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ARTICLE**

**Alparslan Yetisgin<sup>1</sup>**  
**Abdulhalik Cinakli<sup>1,2</sup>**  
**Nergiz Arpa<sup>1</sup>**  
**Mahmut Kul<sup>1,3</sup>**  
**Serap Satis<sup>1</sup>**

<sup>1</sup>Harran University Faculty of Medicine, Department of Physical Medicine and Rehabilitation, Sanliurfa, Turkey.  
<sup>2</sup>Sanliurfa Training and Research Hospital, Department of Physical Medicine and Rehabilitation, Sanliurfa, Turkey.  
<sup>3</sup>Bartın State Hospital, Department of Physical Medicine and Rehabilitation, Bartın, Turkey.

**Corresponding Author:**  
 Alparslan Yetisgin  
 Harran University Medical School  
 Department of Physical Medicine and Rehabilitation,  
 Osmanbey Kampusu, 63290,  
 Sanliurfa, Turkey  
 Tel: +90 5056354567  
 E-mail: dra\_yetisgin@yahoo.com

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 konuralptipdergi@duzce.edu.tr  
 konuralptipdergisi@gmail.com  
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## Risk Factors for Pregnancy Related Low Back Pain

### ABSTRACT

**Objective:** The mean incidence of back pain in pregnant women very often as compared to non-pregnant women of the same ages. In this study, we aimed to investigate the frequency of low back pain during pregnancy in newly delivered mothers who had no predisposing factors for low back pain.

**Methods:** 83 newly delivered women were included for the study who are having a normal pregnancy, no history of back/low back/hip pain requiring hospital admission or medication, no history of hospital admission during pregnancy except for the last delivery, being a housewife, and delivering a single baby at term. A questionnaire including demographic and clinical characteristics were applied to participants.

**Results:** 51.8% of all mothers declared experiencing pain in at least one of the anatomical regions including back, low back, hip, and posterior pelvic area during the last pregnancy. No significant difference was determined between pain and no pain group in term of age, pre-pregnancy and prenatal body weights/body mass index, weight gain during pregnancy, number of pregnancy, age of marriage/first live birth, delivery mode. Neonatal height was significantly greater in the mothers with pain compared to the mothers with no pain, although no significant difference was found with regard to neonatal weight and gender. A very significant relationship was found between the presence of pain during a previous pregnancy and during the last pregnancy.

**Conclusions:** Pregnancy-related low back pain is a common health problem among pregnant women, even in women with no history of predisposing factors for low back pain.

**Keywords:** Pregnancy, Low Back Pain, Hip Pain.

## Gebelikle İlişkili Bel Ağrısında Risk Faktörleri

### ÖZET

**Amaç:** Gebelerde bel ağrısının aynı yaştaki kadınlarla karşılaştırıldığında çok daha sık olduğu gösterilmiştir. Bu çalışmada özgeçmişinde bel ağrısına yol açabilecek özellik olmayan yeni doğum yapmış annelerde gebelikleri boyunca bel ağrısı olup olmadığının incelenmesi amaçlanmıştır.

**Gereç ve Yöntem:** Özgeçmişinde doktora gidecek veya ilaç kullanacak düzeyde hiç sırt/bel/kalça ağrısı olmayan, normal yollardan gebe kalıp zamanında sağlıklı tek bebek doğuran, gebeliği boyunca doğum hariç hastaneye yatışı olmayan ev hanımı 83 yeni doğum yapmış anne seçildi. Katılımcılara demografik ve klinik özellikleri içeren bir anket uygulandı.

**Bulgular:** Annelerin %51.8'i bu gebelikleri boyunca sırt/bel/kalça-posterior pelvik bölgelerinden en azından birisinde ağrı tarif ederken, %48.2'sinin ağrısı olmamış. Ağrılı ve ağrısız grup arasında yaş, gebelik ve doğum öncesi ağırlıklar/vücut kitle indeksi, gebelikte alınan ağırlık, gebelik sayısı, evlilik ve ilk canlı doğum yaşı, doğum şekli arasında anlamlı fark bulunmadı. Ağrılı grubun yenidoğan bebeğinin boyu, ağrısız gruba göre yüksek iken, bebek ağırlığı veya cinsiyeti açısından fark yoktu. Eski gebeliklerinde ağrı olup olmamasıyla, bu son gebeliğinde ağrı olması arasında çok anlamlı ilişki tespit edildi.

**Sonuç:** Özgeçmişinde bel ağrısı gelişimi için predispozan herhangi bir faktör olmasa dahi gebelikte bel ağrısı çok karşılaşılan bir sağlık problemidir.

**Anahtar Kelimeler:** Gebelik, Bel Ağrısı, Kalça Ağrısı

## INTRODUCTION

The biomechanical, hormonal, vascular, and psychosocial changes occurring in the maternal body due to pregnancy give rise to numerous musculoskeletal disorders, particularly low back pain (1-4). Additionally, the alteration of the maternal body's center of gravity caused by the enlarging gravid uterus results in a mechanical stress, which also contributes to the development of low back pain (5). Moreover, low back pain often begins between the 20th and 28th weeks of gestation and the reported incidence of low back pain in pregnant women ranges between 14-90% (6,7). However, the mean incidence has been shown to be 25% in pregnant women, as compared to 6.3% in non-pregnant women of the same ages (1-4). Most of the treatment methods used for low back pain cannot be used in pregnant women. Therefore, the treatment options for pregnant women are often preventive (8). In this regard, determining the risk factors for low back pain in pregnancy and taking prompt measures are mandatory as there are limited treatment options for low back pain in pregnancy.

There are numerous studies reporting on pregnancy-related low back pain. However, to our best knowledge, there has been no study investigating the elimination of the predisposing factors for low back pain in pregnancy. In this study, we aimed to investigate the frequency of low back pain during pregnancy in newly delivered mothers who had no predisposing factors for low back pain (except for previous pregnancies).

## MATERIAL AND METHODS

A questionnaire was administered to women that had given birth within the last 72 hour and remained hospitalized in Şanlıurfa Training and Research Hospital Obstetrics and Gynecology Clinic between July 2016 and January 2019. Prior to the study, an approval was obtained from Harran University Medical School Ethics Committee on 26 January 2016. Inclusion criteria were having a normal pregnancy, no history of low back/hip pain requiring hospital admission or medication, and hospital admission during pregnancy except for the last delivery, being a housewife, and delivering a single baby at term. Accordingly, of the 384 women that participated in the survey, 83 women met the inclusion criteria and were included in the study.

Exclusion criteria were hospitalization in the units other than the Gynecology and Obstetrics clinic such as intensive care unit (ICU) or isolation ward, a history of hypertension before/after pregnancy, kidney/liver disease, diabetes mellitus, urinary tract infections or bleeding during the last pregnancy, accident/fracture/dislocation/surgery in the back/low back/hip or lower extremities, and

chronic diseases associated with low back/hip pain, chronic inflammatory rheumatic disorders (e.g., ankylosing spondylitis), and lumbar disc hernia. Additionally, the women with pre-pregnancy limb length and girth discrepancy and gait disturbances were also excluded from the study.

The questionnaire queried about the presence of low back/hip pain or posterior pelvic pain during both the last and the previous pregnancies, age, pre-pregnancy and pre-partum weight and height, mode of delivery, pre-pregnancy physical activity and exercise statuses, level of education, residential stratum (urban or rural), number of previous pregnancies/curettage/stillbirth, smoking status, use of oral contraceptives (OC), and age at first marriage/pregnancy/delivery. The patients that experienced back/hip pain or posterior pelvic pain during the last pregnancy were further questioned about the characteristics of their pain, and severity of pain according to visual analogue scale (VAS). Additionally, the sex and the body weight of the neonates were also noted and compared with the other variables.

### Statistical Analysis

Data were evaluated using IBM SPSS for Windows version 20.0 (SPSS Inc., Armonk, NY, USA). Continuous variables were expressed as mean  $\pm$  standard deviation (SD). Normal distribution of continuous variables was tested using Kolmogorov-Smirnov Test. Variables with normal distribution were compared using Student's t-test and the variables with non-normal distribution were compared using Mann-Whitney U test. Chi square test was used for the comparison of the categorical variables. Correlations among variables were determined using Spearman or Pearson correlation coefficient. One-way ANOVA followed by the post-hoc Bonferroni test was used for comparing continuous variables among three or more groups. A p value of  $<0.05$  was considered significant.

## RESULTS

Tables 1 and 2 present the demographic and clinical characteristics of the 83 mothers. Mean age of the mothers was  $26.8 \pm 6.1$  (range, 17-42) years. Of the 83 mothers, 20 (24.1%) of them had their first delivery and 24 (28.9%) of them had their first live birth. Only 1 (1.2%) mother declared performing physical exercise at least 1-2 days a week before pregnancy and 72 (86.7%) mothers declared that they had regular visits to a Gynecology and Obstetrics clinic and regularly used the medications prescribed by the physicians.

**Table 1.** Demographic and Clinical Characteristics of All Mothers

	<b>Painful Group (n=43)</b>	<b>Painless Group (n=41)</b>	<b>p</b>
Age, year	26.9±5.8	26.7±6.6	0.877
Height, cm	161.8±4.7	160.4 ±5.4	0.197
Pre-pregnancy weight, kg	60.1± 9.3	59.7± 7.3	0.851
Prenatal weight, kg	70.0±10.0	70.2±7.7	0.939
Weight gain during pregnancy, kg	9.98±4.0	10.5± 3.9	0.566
Pre-pregnancy BMI	22.92±3.3	23.3± 3.6	0.595
Prenatal BMI	26.73±3.6	27.4±3.9	0.410
BMI change during pregnancy	3.8±1.5	4.1±1.6	0.595
Newborn weight, kg	3351.2±356.1	3317.6±373	0.909
Newborn height, cm	51.4±2.3	49.98±1.5	<b>0.002</b>
Marriage age, year	19.6±2.6	20.28±3.3	0.274
First gestational age, year	20.4± 2.5	21.00±3.3	0.316
First live birth age, year	20.6± 2.6	21.48±3.2	0.188
Number of pregnancy	3.5±2.1	3.68±2.6	0.959
Number of curettage	0.05±0.2	0.08±0.4	0.959
Number of Abortions/stilbirths	0.16±0.43	0.38±0.77	0.250
Oral contraceptive usage, month	0.331±1.85	0.25±0.90	0.588

Values are presented as mean±SD BMI; Body mass index

Of the 83 mothers, 43 (51.8%) of them declared experiencing pain in at least one of the anatomical regions including back, low back, hip, and posterior pelvic area during the last pregnancy (Painful group) and 40 (48.2%) mothers declared having no pain (Painless group). In the 43 mothers that experienced a pain, low back pain was revealed to be the most common pain (n=22; 51.2%), followed by hip/posterior pelvic pain (n=14; 32.6%), low back pain and hip/posterior pelvic pain

(n=4; 9.3%), and back pain (n=3; 7%). In these mothers, the pain was aggravated by physical exercise in 38 (88.37%) and at rest in 5 (11.63%) of them. Moreover, although the pain caused no sleep disturbances in 32 (74.42%) mothers, it resulted in disturbed sleep for at least several days in 11 (25.58%) of the mothers. However, only 4 (9.3%) mothers indicated that they presented to a physician for the pain, among whom 3 (75%) mothers suffered from disturbed sleep caused by the pain.

**Table 2.** Demographic and Clinical Characteristics of All Mothers

	<b>Painful Group (n=43)</b>	<b>Painless Group (n=40)</b>	<b>p</b>
Residence (Village/district/city)	16/18/9	18/8/14	0.084
Education level No/Literate/Primary School/High School/University	11/15/9/5/3	11/4/20/3/2	<b>0.025</b>
Smoking	1	3	0.271
Use of oral contraceptives	2	3	0.586
History of curettage	2	2	0.959
History of Abortions/Stillbirths	6	9	0.250
No pain at previous pregnancies*	18	28	<b>&lt;0.0001</b>
Pain at previous pregnancies	17	0	
Delivery Mode(vaginal/cesarean)	29/14	24/40	0.481
Gender of newborn (F/M)	26/17	18/22	0.158
VAS (mild/moderate/severe/very severe/unbearable)	6/22/9/5/1	-	

\*20 mothers whose first pregnancy were excluded.

Painful group according to VAS scores were divided into 5 groups as follows; 1-2; mild, 3-4; moderate, 5-6; severe, 7-8; very severe, 9-10; unbearable pain. Patients had mild (N=6), moderate (N=22), severe (N=9), very severe (N=5) and unbearable (N=1) pain. When all clinical and demographic characteristics of these groups were compared, all parameters (except delivery mode

and education level) were found to be similar (all p> 0.05). While 86.4% of the middle-group (the largest group) had vaginal delivery, 66.7% of those with very severe and unbearable pain had delivered by cesarean section (p=0.032). While 50% of those who described severe and intolerable pain were high school or university graduates, only 13.5% of

the other groups were high school or university graduates ( $p=0.023$ ).

Neonatal height was significantly higher in mothers with pain compared to the mothers with no pain ( $p=0.002$ ), although no significant difference was found with regard to neonatal weight and gender ( $p=0.909$ ,  $p=0.158$ , respectively). In mothers with pain, mean gestational age at the onset of pain was  $6.9\pm 2.1$  (range, 1-9) months and the mean duration of pain was  $31.1\pm 46.0$  (range, 2-240) days. In these mothers, the pain began in the third trimester in 31 (72.1%) and in the first trimester in 4 (9.3%) of them and mean Visual Analog Scale (VAS) score was  $4.26\pm 1.81$  (range, 2-9).

A significant relationship was found between the presence of pain during a previous pregnancy and during the last pregnancy ( $p<0.001$ ). Of note, all the 17 (100%) mothers that declared experiencing a pain during a previous pregnancy declared having pain in the last pregnancy as well. However, only 26 (39.4%) out of 66 mothers that had their first delivery or had no pain during a previous pregnancy declared experiencing a pain in the last pregnancy. On the other hand, a significant relationship was found between pain localization in previous pregnancies and in the last pregnancy ( $p<0.001$ ). In particular, of the 13 mothers that experienced low back pain during a previous pregnancy, 8 of them also experienced low back pain and 5 of them experienced hip/posterior pelvic pain in the last pregnancy. Similarly, the 2 mothers that experienced back pain and 1 mother that experienced back pain and hip/pelvic posterior pain during a previous pregnancy experienced the same pains during the last pregnancy.

No significant relationship was found between pain localization and gestational age at the onset of pain, duration of pain, and VAS scores ( $p=0.611$ ,  $p=0.072$ ,  $p=0.675$ , respectively). However, a significant correlation was found between VAS scores and duration of pain ( $p<0.0001$ ;  $r=0.606$ ). Additionally, a significant relationship was found between duration of pain and pre-partum maternal weight ( $p=0.016$ ;  $r=0.365$ ), change in maternal body mass index (BMI) ( $p<0.001$ ;  $r=0.559$ ), and gestational age at the onset of pain ( $p<0.001$ ;  $r=-0.597$ ).

## DISCUSSION

The aim of this study was to investigate the frequency of and the factors related to low back pain in pregnant women with no history of predisposing factors for low back pain. Our results indicated that 51.8% of the women experienced low back pain during pregnancy and these women had no predisposing factors for low back pain, no urinary tract infections/bleeding, and no multiple gestation. This rate was consistent with the rates reported in two previous large-scale studies conducted in Turkey (53.9% and 54.1%) (9,10). However, the rates reported in the literature vary between 14.2% and 90% (6,7). We consider that

this wide variation among the rates could be attributed to the wide variation in the methodologies used by the studies.

Low back pain was the most common pain experienced by our participants during the last pregnancy (51.2%) compared to back pain and hip/posterior pelvic pain. Ostgaard et al. and Kristian et al. reported sacroiliac/posterior pelvic pain 50%, back pain 40% in their studies (11,12). In Turkey, Kesikburun et al. reported that low back pain was the most common musculoskeletal pain in pregnant women, followed by back pain, hand-wrist pain, and hip pain (3). We consider that the differentiation in the frequency of the pains experienced by pregnant women could be ascribed to the differentiation of the study populations.

In our study, mean gestational age at the onset of pain was  $6.9\pm 2.1$  (range, 1-9) months and the mean duration of pain was  $31.1\pm 46.0$  (range, 2-240) days in mothers with pain. In these mothers, the pain began in the third trimester in 31 (72.1%) mothers, which is consistent with the finding reported in the literature that suggests that low back pain often begins between the 20th and 28th weeks of gestation (6,7). Similarly, Sencan et al. also reported that the pain in their participants mostly began in the third trimester (9).

Literature indicates that the risk of low back pain during pregnancy is 85-94% higher in women with a history of low back pain during a previous pregnancy compared to women with no history of pain (13,14). Similarly, in our study, we also noted that all the mothers that had a history of low back pain during a previous pregnancy suffered from low back pain in the last pregnancy as well. In addition, we also found a significant relationship between pain localization in previous pregnancies and in the last pregnancy.

In our study, no significant difference was found between the mothers with and without pain with regard to maternal age and the number of previous pregnancies. A previous meta-analysis reviewed a large number of studies and found that there is no consensus in the literature as to whether advanced age or young age is a risk factor and as to whether multiparity is a risk factor for low back pain (6).

Literature reviews also indicate that there is no consensus as to whether there is a relationship between pre-pregnancy maternal height, weight, BMI and pregnancy-related low back pain (11,13,15,16). In our study, although there were some significant correlations between duration of pain and pre-partum maternal weight and between change in maternal BMI and gestational age at the onset of pain in the painful group, we found no difference between maternal height/weight, pre-pregnancy/pre-partum BMI, and change in maternal BMI and the development of low back pain between the painful and painless groups. On the other hand, although a previous study suggested

that the male sex of the fetus may be a predictor factor for low back pain during pregnancy, numerous other studies implicated that there is no such association (3,17,18).

Increased abdominal diameter, fetal weight, and muscular dysfunction have been shown to be associated with low back and pelvic pain in pregnancy (19-21). Mogren et al. investigated the presence of low back and pelvic pain in pregnancy and reported that neonatal weight was greater in mothers who suffered from low back or pelvic pain during pregnancy compared to those who did not experience any pain (18). In our study, however, no significant difference was found between mothers with and without pain with regard to neonatal weight. However, neonatal height was significantly higher in neonates of the mothers with pain compared to the those without pain. We could find no study in the literature reporting on a relationship between neonatal height and pregnancy-related pain.

Literature indicates that there is no consensus on the relationship between smoking and low back pain in pregnancy (8,16,17,22). In our study, we could not find such a relationship and could not draw conclusions since only 4.8% of the mothers were active smokers. It has also been shown that pregnant women with a sedentary lifestyle have an increased risk for low back pain during pregnancy compared to the mothers with an active lifestyle (23). In our study, however, we could not draw a conclusion regarding this difference as only one mother declared performing regular physical exercise before pregnancy. There is also no consensus as to whether the use of OC is

a risk factor for low back pain in pregnancy (7,11,24). In our study, although 5 mothers had a history of the use of OC, we could not find any relationship between the history or the duration of the use of OC and low back pain in our participants.

In our study, only 9.3% of the mothers with pain declared that they had regular visits to a physician during pregnancy, 75% of whom suffered from disturbed sleep. Similarly, Sencan et al. reported that only 4.2% of their mothers with pain received treatment during pregnancy (9). Taken together, these low rates could be explained by the fact that low back pain in pregnancy is viewed as normal by pregnant women, the treatment/imaging options are limited for pregnancy-related low back pain, and pregnant women are highly concerned about the potential effects of the treatment on the fetus. However, it should be recognized that if untreated, pregnancy-related low back pain may result in chronic postpartum low back pain as well as socioeconomic problems such as a prolonged work stoppage (25,26).

The major limitation of our study was the small number of participants. In addition, the findings of our study cannot be generalized to all the pregnant women in Turkey as the study was a single-center study and evaluated pregnant women residing in the same geographical region.

In conclusion, pregnancy-related low back pain is a common health problem among pregnant women, even in women with no history of predisposing factors for low back pain. Further multicenter studies with larger patient series are needed to substantiate our findings.

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