

# BACK AND PELVIC PAIN IN AN UNDERSERVED UNITED STATES PREGNANT POPULATION: A PRELIMINARY DESCRIPTIVE SURVEY

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## ABSTRACT

**Objective:** The objective of this study was to identify the prevalence of back pain and treatment satisfaction in a population of low-socioeconomic pregnant women.

**Methods:** This study used a cross-sectional design to determine the prevalence of self-reported musculoskeletal pain in pregnancy for 599 women. Women completed an author-generated musculoskeletal survey in the second trimester of their pregnancy that addressed pain history, duration, location, and intensity, as well as activities of daily living, treatment frequency, and satisfaction with treatment.

**Results:** Sixty-seven percent of the total population reported musculoskeletal pain, and nearly half presented with a multi-focal pattern of pain that involved 2 or more sites. Twenty-one percent reported severe pain intensity rated on a numerical rating scale. Eighty percent of women experiencing pain slept less than 4 hours per night and 75% of these women took pain medications. Importantly, 85% of the women surveyed perceived that they had not been offered treatment for their musculoskeletal disorders.

**Conclusion:** Multi-focal musculoskeletal pain in pregnancy was prevalent in this underserved patient population. The pain in this population negatively affected sleep and treatment appeared inadequate. (*J Manipulative Physiol Ther* 2007;30:130-134)

**Key Indexing terms:** *Low Back Pain; Pelvic Pain; Pregnancy; Obstetrics; Quality of Life; Interdisciplinary Communication*

**L**ow back pain (LBP) in the general population is recognized as a major health concern, and left untreated, this malady can lead to chronic, disabling

morbidity.<sup>1,2</sup> Accordingly, chronic pain is a major health care expense in the United States, and LBP is responsible for the majority of chronic musculoskeletal pain.<sup>3</sup> Low back pain and pelvic pain (PP) in pregnancy, however, are frequently viewed as transient conditions that are anticipated to subside after childbirth. In fact, recent studies have identified that women who do have LBP/PP during pregnancy receive little recommendations and/or treatment for their complaints.<sup>4,5</sup> Although the prevalence of LBP/PP during pregnancy in the United States is unclear, reports from populations in other countries imply that the condition is prevalent and has a negative effect on quality of life.<sup>6-8</sup> Importantly, women who have been pregnant have the highest incidence of chronic LBP after pregnancy, and up to 40% of pregnant women continue to experience pain 18 months postpartum.<sup>9,10</sup> Therefore, LBP/PP in pregnancy, although largely ignored, may contribute to a substantial level of morbidity and cost in pregnant women and, particularly, women postpartum.

Studies from Scandinavia suggest that morbidity associated with pregnancy is a major expense for society.<sup>7</sup> For example, 1 in 5 pregnant women in Scandinavia is on sick leave for back pain during or after pregnancy. The average sick leave for these women is 7 weeks, a duration added to the

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1. Do you have low back pain now? Yes No
2. Do you have pain between the shoulders now? Yes No
3. Do you have pubic or groin (pelvic bone pain) pain? Yes No
4. Did you have low back pain before becoming pregnant for the first time? Yes No
5. Did you have low back pain with any previous pregnancy? not pregnant before Yes No
6. How physically demanding have your jobs been in the past?  
(Not demanding) 0 1 2 3 4 5 6 7 8 9 10 (very demanding)
7. Please indicate your usual level of pain during the past week?  
(None) 0 1 2 3 4 5 6 7 8 9 10 (bad pain)
8. Please indicate your level of pain now. (None) 0 1 2 3 4 5 6 7 8 9 10 (bad pain)
9. How long did your current episode of pain begin?
  - Less than one week ago
  - Less than two weeks ago
  - 2 weeks to 8 weeks ago
  - 8 weeks to < 3 months ago
  - 3 months < 6 months ago
  - 6 months ago
10. During the last week, how often have you taken pain relievers (such as aspirin, tylenol, motrin, or prescription medication) for control of your pain? Never 1 2 3 4 or more times
11. How many hours of sleep do you get at night?  
Not at all 1 2 3 4 5 6 7 8 9 10 all night
12. Have you had treatment for your low back/leg pain – neck pain/arm pain – pubic/groin pain?  
Yes No
13. If you had treatment, how satisfied are you with the treatment for your low back/leg pain – neck/arm pain – pubic/groin pain? (circle all that apply)  
(not satisfied) 1 2 3 4 5 6 7 8 9 10 (very satisfied) (not applicable)

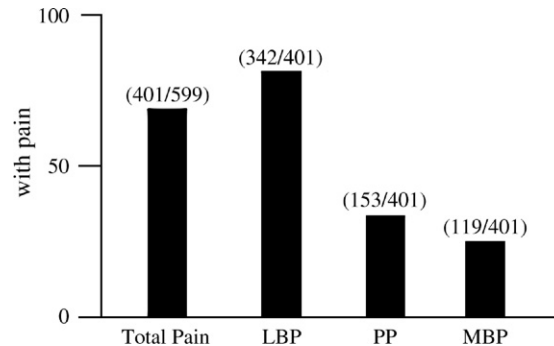
**Fig 1.** Questionnaire used in this study.

normal pregnancy leave. Surprisingly, sick leave for LBP/PP surrounding pregnancy is the single largest social health care expense in Scandinavia.<sup>7</sup> Certainly, complicating factors during pregnancy and child rearing could have extensive and vital effects on women at important time points in their life.

We aim to identify and classify back pain surrounding pregnancy in an underserved patient population and hypothesize that back pain during pregnancy has negative effects on quality of life. We performed an analysis of collected data on a population of pregnant women attending a multidisciplinary clinic at Barnes-Jewish Hospital in the Washington University Medical Center in St Louis, Mo. The objectives of this study were to (1) identify the prevalence of back pain, (2) classify the locations of the pain, and (3) evaluate patient perception of care and satisfaction with treatment.

## METHODS

The protocol was approved by the Institutional Review Board of Washington University School of Medicine and was compliant with Health Insurance Portability and Accountability Act rules. This study used a cross-sectional design to determine the prevalence of self-reported back pain, the intensity and location of pain, the treatment modalities used, and the level of patient satisfaction with treatment. Participants in this study were recruited at the Women’s Wellness Center of Barnes-Jewish Hospital and the Washington University School of Medicine in St Louis, Mo. This clinic is staffed by faculty in the Department of



**Fig 2.** Prevalence and location of pain reported on musculoskeletal questionnaire.

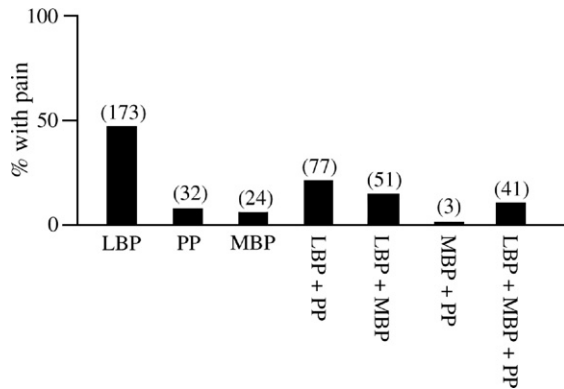
Obstetrics and Gynecology and serves predominantly an uninsured, underinsured or Medicaid-insured population that delivers at Barnes-Jewish Hospital. The Women’s Wellness Center includes the following: low-risk pregnancies, high-risk pregnancies, the Center for Diabetes in Pregnancy, the Teen Pregnancy Center, and the Musculoskeletal Pain in Pregnancy Center. Certified nurse midwives, nurse practitioners, and residents in obstetrics and gynecology provide care at all clinics. Attending physicians from the Washington University Department of Obstetrics and Gynecology staff all clinics. Chiropractic physicians, chiropractic residents, and chiropractic interns staff the Musculoskeletal Pain in Pregnancy Center. Coordinating staff for this center includes obstetrical practitioners, physiatrists, nurses, and nurse assistants.

Surveys were offered to all obstetrical patients in the Women’s Wellness Center. The average week of gestation was 22. As part of routine obstetrical care, women completed a screening questionnaire containing information on general medical health and a targeted questionnaire about the patient’s back problems (Fig 1). The questionnaire was designed to collect information about pregnancy-related pain and quality-of-life issues.

Pain intensity was assessed by the Numerical Rating Scale, with a score of greater than 8 considered severe. A critical measure of quality of life is sleep, and we defined sleep problems as sleep duration of less than 4 hours per night.<sup>11,12</sup> The admitting receptionist collected the questionnaires. Using Excel software (Microsoft Inc, Redmond, Wash), a research physician entered information into a de-identified database. The analysis was unadjusted for covariates, and frequencies were compared by  $\chi^2$  analysis using  $\alpha = .05$  for significance. For inference, 95% confidence intervals were computed using normal approximation methods. For dependent frequencies, McNemar’s test for agreement was used.

## RESULTS

Ninety percent (599/666) of the women enrolled during a 15-month interval complied with the request to complete the



**Fig 3.** Prevalence of musculoskeletal pain by anatomical location.

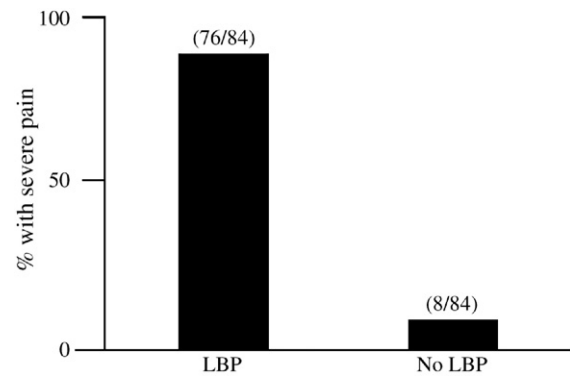
back pain survey. The 67 women not completing the survey gave the following as reasons for nonparticipation: not interested, 48; no time, 16; other, 3. Completed surveys (n = 599) were entered into the database. The average age of patients was 22.7 years (SD, 4.5). The average weight of the women was 177.4 lb (SD, 56.7). The average period of gestation was 17.1 weeks. The sample group had racial self-identifications of 70% African American, 20% white, 6% Bosnian, 3% Hispanic, and 1% other.

We found that two thirds of the population reported back pain. The women identified pain at 3 sites: LBP, PP, and mid-back pain (MBP) (Fig 2). Although LBP was reported in a majority of women complaining of musculoskeletal pain, the data indicate that nearly half of the women presented with a multi-focal pattern of pain involving 2 or more sites: 1 in 3 of the women reported pain at 2 sites and 1 in 10 reported pain at all 3 sites. Figure 3 illustrates the back pain data by anatomical location. Only a small fraction of cases involved PP or MBP alone, yet these areas were frequently sites of pain in combination with LBP.

Low back pain produced the largest number of severe pain cases, whereas MBP alone was never reported to be severe. However, in combination with other sites, MBP and PP were components of the multi-focal pain complex reported as severe. Low back pain alone or in combination with other sites was the major source of severe pain; 90% of the reports of severe pain involved LBP (Fig 4). Indeed, we found a significant relationship between the number of pain sites and pain severity ( $P < .01$ ).

Sleep is a quality of life measurement that can affect many other activities of daily living. Sleep disturbance was frequently associated with back pain; the test for this association was significant ( $P < .01$ ). Sleep problems were reported in 37% (CI, 32.8-41.2) of respondents. Importantly, 80% (CI, 74.7-85.3) of women reporting sleep disturbances had back pain, whereas only 8% (CI, 4.8-11.2) of women without pain reported any problems sleeping.

Because pain often leads to medication use, we asked the women if they were taking pain medication. We found a significant relationship ( $P < .05$ ) between reports of



**Fig 4.** Percentage of reported severe pain (numerical rating scale >8) for women with and without LBP.

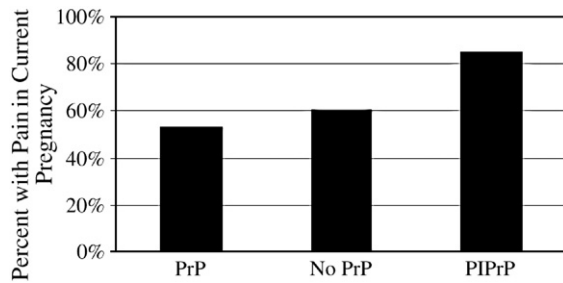
musculoskeletal pain and the amount of pain medication use. Of women reporting use of pain medication, 75% (CI, 69.2-80.8) had back pain. Taken together, nearly 3 of 4 women with sleep disturbance, pain medication use, or both had back pain.

We next determined whether there was a relationship between pain in a previous pregnancy and pain in the current pregnancy. Of the respondents surveyed, 60% (CI, 55.3-64.7) reported back pain in their first pregnancy. In women who reported a previous pregnancy, 53% (CI, 48.2-57.8) reported pain in the current pregnancy. However, 85% (CI, 80.6-89.4) of women who reported pain in a previous pregnancy reported pain in the current pregnancy; the test for this association was significant using McNemar's test of agreement ( $P < .0001$ ; Fig 5).

Based on the high prevalence of back pain that we observed during pregnancy, questions arose about the effectiveness of the treatment provided. Surprisingly, 85% (CI, 81.9-88.1) of women reported they had not received any treatment for their pain. Of the 15% (CI, 11.5-18.5) who perceived that their back complaints were addressed, less than 10% of these, or 1% of the 401 women with pain, were satisfied with the symptom relief they obtained.

## DISCUSSION

The data show a high proportion of patients in an underserved population of pregnant women experience back pain. Although LBP is the most common source of pain, PP and MBP frequently contributed as symptoms. Multi-focal pain related to reports of severe pain. The pain experienced predisposed those patients to sleep disturbances, 1 measure of quality of life. Pain reports were correlated with frequent use of analgesic medications. The data also indicate that pain in a previous pregnancy predicts a high risk for back complaints in future pregnancies. Despite the high prevalence of musculoskeletal symptoms, few patients had received treatment during standard obstetrical care and even less were satisfied with the treatment received.



**Fig 5.** Percentage of reported musculoskeletal pain in current pregnancy for women with a previous pregnancy, without previous pregnancy and with musculoskeletal pain in a previous pregnancy. PrP indicates previous pregnancy; PIPrP, pain in previous pregnancy.

This study examined pregnant women using an author-generated survey to gather patient perception on their back pain and treatment. Because this survey has not been studied in previous populations of pregnant women, it cannot be assumed as reliable. In addition, the women did not clearly indicate whether they had expressed their pain to their obstetric practitioners before completing their back pain survey. This could be seen as a limitation; however, they were questioned on average after their third obstetric visit. The survey did not include other areas of musculoskeletal pain such as neck pain or wrist pain either. These other areas of musculoskeletal pain could have individual significance in this population and/or could have overlapping influence on back pain reports. Lastly, the type of medication was not identified as over-the-counter or prescription; therefore, the use of medication is not clear. Nevertheless, such a high percentage of medication use in a pregnant population is somewhat alarming.

Previous studies suggest that LBP/PP may be frequently encountered in pregnancy, although these studies have largely involved populations outside the United States.<sup>6,8,13</sup> These studies involved populations of women from mixed socioeconomic backgrounds and older age groups than in our study, yet the prevalence rates for LBP are similar. Ostgaard et al<sup>6</sup> and Kristiansson et al<sup>13</sup> determined that previous pregnancy (regardless of pain history) predisposed women to experience back pain in the current pregnancy. Our results indicate that previous pregnancy does not increase risk of experiencing pain during the current pregnancy overall. However, patients who had pain in a previous pregnancy had a high rate of pain in the current pregnancy. Fully, 85% of women who experienced pain in a previous pregnancy reported pain in our survey. This is in agreement with the distinction made on risk factors related to pain in pregnancy by Orvieto et al<sup>14</sup> and Wu et al<sup>15</sup>.

Previous studies have identified that the most frequent locations for pain in a population of women with PP in pregnancy were at bilateral sacro-iliac joints, pubic symphysis, coccyx, and groin, whereas the highest intensity of pain was in the lower back and sacro-iliac joints.<sup>6,16</sup>

Consistent with our findings, these populations with multi-focal pain have more severe pain and, thus, more disability.<sup>13,17</sup> Taken together, our results are consistent with a model where the low back is a primary site of pain generation, and where the pelvis and mid back increase the pain severity.

Poor sleep has been shown to be associated with back pain and to negatively impact quality of life.<sup>11,12,18</sup> As pregnant women experience changes in shape and size of the body, it is a common notion that the pregnancy experience involves pain and difficulty with sleeping. However, structural changes with weight gain and spine posture during pregnancy do not parallel pain occurrence or intensity.<sup>14,19,20</sup> Accordingly, few of the women in the study reported sleep problems in the absence of back pain. With women who experienced back pain, sleep disturbance was commonplace. Therefore, in our population of gravid women, we saw a direct association between sleep deficiency and back pain. We speculate that such disruption in life quality, left untreated, may become a chronic pain issue.

Altered pain medication use is recognized as a clinical outcome measure for nonpregnant patients with chronic LBP.<sup>21</sup> There are implicit concerns on the use and overuse of pain medications, and particularly in pregnant populations.<sup>22-24</sup> Thus, although the type of medication was not identified in this study, the fact that three fourths of the women who reported pain also described use of pain medication suggests increased risk of morbidity for these women. These results raise the question of whether or not the high incidence of pain medication use reflects a lack of education about potential risks of medications or more an inability for the pregnant woman to cope with the pain.

What can be done to effectively treat back pain in pregnancy and, thereby, to enhance the coping skills in pregnant women who experience pain? We suggest that substantial improvements in the well being of pregnant patients might result from programs that proactively address back problems experienced by these women. Accordingly, obstetrical care might include early back pain screening to identify risk factors, such as previous pain in pregnancy, multi-focal pain, or severe pain. Such self-reporting of risk factors for back pain would be a proactive step to allow early education and/or treatment to reduce the risk for pain in the current pregnancy.

## CONCLUSION

Our findings highlight the prevalence and complexity of back pain in pregnancy, and, notably, in a population in the United States. Importantly, we have identified that pregnancy-related pain is related to sleep disturbance and this may influence the patient's quality of life. In addition, at least within this population, little care was offered, and the

care provided was not satisfactory. Taken together with the current understanding of chronic musculoskeletal pain and that no other population has more chronic LBP than women who have been pregnant, back pain in pregnancy can no longer be considered normal. We feel this study raises serious consideration for determining strategies and treatments to alter back pain in pregnancy.

#### Practical Applications

- There appears to be a high prevalence of musculoskeletal pain in pregnancy.
- Multi-focal pain in pregnancy leads to greater pain severity.
- Previous pain in pregnancy is a high-risk factor for future pain in pregnancy.
- The care that is offered for musculoskeletal pain in pregnancy needs to be expanded.

#### REFERENCES

1. Borenstein D. Epidemiology, etiology, diagnostic evaluation and treatment of low back pain. *Curr Opin Rheumatol* 1996;8:124-33.
2. Croft PR, Macfarlane GH, Papageorgious AC, Thomas E, Silman AJ. Outcome of low back pain in a general practice: a prospective study. *BMJ* 1998;316:1356-9.
3. Hart LG, Deyo RA, Cherkin DC. Physicians office visits for low back pain. Frequency, clinical evaluation, and treatment patterns from a U.S. survey. *Spine* 1995;20:11-20.
4. Wang SM, Dezinno P, Maranets I, Berman MR, Caldwell-Andrews AA, Kain ZN. Low back pain during pregnancy: prevalence, risk factors and outcomes. *Obstet Gynecol* 2004;104:65-70.
5. DeJoseph JF, Cragin L. Biomedical and feminist perspectives on low back pain during pregnancy. *Nurs Clin North Am* 1998;33:713-24.
6. Ostgaard HC, Andersson GBJ, Karlsson K. Prevalence of back pain in pregnancy. *Spine* 1991;16:549-51.
7. Noren L, Ostgaard S, Nielsen TF, Ostgaard HC. Reduction of sick leave for lumbar back and posterior pelvic pain in pregnancy. *Spine* 1997;22:2157-60.
8. Stapleton DB, MacLennan AH, Kristiansson P. The prevalence of recalled low back pain during and after pregnancy: a south Australian population survey. *Aust N Z J Obstet Gynaecol* 2002;42:482-5.
9. Harreby M, Kjer M, Hesselsoe G, Neergaard K. Epidemiological aspects and risk factors for low back pain in 38-year-old men and women: a 25-year prospective cohort study of 640 school children. *Eur Spine J* 1996;5:312-8.
10. Brynhildsen J, Hansson A, Persson A, Hammard M. Follow-up of patients with low back pain during pregnancy. *Obstet Gynecol* 1998;91:182-6.
11. Schochat T, Raspe H. Elements of fibromyalgia in an open population. *Rheumatology* 2003;42:829-35.
12. Spiegel K, Leproult R, Van Cauter E. Impact of sleep debt on physiological rhythms. *Rev Neurol* 2003;159:11-20.
13. Kristiansson P, Svarsudd K, Von Schoultz B. Back pain during pregnancy: a prospective study. *Spine* 1996;21:702-9.
14. Orvieto R, Achiron A, Ben-Rafael Z, Gelernter I, Achiron R. Low back pain of pregnancy. *Acta Obstet Gynecol Scand* 1994;73:209-14.
15. Wu WH, Meijer OG, Uegaki K, Mens JM, van Dieen JH, Wuisman PI, et al. Pregnancy-related pelvic girdle pain (PPP): I. Terminology, clinical presentation, and prevalence. *Eur Spine J* 2004;13:575-89.
16. Mens JMA, Vleeming A, Stoeckart R, Stam HJ, Snijders CJ. Understanding peripartum pelvic pain: implications of a patient survey. *Spine* 1996;21:1363-70.
17. Albert H, Godskesen M, Westergaard J. Prognosis in four syndromes of pregnancy-related pelvic pain. *Acta Obstet Gynecol Scand* 2001;80:505-10.
18. Lentz MJ, Landis CA, Rothermel J, Shaver JL. Effects of selective slow wave sleep disruption on musculoskeletal pain and fatigue in middle aged women. *J Rheumatol* 1999; 26:1586-92.
19. Bullock JE, Jull GA, Bullock MI. The relationship of low back pain to postural changes during pregnancy. *Aus J Physiother* 1987;33:10-7.
20. Fast A, Shapiro D, Ducommun EJ, Friedmann LW, Bouklas T, Floman Y. Low back pain in pregnancy. *Spine* 1987;11:368-71.
21. Andersson GBJ, Lucente T, Davis AM, Kappler RE, Lipton JA, Leurgans S. A comparison of osteopathic spinal manipulation with standard care for patients with low back pain. *N Engl J Med* 1999;341:1426-31.
22. Li DK, Liu L, Odouli R. Exposure to non-steroidal anti-inflammatory drugs during pregnancy and risk of miscarriage: population based cohort study. *BMJ* 2003;327:368-72.
23. Jansen NM, Genta MS. The effects of immunosuppressive and anti-inflammatory medications on fertility, pregnancy and lactation. *Arch Intern Med* 2000;160:610-9.
24. Gabbe SG, Neibyl JR, Simpson JL. *Obstetrics: normal and problem pregnancies*. 2nd ed. New York: Churchill Livingstone; 1991.