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Is There a Significant Difference between Pregnancy Related Lumbopelvic Pain Subtypes in Terms of Pain Characteristics, Fatigue, Balance, Emotional and Functional Status, Health Related Quality of Life and Disability?

Gebelik ile İlişkili Lumbopelvik Ağrının Alt Tipleri Arasında Ağrı Özellikleri, Yorgunluk, Denge, Emosyonel ve Fonksiyonel Durum, Yaşam Kalitesi ve Engellilik Açısından Farklılık Var mıdır?

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ABSTRACT Objecive: The aim of this study was to compare the subgroups of pregnancy related lumbopelvic pain (PRLPP) in terms of prevalence, pain characteristics, fatigue, exercise capacity, balance, health-related quality of life (HRQoL), psychological status, and disability. **Material and Methods:** A total of 100 pregnant women with lumbopelvic pain were included in the study after exclusion of obstetric complications. Pain characteristics of the patients were interviewed and musculoskeletal system examination was performed. Short Form-36, Fatigue Severity Scale, Beck Depression and Beck Anxiety Inventory, Berg Balance Scale, 6-minute walking test, Oswestry Disability Scale results were recorded. The patients were divided into 3 groups as lumbar pain (LP), pelvic girdle pain (PGP), and combined pain according to physical examination findings. **Results:** The prevelance of subgroups of PRLPP was found as; LP in 49%, PGP in 31%, and combined pain in 20%. The location, distribution, severity, and duration of pain were found to be significantly different between the subgroups. Also disability, depression, anxiety, and exercise capacity were differed between pain subgroups. The patients with combined pain had higher depression, disability, anxiety scores, and lower exersice capacity. Pain intensity was negatively correlated with HRQoL and balance whereas positively correlated with fatigue, depression, anxiety, and disability. Duration of pain was correlated with disability, and exercise capacity. **Conclusion:** PRLPP is a heterogeneous condition and pain characteristics, disability, exercise capacity, depression, and HRQoL may differ significantly. For that reason, identification of pain subgroups at an early stage is important for preventing chronicity, disability, and selecting specific treatment strategies.

Keywords: Pregnancy related lumbopelvic pain; pelvic girdle pain; disability; exercise capacity; depression

ÖZET Amaç: Bu çalışmanın amacı; gebelik ile ilişkili lumbopelvik ağrının alt tiplerini prevalans, ağrı özellikleri, yorgunluk, egzersiz kapasitesi, denge, yaşam kalitesi, psikolojik durum ve engellilik açısından karşılaştırmaktır. **Gereç ve Yöntemler:** Çalışmaya obstetrik komplikasyonlar dışlandıktan sonra gebelikle ilişkili lumbopelvik ağrısı olan 100 gebe dâhil edildi. Hastaların ağrı özellikleri sorgulandı ve kas-iskelet sistemi muayeneleri yapıldı. Kısa Form-36, Yorgunluk Şiddet Ölçeği, Beck Depresyon Envanteri, Beck Anksiyete Envanteri, Berg Denge Skalası, 6 dakika yürüme testi ve Oswestry Özürlülük Ölçeği sonuçları kayıt edildi. Hastalar fizik muayene bulgularına göre lomber ağrı (LP), pelvik kuşak ağrısı [pelvic girdle pain (PGP)] ve kombine ağrı olmak üzere 3 gruba ayrıldı. **Bulgular:** Gebelik ile ilişkili lumbopelvik ağrı alt tiplerinin prevalansı; %49 LP, %31 PGP ve %20 kombine ağrı olarak bulundu. Ağrının yeri, yayılımı, şiddeti ve süresi gruplar arasında belirgin olarak anlamlı saptandı. Ayrıca engellilik, depresyon, anksiyete ve egzersiz kapasitesi de gruplar arasında farklı bulundu. Kombine ağrısı olan hastalarda depresyon, engellilik ve anksiyete skorları daha yüksek ve egzersiz kapasitesi daha düşüktü. Ağrı şiddetinin, yaşam kalitesi ve denge ile arasında negatif korelasyon bulunurken; yorgunluk, depresyon, anksiyete ve engellilik ile arasında pozitif korelasyon vardı. Ağrı süresi de engellilik ve egzersiz kapasitesi ile ilişkili bulundu. **Sonuç:** Gebelik ile ilişkili lumbopelvik ağrı heterojen bir durumdur ve ağrı özellikleri, engellilik, egzersiz kapasitesi, depresyon, yaşam kalitesi belirgin farklılık gösterebilir. Bu nedenle ağrı alt tiplerini erken dönemde saptamak kronikleşmenin ve engelliliğin önlenmesi ve spesifik tedavi yöntemlerinin seçilmesi için önemlidir.

Anahtar Kelimeler: Gebelik ile ilişkili lumbopelvik ağrı; pelvik kuşak ağrısı; engellilik; egzersiz kapasitesi; depresyon

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Pregnancy related lumbopelvic pain (PRLPP), is defined as recurrent and continuous pain which lasts for longer than a week in the lumbopelvic region during pregnancy.[1] This type of pain is a frequently encountered musculoskeletal problem during pregnancy with an estimated reported prevalence of 30-78%.[2,3]

Pregnancy related lumbopelvic pain (LPP) is considered as normal and regarded as a natural consequence of pregnancy, yet in about one third of expectant women it negatively effects daily life activities, decreases quality of life, leads to significant disability, sleep disorders, depression, and anxiety, and causes absenteeism from work as reported in previous studies.[4-8] Pregnancy related LPP is not limited to pregnancy. In most of the cases, there is a spontaneous improvement within 6 months, however, the pain gets chronic in 5-21% of the cases and persists up to 2 to 12 years after giving birth in 10% of women, the disability, decrease in quality of life, and work-related skills is identified to continue even 10 years after delivery.[9,10]

Furthermore, experiencing PRLPP during a pregnancy predisposes individuals to pain in future pregnancies as well as in later stages of life.[11]

Pregnancy related LPP is a broader term consisting of 3 different subgroups. These are lumbar pain (LP), pelvic girdle pain (PGP), and combined (lumbopelvic) pain.[2,6,12,13] PGP is experienced between posterior iliac crest and gluteal fold and at sacroiliac joints, it generally radiates to the posterolateral part of the thigh and/or appears at symphysis pubis and radiates to the anterior part of the thigh. Its prevalence is reported as 20-80%.[6,14] Lumbar pain appears above the level of sacrum; it is experienced at the lumbar region, by radiating or not radiating to the legs.[2,12] The term LPP is used when no distinction is made between PGP and lumbar pain.[13] The coexistence of lumbar pain and PGP is reported to be 5-30%.[11,13,15,16] Gutke found a reliable classification system to differentiate the subgroups.[17] The risk for persistent pain and the caused negative effects are higher in combined pain.[15] PGP presents with severe pain, has a different clinical presentation than lumbar pain, leads to limitations in daily life activities, decreases in quality of life, and causes high levels of disability and labor loss.[5,15]

In the literature, in most of the research studies on PRLPP, the focus was on the risk factors, physical examination tests, the treatments that were given and outcomes and outcome measurements without paying attention to the heterogeneous nature of the pain and the presence of pain subgroups. However, subgroups differ in terms of pain severity, depression, quality of life, disability, permanent pain risk, and chronic pain as well as optimum treatment strategies.[2,3,6,11,12,15,16]

Defining the subgroups and knowing the differences between the subgroups is important for developing and employing subgroup specific treatment strategies. Therefore, it would be possible to eliminate the risk for persistent pain and negative results caused by pain in future pregnancies and later stages of life.

The aim of this study was to compare pain subgroups in terms of prevalence, pain characteristics, fatigue, functional status, balance, health related quality of life, psychological state, and disability in a group of pregnant Turkish women. To the best of our knowledge, this is the first study about the characteristics and different aspects of pain across PRLPP subtypes and their associations.

MATERIAL AND METHODS

PARTICIPANTS

Among pregnant women applying to Ankara Physical Medicine and Rehabilitation Training and Research Hospital with the complaint of lumbar pain, we enrolled 100 women identified as not having any pregnancy related complications after evaluations by an obstetrics and gynecology specialist. The study protocol was approved by the Ethics Committee of Ankara Physical Medicine and Rehabilitation Training and Research Hospital (date: August 28, 2013; no: B.10.1.TKH.5.06.0.02.Z.F1.08-4419). All the pregnant women in the study received verbal information about the methods that will be used and their written consents were obtained. All procedures were performed in accordance with the Helsinki Declaration.

Patients diagnosed as inflammatory lumbar pain, lumbar discopathy and lumbar spinal stenosis or had

other causes of specific lumbar pain before pregnancy; patients with psychotic and mental problems, patients identified to have obstetric complications by an obstetrics and gynecology specialist like preterm labor, preeclampsia, placenta previa, detached placenta, intrauterine growth retardation, urinary system infection, and gestational diabetes mellitus were excluded from the study.

Each consenting subject was interviewed and her clinical history and demographical information was recorded, physical activity was questioned. General systemic examination and detailed neuromusculoskeletal system examinations were performed. Each assessment was performed by the same physical medicine and rehabilitation physician.

OVERVIEW OF PROCEDURES

Pain Characteristics

The intensity of pain was assessed using the visual analog scale (VAS) ranging from 0 to 10 cm graph. A VAS score of "0" was defined as no pain, and "10" as unbearable pain. This scale is widely used in evaluating the severity of pain.[18,19] Pain intensity was divided into 3 groups as mild pain between 1-4, moderate pain between 5-7, and severe pain between 8-10. The pain was evaluated separately during activity, at rest, and at nighttime.

The views of the patients on different aspects of pain were explored by a set of questions which included the onset time, duration, type, aggravating factors, relieving factors, and site, location and radiation of pain.

In the diagnosis of lumbar pain and PGP; straight leg raise, Laseque, femoral nerve stretching, posterior pelvic pain provocation (P4 test), active straight leg raise (ASLRT), Patrick (FABER), Gaenslen, Mennel, modified Trendelenburg, symphysis pubis palpation, long dorsal sacroiliac ligament palpation, and sacroiliac compression tests were used. As a result of anamnesis and physical examination, patients were divided into 3 subgroups as lumbar pain, PGP (anterior and posterior pelvic pain), and combined pain.

In patients having localized pain in the area between the posterior iliac crest and the gluteal fold that harbors the sacroiliac joints and symphysis pubis radiating to posterior thigh and perineal region; finding positive results in some of the posterior pelvic pain provocation (P4), ASLRT, Gaenslen and Patrick (FABERE) tests was regarded as posterior pelvic pain. Finding pain/tenderness on symphysis pubis palpation and having a positive Trendelenburg test resulted in the diagnosis of anterior pelvic pain.

If patients had pain that was localized to the area between the spinal processes of T12-S1 vertebrae with or without radiation to leg/legs together with spasm of paravertebral muscles and limitations of range of motion in lumbar joints, they were diagnosed as having lumbar pain. Patients who had lumbar pain and PGP together were included in the combined pain group.[12,17] Diagnostic imaging tests were not used in these patients.

Physical Activity

Performing at least 150 minutes of moderate-intensity aerobic physical activity (e.g. walking) or 75 minutes of vigorous-intensity aerobic physical activity (e.g. running or jogging) throughout the week was defined as being physically active.[20]

The patients who did not have this level of activity before pregnancy were regarded as sedentary/inactive.

Health-Related Quality of Life

Health-related quality of life (HRQoL) was measured using the Medical Outcomes Study Short Form 36 questionnaire (SF-36). The SF-36 is a commonly accepted and employed generic instrument for measuring HRQoL. It assesses 8 domains of health concepts by virtue of a multi-item scale. These health domains include physical functioning (PF), role limitations-physical (RP), bodily pain (BP), general health (GH), vitality, social functioning (SF), role limitations-emotional (RE), and mental health. Furthermore, in order to reflect overall mental or physical health issues independently, these domain scores are further decomposed into two principle categories such as physical component summary (PCS) score or mental component summary (MCS) score , respectively. In respect of the 5 domains such as PF, RP, BP, and SF and RE, scores out of 100 were assigned. Scores of 50 were

assigned for the 3 remaining domains where a higher score represented a better health status. Validity and reliability of the Turkish version of the form has been tested by Kocyigit et al.[21]

Fatigue

The effect of excessive fatigue on the patient's daily function was evaluated by employing the Fatigue Severity Scale (FSS) that incorporates 9 statements about fatigue. A score of 1-7 was assigned to each statement and then the total score was calculated by 9 being the lowest and 63 being the highest severity level of fatigue. For pathological fatigue, the cut-off level was identified as 4 or above. Low total scores correspond to low levels of fatigue.[22] The validity and reliability of the scale has been demonstrated in Turkish.[23]

Depression

Depression was evaluated using the Beck Depression Inventory which included 21 questions with respect to the patients' state of feelings. The answers to these questions are structured with 4 choices having varying levels of intensity. The answer to each question is scored from 0 to 3, the total score that is obtained by adding all respective scores is between 0-63. The severity of depression is evaluated based on the total score (0-9 normal, 10-16 mild, 17-23 moderate and 24-63 severe). The cut-off value is 17. Validity and reliability of the Turkish version has been demonstrated by Hisli.[24]

Anxiety

The anxiety status of the patients was evaluated with the Beck Anxiety Scale. This scale contains 21 questions. The cut-off value is 8. While scores of 8-15 indicates mild anxiety, 16-25 indicates moderate, and 26-63 indicates severe anxiety. Validity and reliability of the Turkish version has been tested.[25]

Balance

Balance problems of the patients were evaluated with Berg Balance Scale. It consists of 14 items that are based on the direct observation of performance. The highest score is 56, 0-20 is balance impairment, 21-40 tell us that the balance is acceptable, and 41-56 demonstrates good balance.[26]

Functional Status

Functional exercise capacity of the patients was evaluated with 6 minute walking test (6MWT). 6MWT is one of the submaximal field tests that evaluate functional exercise capacity. The distance covered in 6 minutes is expected to be 400-700 meters under normal circumstances.[27]

Disability

To evaluate the disability in the patients, Modified Oswestry Questionnaire was used (Oswestry Disability Scale). This questionnaire has 10 questions and each question has 6 choices. Maximum score is 50 points, Turkish validity study has been performed.[28]

STATISTICAL ANALYSIS

Data analysis was performed with SPSS version 22.0 (SPSS Inc., Chicago, IL, USA) package program. Descriptive statistics were presented as mean±standard deviation or as median (minimum-maximum) for quantitative variables and as case number (n) and percentage (%) for categorical variables. The Shapiro-Wilk test was used to see whether the distribution of quantitative variables was in correlation with normal distribution. When the data were in compliance with normal distribution, the comparisons between the groups were performed with one-way variance analysis. For variables with a p value of <0.05, the Bonferroni post-hoc correction test was used to identify which group caused this difference. The comparison of data that did not show a normal distribution was performed with the Kruskal-Wallis test. Categorical variables were evaluated with Pearson's chi-square or Fisher's exact chi-square test.

Spearman and Pearson correlation tests were used to investigate whether characteristics of pain is associated with fatigue, exercise capacity, balance, depression, anxiety, disability, and HRQoL in our patients. The level of statistical significance was set at $p<0.05$.

RESULTS

The demographical and clinical features of the patients are demonstrated on Table 1 and the comparison of these features based on PRLPP subgroups is presented

on Table 2. Mean age of 100 women with PRLPP was 26.2±5.6 years. Eighteen patients were physically active and 82 were evaluated as sedentary/inactive. Twenty three patients had a history of LPP before pregnancy while 77 patients did not. Among patients who were not nulliparous, 12 patients had LPP during their previous pregnancies while 44 did not have it.

Of expectant mothers experiencing pain, 49% had lumbar pain, 31% had PGP, and 20% experienced combined pain. The distribution of patients according to diagnostic subgroups is shown on Figure 1. The comparison of pain characteristics among PRLPP subgroups is shown on Table 3. The location of pain, its distribution, severity, and duration was found to be significantly different between the 3 subgroups ($p<0.05$).

In pregnant women with pain, the comparisons of quality of life, disability, fatigue, depression, anxiety, balance, and functional exercise capacity according to PRLPP subtypes are given in Table 4.

The results of correlation analyses conducted in the study were illustrated in Table 5.

DISCUSSION

Our study demonstrated that the prevalence and pain characteristics such as intensity and duration, HRQoL, disability, emotional status, functional exercise capacity significantly differ between PRLPP subgroups. Furthermore, there is significant correlations between fatigue, HRQoL, disability, emotional status, functional exercise capacity, balance, and pain in women with PRLPP.

The prevalence of LPP varies between studies due to different classification methods, definitions, and sample sizes.[15,29] PGP prevalence as a subtype was found to be higher in certain studies however in prospective and large patient series, it changed between 16 and 25%.[1,2,6,15,29] The reported prevalence of lumbar pain is >50% and it ranges from 20% to 90%.[12] The prevalence of combined PGP, and lumbar pain is 5-30%.[11,13,15,17] In a recent study of 242 pregnant women with LPP; 58.7% had lumbar pain, 28.1% had PGP and 13.2% had combined pain.[2] In our study, of pregnant women with LPP, 49% had lumbar pain, 31% had PGP, and 20% had combined pain.

TABLE 1: Demographic and clinical characteristics of the patients.

	Patients (n=100)
Age (years) ($\bar{X}$±SD)	26.2±5.6
BMI before pregnancy (kg/m^2, $\bar{X}$±SD)	23.9±4.1
Educational status (n, %)	
Illiterate	5 (5%)
Literate	12 (12%)
Primary school	33 (33%)
High school	27 (27%)
University	23 (23%)
Currently employed (n, %)	
Yes	30 (30%)
No	70 (70%)
Smoking (n, %)	
Yes	33 (33%)
No	67 (67%)
Physical activity (n,%)	
Physically active	18 (18%)
Sedantary	82 (82%)
Presence of comorbidities (n,%)	
Yes	22 (22%)
No	78 (78%)
Presence of trauma (n,%)	
Yes	9 (9%)
No	91 (91%)
Heavy worker (n,%)	
Yes	36 (36%)
No	64 (64%)
Week of pregnancy (median, minimum-maximum)	30 (9-40)
Trimester (n, %)	
1st trimester	2 (2%)
2^{nc} trimester	42 (42%)
3rd trimester	56 (56%)
Weight gain during pregnancy (kg, $\bar{X}$±SD)	8.8±5.2
Gravida (median, minimum-maximum)	2 (1-7)
Parity (median, minimum-maximum)	0 (0-4)
Presence of LPP before pregnancy (n, %)	
Yes	23 (23%)
No	77 (77%)
Presence of LPP in prior pregnancies (n, %)	
Yes	12 (12%)
No	44 (44%)

SD: Standard deviation; BMI: Body mass index; LPP: Lumbopelvic pain.

In research studies investigating the changes in the severity of pain between pain subgroups, pain severity was found to be higher in PGP as compared to lumbar pain in certain studies, while there are other studies reporting higher pain severity for combined pain.[6,16] In our study, pain severity was the lowest in

TABLE 2: Comparison of demographic and clinical characteristics between subgroups of PRLPP.

	LP (n=49)	PGP (n=31)	LPP (n=20)	p value
Age (years, X±SD)	25.3±5.3	27.2±5.5	26.9±6.5	0.290
BMI before pregnancy (kg/m^2, X̄±SD)	26.7±4.0	27.7±4.5	28±4.7	0.446
Educational status (n, %)				
Illiterate	2	0	3	0.235
Literate	15	5	2	
Primary school	19	9	5	
High school	10	9	8	
University	13	8	2	
Currently employed (n, %)				
Yes	15	9	6	0.989
No	34	22	14	
Smoking (n)				
Yes	18	9	6	0.737
No	31	22	14	
Physical activity (n, %)				
Physically active	10	6	2	0.577
Sedantary	39	25	18	
Presence of trauma (n)				
Yes	5	3	1	0.905
No	44	28	19	
Gestational week (X̄±SD)	28.2±7.3	27.6±6.3	31.9±6.9	**0.026**
Parity (median, minimum-maximum)	0 (0-4)	0 (0-3)	0 (0-3)	0.823
Weight gain in pregnancy (kg, X̄±SD)	8.2±4.9	8.9±5.1	10.2±6.2	0.563
Presence of LPP before pregnancy (n)				
Yes	14	4	15	0.256
No	35	27	5	
Presence of LPP in prior pregnancies (n)				
Yes	8	2	2	0.370
No	19	15	10	

PRLPP: Pregnancy related lumbopelvic pain; LP: Lombar pain; PGP: Pelvic girdle pain; LPP: Lumbopelvic pain; SD: Standard deviation; BMI: Body mass index.

lumbar pain group and the highest in combined pain group. Furthermore, the intensity of pain was significantly correlated with fatigue, HRQoL, the severity of disability, anxiety and depression, and all SF-36 subscales except RE and MCS.

As concerns the onset of pain, the general idea is that it starts at the end of the first trimester reaching its peak level at 24-36 weeks.[1,30] A study reported that pain appeared during the second trimester at 22 weeks.[12] Based on our study data, the time of onset for pain was 21.2±3.4 gestational weeks and in lumbar pain and combined pain subgroups the duration of

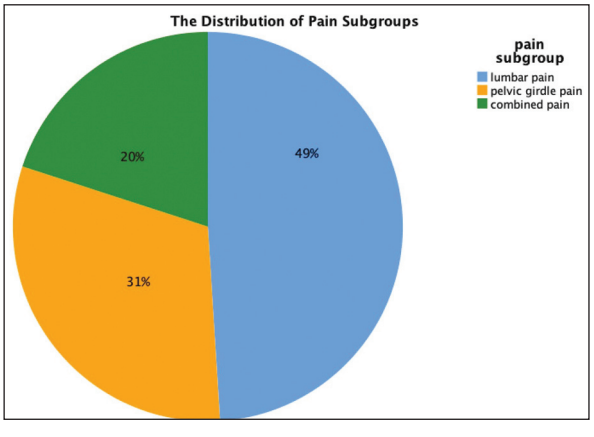

FIGURE 1: The prevelance of pain subgroups.

TABLE 3: The comparisons of pain characteristics between subgroups of PRLPP.

	LP (n=49)	PGP (n=31)	LPP (n=20)	p value	Post-hoc test
Location of pain (n)					
Low back	49	0	20	**0.000**	
Pelvic	0	18	0		
Inguinal	0	5	19		
Gluteal	0	8	0		
Radiation of pain (n)					
None	26	24	12	**0.005**	
Hip	6	4	2		
Anterior thigh	1	3	0		
Posterior thigh	1	0	1		
Both anterior and posterior thigh	15	0	5		
Intensity of pain (VAS, $\bar{X}$±SD)	6.5±1.6	7.0±1.6	7.9±1.6	**0.008**	Group 1-2 p=0.692 Group 1-3 p=0.006 Group 2-3 p=0.156
Severity of pain intensity					
Mild (VAS 0-4)	4	1	0	0.136	
Moderate (VAS 5-7)	31	19	8		
Severe (VAS≥8)	14	11	12		
Duration of pain (month, $\bar{X}$±SD)	4.0±1.5	2.9±1.6	4.1±2.0	**0.020**	Group 1-2 **p=0.029** Group 1-3 p=1.000 Group 2-3 p=0.052
Type of pain (n)					
Nociceptive pain	42	29	17	0.562	
Neuropathic pain	7	2	3		

PRLPP: Pregnancy related lumbopelvic pain; LP: Lombar pain; PGP: Pelvic girdle pain; LPP: Lumbopelvic pain; SD: Standard deviation; VAS: Visual analog scale.

pain was significantly longer than in PGP group. Moreover, the duration of pain was significantly correlated with the severity of disability, functional exercise capacity, balance and RE subscale of SF-36.

Pregnancy-related LPP is generally described as a constant and dull pain. In a study, the type of pain was reported as dull pain (45%), radicular pain (20%), stabbing pain (15%), sharp pain (15%), and burning pain (5%).[29]

In the literature, in a study investigating whether LPP had features of neuropathic pain; neuropathic pain was identified in 37.8% of the patients negatively affecting their functional status and health related quality of life.[31] In our study, 12 pregnant women (12%) described spontaneous neuropathic pain and with provocative sensory tests, allodynia and hyperalgesia were identified in these patients; however, pain subgroups did not have statistical differences with regard to neuropathic pain.

It has been shown that pregnancy-related LPP causes disability, with the frequency of disability varying between 21 and 81%.[4-6,13] With more intense pain, PGP has a different clinical presentation from lumbar pain, and it limits many daily living activities and work ability, it is associated with decreased quality of life, high degrees of disability, and long periods of health reports.[5,6,15] Previous studies demonstrated a significant correlation between disability and pain intensity.[3,8,15,32] Prevalence of severe disability in PRLPP was identified by Virgara et al. as 21.9% moderate disability and 6.3% severe disability whereas Pierce et al. reported 23% severe disability.[6,8] In our study, 16% of the patients had severe disabilities and the intensity and duration of pain were significantly correlated with the severity of a disability. There are limited studies in the literature investigating disability among PRLPP subgroups. It was reported that disability scores were the highest in the combined pain group while the lowest in the LP group.[6,15] Our results are similar to those of these studies.

TABLE 4: The comparisons of fatigue, HRQoL, balance, disability, anxiety, depression and functional exercise capacity between subgroups of PRLPP.

	LP (n=49)	PGP (n=31)	LPP (n=20)	p value	Post-hoc tests
SF-36 (X±SD)					
PF	37.5±8.9	35.4±10.6	33.3±8.9	0.186	For SF-36/GH
RP	36.2±10.7	34.6±10.9	32.5±8.3	0.405	Group 1-2 **p=0.136**
BP	35.7±7.7	33.9±8.1	33.5±7.7	0.437	Group 1-3 **p=0.175**
GH	43.0±9.0	41.1±8.5	36.7±7.6	0.004	Group 2-3 **p=0.003**
VT	46.2±9.0	44.9±8.1	41.4±7.1	0.084	
SF	35.9±10.5	36.6±10.7	36.2±12.1	0.965	
RE	34.4±11.9	33.5±11.5	32.1±10.5	0.821	
MH	40.8±10.3	39.5±11.5	33.5±9.9	0.037	
PCS	35.7±7.7	34.9±7.9	32.4±8.0	0.291	
MCS	41.0±10.1	40.4±9.2	37.4±8.6	0.294	
Oswestry Disability Index (X̄±SD)	17.9±8.1	22.2±8.2	25.3±8.6	0.007	Group 1-2 **p=0.073**
					Group 1-3 **p=0.008**
					Group 2-3 **p=0.517**
Severity of disability (n)					
Mild (ODI 1-10)	4	6	0	0.063	
Moderate (ODI 11-30)	37	23	14		
Severe (ODI≥31)	8	2	6		
FSS (X̄±SD)	4.8±1.6	5.0±1.3	5.4±1.4	0.416	
Presence of fatigue (n)					
None	18	14	6	0.535	
Yes	31	17	14		
BDI (X̄±SD)	13.6±9.6	12.6±8.9	19.6±9.6	0.027	Group 1-2 **p=1.000**
					Group 1-3 **p=0.057**
					Group 2-3 **p=0.034**
Presence of depression (n)					
None	34	25	7	0.003	
Yes	15	6	13		
BAI (X±SD)	14.6±12.0	13.3±9.4	23.4±12.2	0.006	Group 1-2 **p=1.000**
					Group 1-3 **p=0.013**
					Group 2-3 **p=0.008**
Berg Balance Scale (X̄±SD)	49.7±5.5	50.2±6.4	46.8±6.5	0.076	
Six minute walk test (distance in meters, X̄±SD)	444.7±35.9	490.0±29.7	429.3±35.9	0.000	Group 1-2 **p=0.000**
					Group 1-3 **p=0.208**
					Group 2-3 **p=0.000**

HRQoL: Health-related quality of life; PRLPP: Pregnancy related lumbopelvic pain; LP: Loombar pain; PGP: Pelvic girdle pain; LPP: Lumbopelvic pain; SD: Standard deviation; SF-36 PF: Physical function; RP: Physical role; BP: Bodily pain, GH: General health; VT: Vitality; SF: Social function; RE: Emotional role; MH: Mental health; PCS: Physical component summary; MCS: Mental component summary; ODI: Oswestry disability index; FSS: Fatigue severity scale; BDI: Beck depression inventory; BAI: Beck Anxiety Inventory.

There are also limited studies evaluating the quality of life in women with PRLPP. In a study, the scores of physical function and pain subcategories of SF-36 were found to be significantly low in pregnant women with PGP. However, during the one-year follow-up in the postpartum period, these scores improved despite the persistence of PGP.[33] Another study, which compared Nottingham Health Profile and SF-36 scales between pregnant women with and without PGP, demonstrated that pain had negative effects on quality of life.[34] Gutke et al. investigated HRQoL among PRLPP subgroups and reported that the lowest quality of life scores were found in combined pain and the highest ones were observed in lumbar pain.[15] In our study, we did not find any significant differences between the pain subgroups ex-

TABLE 5: Correlation of pain characteristics with fatigue, HRQoL, balance, disability, anxiety, depression, and functional exercise capacity

	Intensity of pain (VAS)		Duration of pain		Subgroups of pain*	
	r value	p value	r value	p value	r value	p value
FSS	**0.306**	**0.002**	-0.054	0.593	0.125	0.217
Presence of fatigue**	**0.287**	**0.004**	-0.036	0.726	0.026	0.798
SF36-PF	**-0.323**	**0.001**	-0.129	0.202	-0.170	0.090
SF36-RP	**-0.204**	**0.041**	0.094	0.350	-0.134	0.183
SF36-BP	**-0.641**	**0.000**	0.053	0.601	-0.123	0.223
SF-36 GH	**-0.358**	**0.000**	-0.042	0.675	-0.110	0.275
SF-36 VT	**-0.287**	**0.004**	0.070	0.491	**-0.202**	**0.044**
SF-36 SF	**-0.267**	**0.007**	0.122	0.228	0.015	0.884
SF-36 RE	-0.103	0.308	**0.203**	**0.043**	-0.074	0.464
SF-36 MH	**-0.253**	**0.011**	-0.055	0.590	**-0.238**	**0.017**
SF-36 PCS	**-0.475**	**0.000**	-0.058	0.567	-0.153	0.127
SF-36 MCS	-0.159	0.115	0.136	0.176	-0.134	0.185
Berg Balance Scale	**-0.350**	**0.000**	**-0.296**	**0.003**	-0.153	0.128
Oswestry Disability Index	**0.475**	**0.000**	0.176	0.080	0.058	0.565
Disability status***	**0.363**	**0.000**	**0.245**	**0.014**	0.095	0.348
BDI	**0.327**	**0.001**	-0.010	0.920	0.193	0.054
Presence of depression****	**0.273**	**0.006**	-0.014	0.892	**0.213**	**0.033**
BAI	**0.317**	**0.001**	0.045	0.659	**0.236**	**0.018**
Six-minute walk test	-0.066	0.512	**-0.351**	**0.000**	**-0.282**	**0.004**

HRQoL: Health-related quality of life; VAS: Visual analog scale; FSS: Fatigue severity scale; SF-36 PF: Physical function; RP: Physical role; BP: Bodily pain; GH: General health; VT: Vitality; SF: Social function; RE: Emotional role; MH: Mental health; PCS: Physical component summary; MCS: Mental component summary; BDI: Beck depression inventory; BAI: Beck anxiety inventory; * Pain subgroups was coded as lumbar pain (1), pelvic girdle pain (2), combined pain (3); ** presence of fatigue was coded as none (0) and yes (1). ***disability level was coded as none (0), mild (1), moderate (2), severe (3); ****presence of depression

cept for the "GH subcategory". Our results of SF-36 GH category scores showed similarity to the study by Gutke et al. Furthermore, we found a significant correlation between HRQoL and pain intensity.[15]

Research analyzing the relationship between PRLPP and fatigue is also scarce. In one study, no difference was found in FSS scores in pregnant women with or without LPP.[35] This result was due to the fact that the duration of pregnancy-related pain was short. Finding higher FSS scores in pregnant women than in the normal population was explained by the effects of pregnancy itself. We identified fatigue in 62 women (62%) with LPP, with no difference in fatigue between pain subgroups.

Many emotional changes occur during pregnancy, mild depression and anxiety are quite common.[36] Virgara et al. found that PRLPP increased the risk of depression and anxiety by 13 folds and that the development of depression was correlated with the severity of the functional disability.[8] Gong Long et al. performed a study analyzing the relationship between PRLPP subgroups and pre and post-natal depression; in the PGP group, depressive symptoms were significantly higher than the LP group however there was not any significant difference with the combined pain group. In this study, prenatal depression was shown to be strongly correlated with both PGP and LP.[2] In another research, a positive correlation was identified between depression/anxiety and LP and PGP.[3] In our study, we identified depression prevalence as 34% in women with PRLPP. Furthermore, we demonstrated that PRLPP subgroups and the intensity of the pain had a significant influence on depression. Both depression and anxiety scores were found to be significantly high in the combined pain group. We believe that this significant difference in pain groups is due to severe disability, intensity, and longer duration of pain.

Six and 12-minute walk tests are submaximal exercise tests that measure functional exercise capacity.[37] When compared with non-pregnant controls, maximal aerobic capacity (VO_2max) has been found to decrease in pregnant women.[38] In a study by Thorell et al., VO_2max values and exercise capacity were correlated with pain intensity, however they were found to have no effect on pain onset.[39] Moreover, this study found that as VO_2max increased, VAS score decreased, yet a mechanism to explain this observation could not be stipulated. In our study, 6-minute walking distance was close to the lower limit, but all the subgroups were within the normal range. Exercise capacity was the lowest in the combined pain group and the highest in PGP. The duration of pain was significantly correlated with exercise capacity in our study.

Physiological changes in dynamic and static balance are observed during pregnancy and fall risk is increased as compared to the normal population.[40] Lira et al. did not identify any difference in terms of postural balance in pregnant women with or without LPP.[41] Another study showed that pregnant women with LPP had higher fall risk and postural instability as compared to pregnant women without pain.[42] In our study, there was no difference among subgroups in terms of balance, but the intensity and duration of pain were identified to have significant effects on balance.

STUDY LIMITATIONS

There were several limitations in our study. The present study was based on a small sample and our sample cannot be considered as representative of the general population of subjects with PRLPP. It was also a cross-sectional study design, and only a single time point can be evaluated.

Furthermore, the study sample has no control group thus some of our conclusions were limited due to this. Although the conclusions of the study are based on sound data and the methodologies, further controlled studies are necessary to generalize the conclusions of this study.

CONCLUSION

Pregnancy related LPP is a heterogeneous condition, pain intensity, depression, quality of life, permanent pain risk and its chronicity, disability, and optimal treatment strategies can differ significantly.

Identifying pain subgroups at an early stage is important for prevention and for developing and selecting specific treatment strategies. In this study, we found that the intensity of pain, its duration and radiation, the GH domain of quality of life, anxiety, depression, disability and functional exercise capacity differed significantly among PRLPP subgroups. To the best of our knowledge, our study is the first study in the literature to simultaneously compare the differences in prevalence, pain characteristics, fatigue, functional exercise capacity, balance, HRQoL, psychological state, and disability between the LPP subgroups. Our main objective should be to prevent the negative consequences caused by PRLPP and its biopsychosocial impact and to eliminate the risk of persistent pain in future pregnancies and later years of life by providing a holistic treatment approach.

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Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

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