 5.
Factors Related to Low Back Pain During Labor (N = 93)

Variables	Low back pain group		
	Odds ratio	95% CI	*p*-value
Age			
Parity	0.95	0.71–1.23	.85
Primiparas	0.89	0.75–1.29	.20
Multiparas (reference group)	1.00		
Worked during Pregnancy			
Yes	0.99	0.41–2.35	.97
No (reference group)	1.00		
Childbirth Education			
Yes	0.82	0.65–1.18	.81
No (reference group)	1.00		
Body Weight When Hospitalized	1.13	1.02–1.25	.02
Body Weight Gained during Pregnancy	1.61	0.91–2.83	.13
Length of labor (min)			
First stage	1.18	0.71–1.21	.33
Second stage	0.88	0.66–1.51	.76
Total stage	1.05	0.11–1.11	.32
History of Dysmenorrhea			
Yes	1.17	0.58–1.74	.28
No (reference group)	1.00		
History of Back Pain during Pregnancy			
Yes	3.23	1.12–9.10	< .01
No (reference group)	1.00		
Birth Weight of the Newborn	0.79	0.88–1.12	.26

Note. Binary logistic regression analysis using non-low back pain group as the reference category. CI = confidence interval.

Discussion

The incidence of low back pain in this study was consistent with previous studies, illustrating that there are high percentages of women in labor troubled by low back pain. (Bahassadri et al., 2006; Melzack & Schaffelberg, 1987). We also found that the anatomic location of low back pain changed in various stages of labor. This result was somewhat different from that in the study by Chang (1994), in which most of the pain was located in the waist and back, followed by the sacrum. These differences may be attributed to the use in the previous studies of retrospective collection of data, in which the subjects were asked to specify the position of pain on a body graphic chart, whereas in our study we asked the participants to ascertain the anatomic location of pain as labor progresses. Women in this study had a higher percentage (45.71%) of continuous low back pain than those (33%) in the study of Melzack and Schaffelberg (1987). Whether or not the difference was influenced by ethnicity needs to be examined further. Melzack and Schaffelberg (1987) deemed continuous low back pain to be severe, especially when combined with uterine contractions. Health care providers should notice women who suffer both abdominal and continuous low back pain.

The history of low back pain during pregnancy and body weight when hospitalized was found to be related to factors of low back pain and non low back pain groups. In pregnant women, the weight of the fetus easily pushes the back muscle forward and the shoulder backward, increas-

ing the curvature of the spine, causing compensation lordosis and back muscle tension. Besides that, estrogen and relaxin also cause pelvic ligament relaxation. Overweight, protracted standing and inappropriate posture all cause back pain during pregnancy easily (Kuan et al., 1995). In our research subjects, the weight when hospitalized in the low back pain group was significantly greater than in the non-low back pain group. According to Melzack, the weight of the woman in labor could affect her sensation of pain; the greater the weight, the more obvious was the sensation. It may be the weight which increases the burden on the waist (Melzack, 1984). Taking the weight (3200 g) of a newborn in Taiwan as an average, the suggested weight gain during pregnancy is 12 kg, but women in Taiwan are accustomed to taking nutritional supplements for their fetus. The adage, "What one person eats is beneficial for two," is a popular proverb, and pregnant women are encouraged to eat more. On the basis of the investigation of the Taiwan Society of Perinatology, more than 80% of pregnant women have a problem with being overweight. A further factor may be that most pregnant women in Taiwan don't engage in prenatal exercise, and failure to perform prenatal exercise, together with these other factors, would make the level of pain more serious. The significant association of low back pain between pregnancy and labor implies that the strain on back muscles during pregnancy may activate low back pain during labor. Nurses therefore should understand the effects of pregnancy on the musculoskeletal system, in addition to instructing pregnant women how to maintain correct posture in their daily life, to perform prenatal exercise, and how to maintain apropppriate weight (To & Wong, 2003). Furthermore, although the results of this study did not show the association between childbirth education and low back pain during labor, previous studies have found participation in childbirth education helpful in alleviating labor pain (Melzack, 1984). This difference probably arises from the low percentage, in our sample, of women participating in childbirth education. It is possible that childbirth education focuses on attenuating the pain of abdominal contractions, rather than back pain (Melzack & Schaffelberg, 1987). We recommend that pregnant women be encouraged to participate in a childbirth education program, whose curriculum should include information on how to avoid or alleviate low back pain.

Our results showed that massage, changing positions, the application of heat, and relaxation with breathing techniques were helpful in soothing low back pain, especially massage. The efficacy of massage in relieving labor pain has also been shown by others (Chang, Chen, & Huang, 2006; Chang, Wang, & Chen, 2002; Simkin & Bolding, 2004). Our study, however, also showed that there were a few women who experienced an exacerbation of their back pain following massage or the application of hot packs. The research of Lee and Kuo (1998) found that some women in labor do not like to be touched during the active labor phase and consider massage to be excessively stimulating. The study by Richardson (1979) also showed that, in order to maintain the integrity of body boundaries, women in labor would refuse unnecessary stimulation from outside, especially when the uterus is in contraction. Besides that, Chen and Chang noted that everybody has different responses to being touched; some people regard touch positively and some do not (Chen & Chang, 2000). To those who regard touch negatively, touch is useless in terms of pain relief. It is recommended that health care providers assess the needs and feelings of women in labor before they use massage or hot packing, in order to avoid increasing the burden of discomfort.

Relaxation and breathing are well known as effective methods for controlling labor pain (Varney, 2004). Only 27.4% women in labor in this study, however, chose this as an effective way to relieve low back pain. Some women felt relaxation and breathing to be effective for low back pain also, maybe because low back pain is also affected by uterine contraction. It's worth mentioning that the lower rate of effectiveness for relaxation and breathing on low back pain might confirm that low back pain and abdominal pain are two distinct pain sensations for many women in labor.

Regarding the factors which aggravated low back pain in labor, progression of labor was the most important. More than half of the women in this study had their pain aggravated by the pace of uterine contractions. Obviously, when taking care of women in labor, health care providers should be aware that low back pain intensifies during contractions and care is indispensable at that time. Continuous fetal monitoring and vaginal examinations made low back pain worse in 41.4% and 35.7% of women, respectively. Continuous fetal monitoring was one of the situations which made women in labor lie in bed for long periods of time (Wu, 2003); lying supine was also one of the factors which aggravated low back pain. Melzack, Belanger, and Lacroix (1991) found that if the laboring woman assumed a

vertical rather than a horizontal posture, back pain would be reduced by 50%. Such a position change improved continuous low back pain and abdominal contractions significantly. In the early stages of labor, health care providers should encourage women in labor to change their positions in bed and ambulate whenever possible. This may not only reduce the back pressure from lying too long, but also promote contractions and the descent of the fetus by way of gravity (Nicols & Zwelling, 1997).

Although vaginal examination is necessary for assessing the progression of labor, it is an invasive technique. Some research has shown that this technique often makes women feel uncomfortable (Ying & Levy, 2002). Reducing unnecessary examinations, being careful and tender in the process of check-ups, appropriate preparation, and support before and after the examination are needed. Nearly one third of participants felt that rupture of membrane could aggravate low back pain, it maybe related to the descending and the internal rotation of fetus were accelerated and increase the pressure of sacral nerve. It might also be affected by the increased intensity of uterine contraction after rupture of membrane (Nicols & Zwelling, 1997).

On the basis of these results, the applications for nursing are as follows:

1. It is necessary to include low back pain in the nursing assessment when women are admitted for laboring. Because low back pain could be intensified by the progress of labor, pain-relief intervention should be undertaken as early as possible.
2. Low back pain during pregnancy was significantly correlated to low back pain during labor. Nurses should reinforce prenatal education on how to prevent or alleviate low back pain and maintain aproppriate weight.
3. A majority of women in labor feel position changes could effectively alleviate low back pain and that lying supine can reduce such pain. Nurses should pay attention to the relationship between low back pain and posture during labor. Other than to assist women in labor in performing off-bed activities, nurses should also encourage them to take vertical positions (such as sitting posture) which could alleviate back pressure.
4. Although most women in labor consider massage to be an effective nursing intervention in low back pain, a few think massage could make it even worse. While performining this intervention, therefore, nurses should note the reaction of the women in labor in order to provide individualized nursing care.
5. This research revealed low back pain to be a symptom of discomfort that has bothered many women in labor. It is necessary to develop effective nursing interventions to manage it. The results of this study might be used as a reference for future study on intervention.
6. Our study has shown that some interventions and situations will alleviate lower back pain in women in labor, and some will exacerbate it. Nurses should assess women in labor carefully and avoid those factors that can worsen the symptoms, and also endeavor to develop effective ways to reduce the negative effects of low back pain in women in labor.

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References

Bahasadri, S., Ahmadi-Abhari, S., Dehghani-Nik, M., & Habibi, G. R. (2006). Subcutaneous sterile water injection for labour pain: A randomized controlled trial. *American and New Zealand Journal of Obstetrics and Gynaecology, 46*(2), 102–106.

Benfield, R. D., Herman, J., Katz, V. L., Wilson, S. P., & Davis, J. M. (2001). Hydrotherapy in labor. *Research in Nursing & Health, 24*(1), 57–67.

Chang, M. Y., Chen, C. H., & Huang, K. F. (2006). A comparison of massage effects on labor pain using the McGill pain questionnaire. *The Journal of Nursing Research, 14*(3), 190–197.

Chang, M. Y., Wang, S. Y., & Chen, C. H. (2002). Effects of massage on pain and anxiety during labour: A randomized controlled trial in Taiwan. *Journal of Advanced Nursing, 38*(1), 68–73.

Chang, Y. (1994). An analysis and exploration of labor pain. *Public Health Quarterly, 21*(2), 128–142. (In Chinese.)

Chen, C. H., & Chang, M. Y. (2000). The application of touch therapy during labor: An old method newly applied. *The Journal of Nursing, 47*(3), 28–32. (In Chinese.)

Chiu, I. W. (2008). The methods and considerations of sampling. In S. Lee (Ed.), *Nursing research: Principles and practice* (3rd ed., pp. 120–124). Taipei: Farseeing. (In Chinese.)

Cline, M. E., Herman, J., Shaw, E. R., & Morton, R. D. (1992). Standardization of the visual analogue scale. *Nursing Research, 41*(6), 378–380.

Cunningham, F. G., Gant, N. F., Leveno, K. J., Gilstrap, L. C., Hauth, J. C., & Wenstrom, K. D. (2005). *Williams Obstetrics* (22nd ed.). New York: McGraw-Hill.

Fast, A., Shapiro, D., Ducommun, E. J., Friedmann, L. W., Bouklas, T., & Floman, Y. (1987). Low-back pain in pregnancy. *Spine, 12*(4), 368–371.

Gift, A. (1989). Visual analogue scales: Measurement of subjective phenomena. *Nursing Research, 38*(5), 286–288.

Hasson, D., & Arnetz, B. B. (2005). Validation and findings comparing VAS vs. Likert scales for psychosocial measurements. *International Electronic Journal of Health Education, 8*, 178–192.

Kuan, T. S., Kuo, T. C., Kuo, K. C., & Hsueh, T. C. (1995). Low back pain in Chinese pregnancy women. *Journal of Rehabilitation Medicine Association, 23*(2), 117–122. (In Chinese.)

Labrecque, M., Nouwen, A., Bergeron, M., & Rancourt, J. A. (1999). A randomized controlled trial of nonpharmacologic approaches for relief of low back pain during labor. *The Journal of Family Practice, 48*(4), 259–263.

Lederman, R. P., Lederman, E., Work, B. A., & McCann, D. S. (1985). Anxiety and epinephrine in multiparous women in labor: Relationship to duration of labor and fetal heart rate pattern. *American Journal of Obstetrics and Gynecology, 153*(8), 870–877.

Lee, L. J., & Kuo, B. J. (1998). The analysis of labor pain in primigravida and the effectiveness of related nursing intervention. *Chung Shan Medical Journal, 9*(1), 65–74. (In Chinese.)

Mårtensson, L., & Wallin, G. (1999). Labour pain treated with cutaneous injections of sterile water: A randomised controlled trial. *British Journal of Obstetrics and Gynaecology, 106*(7), 633–637.

Mårtensson, L., McSwiggin, M., & Mercer, J. S. (2008). US midwives' knowledge and use of sterile water injection for labor pain. *Journal of Midwifery & Women's Health, 53*(2), 115–122.

Melzack, R. (1984). The myth of painless childbirth. *Pain, 19*(4), 321–337.

Melzack, R. (2005). The McGill pain questionnaire: From description to measurement. *Anesthesiology, 103*(1), 199–202.

Melzack, R., & Belanger, E. (1989). Labor pain: Correlations with menstrual pain and acute low-back pain before and during pregnancy. *Pain, 36*(2), 225–229.

Melzack, R., Belanger, E., & Lacroix, R. (1991). Labor pain: Effect of maternal position on front and back pain. *Journal of Pain and Symptom Management, 6*(8), 476–480.

Melzack, R., & Schaffelberg, D. (1987). Low-back pain during labor. *American Journal of Obstetrics and Gynecology, 156*(4), 901–905.

Nicols, F. H., & Zwelling, E. (1997). *Maternal-newborn nursing: Theory and practice.* Philadelphia: W. B. Sauders.

Ostgaard, H. C., Andersson, G. B. J., & Karlsson, K. (1991). Prevalence of back pain in pregnancy. *Spine, 16*(5), 549–552.

Richardson, P. (1979). Approach and avoidance behavior by women in labor toward others. *Maternal Child Nursing Journal, 8*(1), 1–21.

Simkin, P., & Bolding, A. (2004). Update on nonpharmacologic approaches to relieve labor pain and prevent suffering. *Journal of Midwifery & Women's Health, 49*(6), 489–504.

Smith, C. A., Collins, C. T., Cyna, A. M., & Crowther, C. A. (2006). Complementary and alternative therapies for pain management in labor. *Cochrane Database of Systematic Reviews, 18*(4), CD003521.

To, W. W. K., & Wong, M. W. N. (2003). Factors associated with back pain symptoms in pregnancy and the persistence of pain two years after pregnancy. *Acta Obstetricia et Gynecologica Scandinavica, 82*(12), 1086–1091.

Varney, H. (2004). *Varney's midwidery* (4th ed.). Sudbury, MA: Jones and Bartlett Publishers.

Wu, Y. M. (2003). *The experience and coping behavior of women during the course of labor to the use of the electronic fetal monitor.* Unpublished master's thesis, National Taiwan University, Taipei, ROC. (In Chinese.)

Ying, L. C., & Levy, V. (2002). Hong Kong Chinese women's experiences of vaginal examinations in labour. *Midwifery, 18*(4), 296–303.

待產時下背痛及其相關因素

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摘　要： 臨床上雖有相當比例的待產婦受下背痛之苦，卻僅有少數的西方文獻探討這個問題。因此本研究的目的為：(1)描述待產時下背痛的特徵，包括發生率、部位、類型、型態、強度變化趨勢、有效措施及使其惡化的因素，(2)確認影響待產時下背痛之相關因素。採前瞻、相關性重覆量測設計，於中部某醫學中心產房進行研究，共收集 93 位低危險性產婦的資料。於潛伏期（子宮頸口開 2–4 公分)、活動期早期（子宮頸口開 5–7 公分）、以及活動期晚期（子宮頸口開 8–10 公分）重覆測量下背痛的強度。所收集之資料以描述性統計、重覆量測 ANOVA，以及邏輯式迴歸加以分析。結果顯示，有高達 75.3% 的研究對象待產過程有下背痛，疼痛於不同階段的平均值介於 36.66–76.20 之間。下背痛的強度隨著產程進展而加重，疼痛部位也隨時間改變。有 54.29% 的待產婦下背痛的類型為酸痛，45.71% 的產婦屬持續性疼痛，65.3% 的待產婦認為按摩是最能減輕下背痛的方法。懷孕期間有下背痛（OR = 3.23; $p < .01$）及入院時體重較重（OR = 1.13; $p = .02$）的婦女，於待產時亦較容易發生下背痛。依據本研究的結果，待產時下背痛的強度易隨產程進展而加劇，因此及早預防是有必要的，尤其是孕期有下背痛及入院時體重較重的產婦。

關鍵詞： 生產、下背痛、重覆量測。

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