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Pregnancy-related low back pain in women in turkey: prevalence and risk factors

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Pregnancy-related low back pain in women in Turkey: prevalence and risk factors

Abstract

Objectives. To investigate the prevalence of pregnancy-related low back pain (PRLBP) in women in Turkey, identify the factors associated with PRLBP and predict the risk of PRLBP.

Materials and methods. This cross-sectional study included a total of 1500 pregnant women admitted to a prenatal care clinic in a secondary care hospital in Turkey between August 2011 and September 2014. All participants were asked to complete a survey questionnaire. The pregnant women who reported recurrent or continuous pain in the lumbar spine or pelvis for more than 1 week were offered a clinical examination for PRLBP by the spine physiatrist.

The main outcome measure was the presence of PRLBP. We collected data on sociodemographic factors, previous obstetric history, daily habits, history of LBP, and functional disability scores as assessed by the Oswestry Disability Index (ODI).

Results. The mean age of the 1500 women was 26.5±5.5 years. The prevalence of PRLBP was 53.9%, mostly in the third trimester. Women with PRLBP in the third trimester were more disabled than those in the first and second trimesters (mean ODI 40.0±16.7 vs 34.9±19.2 and 37.4 ±15.3, respectively). Risk factors of PRLBP were history of LBP, PRLBP, and menstruation-related LBP as well as no housework assistance (OR=5.394, 95% CI 3.128–9.300, p<0.001; 3.692, 2.745–4.964, p<0.001; 2.141, 1.563–2.932, p<0.001; 1300, 1.029–1.64, p=0.028, respectively).

Conclusion. This cross-sectional study is the largest study of PRLBP in the literature and showed that about 1 in 2 women have PRLBP in any stage of pregnancy. History of LBP related and unrelated to previous pregnancy and menstruation are strong risk factors for PRLBP. Receiving no housework assistance is another risk factor.

Key Words: pregnancy; low back pain; prevalance; risk factors; disability.

Introduction

Low back pain (LBP) is a prevalent disorder associated with increased medical expenses and work loss [1]. It is more common in women than men and due to hormones, pain sensitivity, and social and psychological factors [2]. Pregnancy is one of the predisposing factors for LBP [3]. LBP is more prevalent in pregnant women than non-pregnant women at the same age (25% vs 6.3%)[4]. The prevalence of pregnancy-related LBP (PRLBP) varies from 20% to 90%, mostly above 50% [5]. Although the etiology of PRLBP is still unclear, it is considered as the natural course of pregnancy and expected to disappear spontaneously after delivery,

thereby leading to difficulties in activities of daily living in 80% of pregnant women and work loss in 30% [6].

However, in most studies, no examination related to LBP is performed during pregnancy, and pain drawings and/or survey questionnaires are not used to identify the pain distribution. Most of the surveys were limited to self-reported data [7]**.** In addition, observed associations between possible causative factors and PRLBP did not provide clear answers. The demographic and clinical features of participants before and during pregnancy evaluated had only a minor influence. Hence, several pregnancy-related mechanisms that may play an important role in the development of PRLBP have not been examined [8]. Participant recruitment procedures in studies may have also led to selection bias of the pain group analyzed, in that women with pain might have been more likely to participate. Therefore, selected representation of the overall population may have affected some of the results [9].

Although PRLBP is a serious public health concern, healthcare providers often have limited awareness of possible risk factors and management strategies [10]. Therefore, to prevent PRLBP-related complications, we need to develop easy-to-use assessment tools during routine their examination and to plan multidisciplinary-based early management approaches for high-risk groups.

In the present study, we aimed to identify the prevalence of PRLBP and the factors associated with PRLBP in women in Turkey. Our secondary aim was to predict high-risk groups by revealing possible related factors, to increase the awareness of PRLBP by pregnant women and healthcare providers.

Materials and methods

Study design and participants

A total of 1,560 pregnant women who were admitted to a prenatal care clinic at Agri State Hospital, Agri, Turkey, between August 2011 and September 2014 were screened based on

obstetric examination findings and treatments applied. Verbal and written consent was obtained from each participant.

All participants were asked whether they felt well enough to complete the detailed survey questionnaire, which would require about 20 min. Only one question, PRLBP during pregnancy in a previous study, was defined as "recurrent or continuous pain in the lumbar spine or pelvis for more than 1 week" during the current pregnancy [11], and participants were asked whether they were seen by the gynecologist. If the answer to the question was "Yes", the spine physiatrist evaluated the participant for PRLBP. Clinical examination involved lumbar spine range of motion; palpation of lumbar paraspinal muscles; muscle strength test of the lower extremities; sensorial test; deep tendon and plantar reflexes tests; the Flexion, Abduction, External Rotation (FABER)] test; the Flexion, Adduction, Internal Rotation (FADIR) test; and straight leg raise test. When the clinical examination results were consistent with self-reported data, the participant was included in the PRLBP group. However, pelvic girdle pain could not be distinguished from back pain because of no accepted method to distinguish them, despite the proposed provocation tests. In addition, for the pain location, pain drawings by participants were likely insufficient to differentiate between the two types of actual pain; therefore, pelvic and LBP were considered together in this study. PRLBP was not cumulative for the first, second and third trimesters, when PRLBP was noted for each participant.

Exclusion criteria were not willing to be enrolled, history of spinal and rheumatologic disorders, history of vertebral spine fracture or surgery, previous significant lumbar MRI findings and chronic pain syndromes. We also excluded women with a history of abdominal and/or pelvic surgery.

Survey questionnaire

All participants were required to complete a questionnaire asking about sociodemographic factors including age, body mass index (BMI), education status, residency, employment status, and receiving housework assistance; previous obstetric history including gravidity, parity, number of abortions, history of caesarean section delivery, intervals between previous pregnancies, gender of fetus, history of trauma, use of oral contraceptives, history of surgery and spinal anesthesia; daily habits such as smoking, caffeine intake, and exercise; and history of LBP including previous PRLBP, menstruation-related LBP, and previous LBP.

Pain and disability assessment

Pain intensity for the current PRLBP was measured on a 10-cm visual analogue scale (VAS), with 0 denoting “no pain” and 10 “worst imaginable pain”. The pain was defined as burning, throbbing, crump, stiffness, numbness, or tingling. Sciatica was defined as radiating pain into only one leg below the knee and nerve root/spinal nerve involvement by at least one of the following concomitant neurologic disturbances: including including pain, numbness, tingling and/or burning.

Functional disability was measured by the Turkish version of the Oswestry Disability Index (ODI) [12]. The ODI measures the extent to which a patient's functional level is limited by LBP (i.e., pain intensity, personal care and lifting, walking, sitting, standing, sleeping, sexual life, social life, and travelling). Each section is scored from 0 to 5, 0 indicating no disability and 100 maximal disability.

This study was approved by the Ethics Committee of Erzurum Regional Research Hospital (approval no. B.10.4.İSM.04.25.00-16-36) and conducted in accordance with the principles of the Declaration of Helsinki.

Statistical analysis

Normally distributed continuous data are described with mean±SD. Independent-samples *t* test, Mann-Whitney U test and Pearson's chi-square test were used for analysis of non-

parametric, parametric and categorical data, respectively, to test differences between pain and no pain groups and determine risk factors. Odds ratios (OR) and their corresponding 95% confidence intervals (CIs) for PRLBP were calculated by logistic regression in univariable analyses. Factors significant on univariable analysis at $p<0.25$ were included stepwise in the multivariable regression analysis by the backward LR method. Adjusted ORs were calculated for each variable in the model. The Tukey's test was used to compare pain and disability by trimester. $P<0.05$ was considered statistically significant.

Results

Study population

Overall, 1500 participants were included (Figure 1). Clinical features and obstetric history of participants are summarized in Tables 1 and 2. The mean age of participants was 26.52±5.51 years. The prevalence of PRLBP was 53.93% (n=809): 17.43% (n=141) with LBP were admitted to the clinic in the first trimester, 36.71% (n=297) in the second trimester, and 45.86% (n=371) in the third trimester.

The rate of receiving housework assistance was lower with than without PRLBP (OR=1.624, 95% CI 1.323–1.993 p=0.001). More women with than without PRLBP had a history of abortion (1.437, 1.068–1.935, p=0.017), a greater number of previous abortions (1.205, 1.056–1.373, p=0.005), and a history of trauma (2.172, 1.036–4.554, p=0.036), PRLBP (6.471, 4.834–8.663, p<0.001), LBP (11.555, 7.041–18.965, p<0.001) and menstruation-related LBP (3.810, 2.944–4.932, p<0.001).

Pain status and patterns

The characteristics of the LBP and disability are in Table 3. The mean VAS pain score was 3.70±1.60. Women with PRLBP did not differ in VAS pain by the trimester of clinic admission (p>0.005). PRLBP most commonly presented with leg pain (27.2%) and thigh pain (20.2%) and typically presented as cramping (36.2%) radiating to both lower limbs (45.4%).

Sciatic pain with radiating leg pain was detected in 2.4% of patients. Only 4.2% of women with PRLBP received treatment for pain. Women with PRLBP were moderately disabled (mean ODI score 38.13±16.77). PRLBP was not cumulative for the first, second, and third trimesters. The women with PRLBP who were admitted in the third trimester were more disabled than those admitted in the first and second trimesters (mean ODI: 39.96±16.72 vs 34.91±19.22 and 37.37±15.29; p=0.006), with no difference between those in the second and third trimester (p=0.113).

Potential risk factors of PRLBP

On multivariable regression analysis, risk factors predicting PRLBP were history of LBP (OR=5.394, 95% CI 3.128–9.300, p<0.001), PRLBP (3.692, 2.745–4.964, p<0.001) and menstruation-related LBP (2.141, 1.563–2.932, p<0.001) as well as no housework assistance (1300, 1.029–1.64, p=0.028) (Table 4).

Discussion

Our study found that 53.9% of 1500 pregnant women in Turkey had PRLBP. A previous study of 88 pregnant women in Turkey found a prevalence of 59.1% PRLBP [13] and another study of 1,357 pregnant women found a prevalence of 54.1% [14]. However, we report the results of the largest study of PRLBP in the eastern region of Turkey, where the birth rates are higher than in other parts of the country [15].

In our study, we found PRLBP most prevalent in the third trimester, although it could start at any stage of pregnancy [5]. Our findings are consistent with previous findings suggesting that visiting a physician with PRLBP was most common in the third trimester [16], since the spine is overloaded as the weight of the pregnancy increases [17].

Furthermore, we also found an association of a history of LBP and PRLBP. It was the most important risk factor for PRLBP and is consistent with data from the literature [18]. This finding can be attributed to the fact that compensation mechanisms can be impaired due to

hormonal and biomechanical changes during pregnancy and/or recurrence of the existing pathology. We also found PRLBP higher in the women with a history of PRLBP, which is consistent with the literature [15]. This finding is important, because PRLBP can recur in every pregnancy and pregnancy itself may be an important risk factor for LBP.

In addition, we found a history of menstruation-related LBP and trauma as well as receiving no housework assistance associated with PRLBP. Although the pathogenesis of PRLBP and menstruation-related LBP is unclear, the paraspinal muscle strain can cause both PRLBP and menstruation-related LBP. In addition, trauma-related tissue damage occurring before pregnancy may lead to long-term nociceptive sensitization, thereby suggesting increased risk for PRLBP [19]. Finally, overloading and fatigue related to the increased physical stress of housework can be associated with PRLBP, which explains the association of no housework assistance and PRLBP.

The association of age with PRLBP is still controversial. Kristiansson et al.[16] reported no association of age with PRLBP, whereas Ostgaard et al.[17] reported that young mothers were more likely to have PRLBP than older mothers. In another study, Mens et al.[20] reported no association of BMI with PRLBP, whereas a multi-center study reported BMI $\geq$ 30 kg/m2 associated with PRLBP [11]. In the present study, we found no association of age and BMI with PRLBP. The different results regarding the association of age and BMI with PRLBP may be explained by different sample sizes in previous studies as well as diversity in genetic factors of included women. Genetic factors were also reported as predisposing factors for disc degeneration [21], one of the causes of LBP [22].

In this study, multiparity was not associated with PRLBP. The association of multiparity with PRLBP still remains to be elucidated, because whether physical stress or hormonal activity has more influence on PRLBP is unclear [23]. Gravidity was not associated with PRLBP, because both women with and without PRLBP showed gravidity above 3, as

previously reported [24]. In the present study, pregnant women with a history of abortion were more likely to have PRLBP. In agreement with the literature [25], the number of abortions was also a risk factor for PRLBP. The Eastern Anatolia Region is reported to have the youngest age of marriage for women in Turkey [26]**.** Inadequate hormonal activity [27] and inadequate prenatal care [28] in teenage marriages were found associated with obstetric complications, particularly with abortions. Although our women with and without PRLBP were similar in age, the relatively young age at marriage may have been associated with increased number of abortions, which was a risk factor for PRLBP.

In the current study, only 4.2% of the women with PRLBP received treatment for pain, even though PRLBP was a common and moderately disabling complication of pregnancy. During pregnancy, medications have withdrawal effects on the fetal development, including paracetamol when prescribed daily and several times per day [29]. In addition to pharmacological treatments, several non-pharmacological treatments including exercise [30], kinesiotaping [31], acupuncture [32], and transcutaneous electrical nerve stimulation [33] can be effective. Therefore, increased awareness of PRLBP as a treatable condition can prevent possible complications.

In our study, the most common presentation of PRLBP was LBP with leg pain accompanied by cramps. However, this finding does not agree with Skaggs et al [34], who found that 30.5% of the women studied were unable to define the location of the pain. The most common presentation of PRLBP was previously reported as LBP [14]: PRLBP was mostly induced by prolonged standing, probably due to increased pressure on the low back while standing [35]. In additon, the women with PRLBP were moderately disabled according to the ODI score, and those admitted in the third trimesters were more disabled than those admitted in the first and second trimesters. This finding supports that disability was higher in the third than other trimesters due to overloading of the spine.

Strengths and limitations

Our study has some limitations. First, it was a cross-sectional study without any follow-up. In addition, we had no data regarding the psychological status, marriage age, birth weight of the baby, type of caesarean section, relaxation level, onset of PRLBP, economic status, weight gain during pregnancy, or postpartum period for women. Second, PRLBP was not associated with employment status and activity level because 90% of the pregnant women were housewives and only 1.1% performed regular exercises. However, our study is one of the largest studies of this topic and was conducted in a high-fertility area of Turkey. Furthermore, objective clinical-examination findings were consistent with self-reported data, which indicates the reliability of our results. Also, we included data on all 3 trimesters in the study to evaluate PRLBP thoroughly.

Conclusion

This cross-sectional study is the largest study of PRLBP in the literature and showed that about 1 in 2 women in Turkey had PRLBP at any stage of pregnancy. PRLBP is a common, moderately disabling and treatable complication of pregnancy. However, only a few women with PRLBP received treatment because it is considered the natural course of pregnancy. From our results, the awareness of PRLBP should be increased. A history of LBP related and unrelated to previous pregnancy and related to menstruation were strong risk factors for PRLBP. The risk of PRLBP was reduced with help with housework. For women with these risk factors, precautions should be taken before pregnancy and treatment approaches planned early to prevent PRLBP-related complications.

Conflict of interest. The authors declare no competing interests.

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Figure 1. Flow of women in the study.

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Tables

Table 1. Demographic and socioeconomic aspects of pregnant women without and with pregnancy-related low back pain (PRLBP).

	Without PRLBP	**With PRLBP**	**OR (95% CI)**
No. of participants	691	809	
Age (years), mean±SD	26.6±5.7	26.5±5.3	0.996 (0.978-1.015)
BMI (kg/m^2), mean±SD	26.4±3.4	26.1±3.9	0.977 (0.951-1.004)
Education Level			
None but literate	233 (3.7)	266 (32.9)	1.000
Primary school	365 (52.8)	405 (50.1)	0.972 (0.776-1.218)

High school	47 (6.8)	72 (8.9)	1.342 (0.893-2.017)
College	46 (6.7)	66 (8.2)	1.257 (0.829-1.904)
Residence area			
Urban	467 (67.6)	512 (63.3)	1.000
Rural	224 (32.4)	297 (36.7)	1.209 (0.976-1.498)
Employment			
Unemployed	638 (92.3)	728 (90.0)	1.000
Employed	53 (7.7)	81 (10.0)	1.339 (0.932-1.924)
Housework assistance*			
Yes	364 (52.7)	329 (40.7)	1.000
No	327 (47.3)	480 (59.3)	1.624 (1.323-1.993)*

Data are number (%) unless indicated.
OR, odds ratio; 95% CI, 95% confidence interval
*P<0.05

Table 2. Obstetric history, daily habits and history of LBP in pregnant women without and with PRLBP.

	Without PRLBP	**With PRLBP**	**OR (95% CI)**
No. of participants	691	809	
Gravidity, mean±SD	3.1±2.3	3.2±2.3	1.016 (0.972-1.062)
Parity, mean±SD	1.7±2.0	1.7±1.9	0.989 (0.939-1.040)
Duration between pregnancies (years)	2.5 (1.8)	2.4 (1.8)	0.973 (0.911-1.039)
No. of abortions, mean±SD*	0.3±0.8	0.5±0.9	1.205 (1.056-1.373)*
History of caesarean section	55 (11.2)	59 (10.1)	0.883 (0.599-1.303)
History of abortion**	89 (18.2)	142 (24.2)	1.437 (1.068-1.935)*
History of spinal anesthesia	5 (0.7)	4 (0.5)	0.682 (0.182-2.549)
Male fetus	71 (48.6)	147 (46.2)	0.908 (0.613-1.344)
Use of oral contraceptives	53 (7.7)	66 (8.2)	1.069 (0.734-1.558)
Smoking status	92 (13.3)	122 (15.1)	1.156 (0.863-1.548)
Caffeine intake	51 (7.4)	59 (7.3)	0.987 (0.669-1.457)
History of trauma**	10 (1.4)	25 (3.1)	2.172 (1.036-4.554)*
History of PRLBP**	78 (16.0)	323 (55.1)	6.471 (4.834-8.663)*
History of LBP	18 (2.6)	191 (23.6)	11.555 (7.041-18.965)*
History of MRLBP	96 (13.9)	308 (38.1)	3.810 (2.944-4.932)*

Data are number (%) unless indicated.
OR, odds ratio; 95% CI, 95% confidence interval; MRLBP, menstruation-related LBP
*P<0.05.

Table 3. Characteristics of LBP in women with PRLBP.

	With PRLBP
No. of participants	809
Location of pain	
Back	73 (9.0)
Thigh	163 (20.2)
Leg	67 (8.3)
Low back and leg pain	220 (27.2)
Sciatica	19 (2.4)
Generalized	20 (2.5)
Unidentified	247 (30.5)
Quality of pain	
Burning	172 (21.3)
Throbbing	75 (9.3)
Cramp	293 (36.2)
Burning and cramp	101 (12.5)
Numbness	13 (1.6)
Unidentified	155 (19.1)
Radiation of pain	
No radiation	107 (13.2)
One leg	219 (27.1)
Both legs	367 (45.4)
Unidentified	116 (14.3)
Precipitating factors	
None	1 (0.1)
Sitting	126 (15.6)
Standing	288 (35.6)
Lying	208 (25.7)
Walking	107 (13.2)
Unidentified	79 (9.8)
Treatment for PRLBP	34 (4.2)

Data are number (%).

Table 4. Multivariable regression analysis of factors predicting PRLBP.

Variables	OR	95% CI
No housework assistance	1.300	1.029–1.643
History of LBP	5.394	3.128–9.300
History of PRLBP	3.692	2.745–4.964
History of MRLBP	2.141	1.563–2.932

Figure 1.