İstanbul Med J 2025; 26(1): 57-63
DOI: 10.4274/imj.galenos.2025.72829

The Experience of Pain Management for Pregnancy-Related Musculoskeletal Pain: A Retrospective Cohort Analysis

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ABSTRACT

Introduction: The primary aim of this study was to determine the ultrasound (US)-guided therapies for musculoskeletal pain during pregnancy. The secondary aim of the study was to define the parameters associated with treatment outcomes.

Methods: This retrospective cohort study included patients who had received US-guided injections for musculoskeletal pain during pregnancy and continued treatment for at least two months postpartum.

Results: Eighty patients, who underwent surgery at an average gestational age of 26.23±7.23 weeks, with an average age of 26.96±4.72 years and a body mass index of 27.11±3.39 kg/m^2 were included. Myofascial pain syndrome was the most commonly diagnosed condition. The three most common diagnoses were myofascial pain syndrome (20%), piriformis syndrome (18.8%) and plantar fasciitis (17.5%). The most commonly used treatments were trigger point injections (38, 47.5%) and piriformis injections (15, 18.8%). All patients experienced a decrease in their Numeric Rating Scale (NRS) from day 1 to day 30 ($p<0.001$). There is a moderate and significant positive correlation between the first measurement of NRS and weight gain during pregnancy ($r=0.242$, $p=0.031$).

Conclusion: US-guided pain interventions are safe and effective in all trimesters without maternal and neonatal complications. Pregnancy should not be considered a contraindication to interventional pain management, as these women can achieve significant relief of their symptoms.

Keywords: Pregnancy, musculoskeletal pain, ultrasound, injection, pain, NR

Introduction

Maternal health is an important public health issue worldwide. Interest in maternal morbidity, including musculoskeletal issues during pregnancy, is growing in recent literature, as the number of women with pregnancy-related problems and mortality rates in developing countries such as Türkiye is decreasing (1).

A wide range of musculoskeletal problems results from the biomechanical, hormonal and circulatory changes that occur during pregnancy. The cause may be an exacerbation of pre-existing symptoms or pregnancy-specific pain and/or inflammation. The center of gravity is affected by the position and weight of the expanding uterus, while hormonal fluctuations lead to ligament laxity and fluid retention. These changes increase the risk of musculoskeletal complaints, lower the threshold for developing spinal, hip, pelvic and wrist injuries, and lead to mechanical compression of structures such as the median nerve. Numerous studies have shown that almost all pregnant women experience musculoskeletal problems to varying degrees (2). Short-term disability symptoms occur in 25% of pregnant women (3). Spinal pain was reported most frequently. Other common problems were pain in the extremities, muscle cramps, hip pain, and heel pain (4).

Pain can have a negative impact on quality of life, the development of chronic pain syndrome, and the amount of time lost from work (5). More and more women are opting for elective cesarean sections or inductions to alleviate their discomfort. These complications and delivery options exacerbate maternal and fetal risk and incur significant costs (6,7). In addition, ambulatory challenges during acute pain episodes are suspected to be associated with life-threatening complications in pregnancy, including venous thromboembolism (7).

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Cite this article as: Aşkın Turan S, Akyüz Yıldırım A, Bütün Z, Kayapınar M, Turan H. The experience of pain management for pregnancy-related musculoskeletal pain: a retrospective cohort analysis. İstanbul Med J. 2025; 26(1): 57-63

Received: 12.12.2024
Accepted: 19.01.2025
Publication Date: 19.02.2025

The pregnant patients are usually undertreated because of fear of causing harm to the fetus. The medical treatment for musculoskeletal pain is unavailable. The main methods of pain relief during pregnancy are non-pharmacological and non-invasive (8). If conservative treatments prove inadequate, patients should receive interventional pain management. Due to the risk of radiation exposure to the mother and fetus, either computed tomography or scope-guided pain treatments are rarely suggested. Ultrasound (US) has become a well-known imaging modality for the diagnosis and treatment of musculoskeletal disorders during pregnancy (9). But still, there is fear of causing harm to both fetus and mother. Even if done, the effectiveness of US-guided injections in relieving pain during pregnancy is not well documented.

The primary aim of the study was to determine which interventions were used to treat musculoskeletal pain during pregnancy, using US to identify them. The secondary aim of the study was to determine effectiveness in relation to trimester, and other factors associated with treatment outcome.

Methods

Standard Protocol Approval and Patient Consent

In accordance with the Declaration of Helsinki, this retrospective cohort study was approved by the University of Health Sciences Türkiye, Van Training and Research Hospital Local Ethics Committee (approval number: 2023/20-03, date: 27.09.2023). Before participating in the study, all participants were required to give written and verbal informed consent. The manuscript was written in accordance with the STROBE (Strengthening Observational Study Reporting in Epidemiology) guideline. The study was conducted using a retrospective cohort approach. Primary and secondary outcomes were analyzed using medical records.

Study Design and Participants

This retrospective cohort analysis examined patients aged 18 years or older who received US-guided injections for the treatment of musculoskeletal pain during pregnancy and were monitored for at least two months after delivery. A search in the electronic database was performed between January 2021 and January 2023 with the diagnosis code pregnancy (Z33).

Patients without documentation or with insufficient follow-up were excluded. Patients who missed appointments or were unable to communicate were excluded from the study. Exclusion criteria included patients diagnosed with multiple musculoskeletal disorders, migraine, or nerve entrapment. Patients who presented with new neurological symptoms or abnormal, severe biochemical tests were excluded. Patients with coagulopathy, neuromuscular disease, rheumatologic disease, diabetes, hypertension, or high-risk conditions, including the risk of abortion or in vitro fertilization treatment, were excluded to avoid potential complications during invasive procedures.

The patients' medical records and follow-up data were reviewed retrospectively. Demographic and clinical characteristics of the participants such as age, body mass index (BMI), weight gain during pregnancy, parity, week of gestation when the intervention was performed, week of delivery, education level, occupation, exercise habits and weight of the infant were obtained from the medical records. Neck, back, lumbar spine, hip, knee, ankle, foot, hand, wrist, elbow, shoulder were identified as sites of musculoskeletal pain.

The diagnoses were categorized as follows: 1. Myofascial pain; 2. Piriformis syndrome; 3. Symptoms related to the mechanical sacroiliac joint; 4. Shoulder effusion (bursa or joint); 5. Plantar fasciitis; 6. Facet joint syndrome; 7. Medial/lateral epicondylitis; 8. Trochanteric bursitis; 9. Previous diagnosis of radiculopathy; 10. Dequervain's syndrome.

Initially, patients were advised to undergo conservative treatment, including physical rehabilitation, exercise, paracetamol, and topical non-steroidal anti-inflammatory drugs. For patients who did not respond to conservative treatment, intervention was suggested.

Intervention

In our pain medicine outpatient clinic, we performed the injections, without anesthesia, using an US machine equipped with a linear 13-5 MHz and convex C1-5-D probes (GE Healthcare, VolusonTM E6, Türkiye). The injections were administered as follows: 1. Trigger point injection; 2. Intrabursal/intraarticular injection; 3. Erector spinae plane block; 4. Medial facet branch injection; 5. Caudal epidural injection; 6. Piriformis injection; 7. Injection into the sacroiliac joint.

The trigger point injections and piriformis muscle injections were performed with US, and 3 cc of bupivacaine 0.25% (buvasin 0.5%) was administered. Trigger points were mostly on muscles around the neck and the scapula. Injections of 40 mg triamcinolone (kenacort) and 0.5% bupivacaine were administered under US guidance for intrabursal/intraarticular, sacroiliac joint, and fascial branch injections. Patients with radicular symptoms (previously diagnosed S1 radiculopathy) received a caudal epidural steroid injection of 8 mg dexamethasone under US-guidance. Each procedure was performed in accordance with a recommendation (9).

Outcome Measures and Follow-up

The primary aim of the study was to determine which US-guided therapies for musculoskeletal complaints were performed during pregnancy and to evaluate them in accordance with the medical data. The secondary aim of the study was to assess effectiveness according to trimester and other factors influencing treatment outcome. The Numeric Rating Scale 11 (NRS-11) was used to evaluate the effectiveness of the interventions before the procedure (NRS-1) and at one week (NRS-2) and one month (NRS-3) after the procedure. Patients were re-interviewed on the NRS (NRS-4) at least 30 days after their delivery. Medical records were used to assess the characteristics influencing the degree of pain before and after treatment.

Statistical Analysis

The descriptive statistics were presented in the following formats: frequency, percentage, mean, standard deviation, median, minimum, maximum, and 25^{th}-75^{th} percentiles (Q1-Q3), values. The Shapiro-Wilk test was employed to verify the normality assumption by analyzing the histogram, Q-Q plot, skewness, and kurtosis values. When analyzing the

difference between two groups' numerical data, the Mann-Whitney U test was employed when the data did not fit the normal distribution, and the Independent samples t-test was used when the data did. The Kruskal-Wallis H test was employed to analyze the difference between the numerical values of more than two groups when the data distribution did not conform to the normal distribution. The Bonferroni-Dunn Procedure was applied for pairwise comparisons in significant results. In the case of non-normally distributed data, the Friedman test was employed to determine whether the differences in time-dependent measurements varied between groups. When the numerical data did not follow a normal distribution, the relationships between them were assessed using the Spearman's correlation test. Statistical significance was determined by p-values that were less than 0.05. The SPSS 23.0 package was used for the analyses.

Results

Baseline Characteristics

After excluding 12 patients with missing data or different types of pain, the present study included 80 subjects, 68.8%, of whom were in the third trimester (Figure 1). The first visit to the pain clinic revealed a mean age of 26.96±4.72 years, a BMI of 27.11±3.39 kg/m^2, and a mean week of gestation of 26.23±7.23 weeks. The mean gestational week of delivery was 38.84±1.53 weeks. The average weight gain during pregnancy was 13.54±3.1 kilograms. The proportion of working patients was 46.3%. 48.8% of the participants had never exercised. Pregnancy complications included preterm delivery (10.0%), placental abnormality (5.0%), and pre-eclampsia (5.0%). An analysis of the categorical and numerical sociodemographic characteristics of the patients is presented in Tables 1, 2.

The characteristics of pain are summarized in Tables 1, 2. A mean NRS of 7.75±0.72 and a mean pain duration of 3.66±1.32 weeks were found. Most patients (56.2%) reported that their pain had started before pregnancy, and two-thirds of them reported that their pain had worsened during pregnancy. The pain occurred in the following regions: Back (18.8%), lower extremities (17.5%), heel (17.5%), hip (16.3%), upper extremities (11.3%), neck (7.5%), hand (7.5%) and shoulder (3.8%). The following diagnoses were made: myofascial pain syndrome (20%), piriformis syndrome (18.8%), plantar fasciitis (17.5%), lateral epicondylitis (10.0%), facet syndrome (10.0%), mechanical sacroiliac pain (6.3%), Dequervain's synovitis (5.0%), trochanteric bursitis (5.0%), S1 radiculopathy (3.8%), and subacromial effusion (3.8%). Trigger point injections were administered in 38 patients (37.5%), while 15 patients received piriformis injections. Intrabursal/intraarticular injections accounted for 8.8% of all injections. A total of six patients (7.5%) underwent caudal epidural injections for S1 radiculopathy, which was confirmed by magnetic resonance imaging. Six patients (7.5%), with back pain, underwent the erector spinae plane block. The sacroiliac joint was injected in five patients (6.3%). Injections of the medial branch of the facet were administered in three (3.8%) patients.

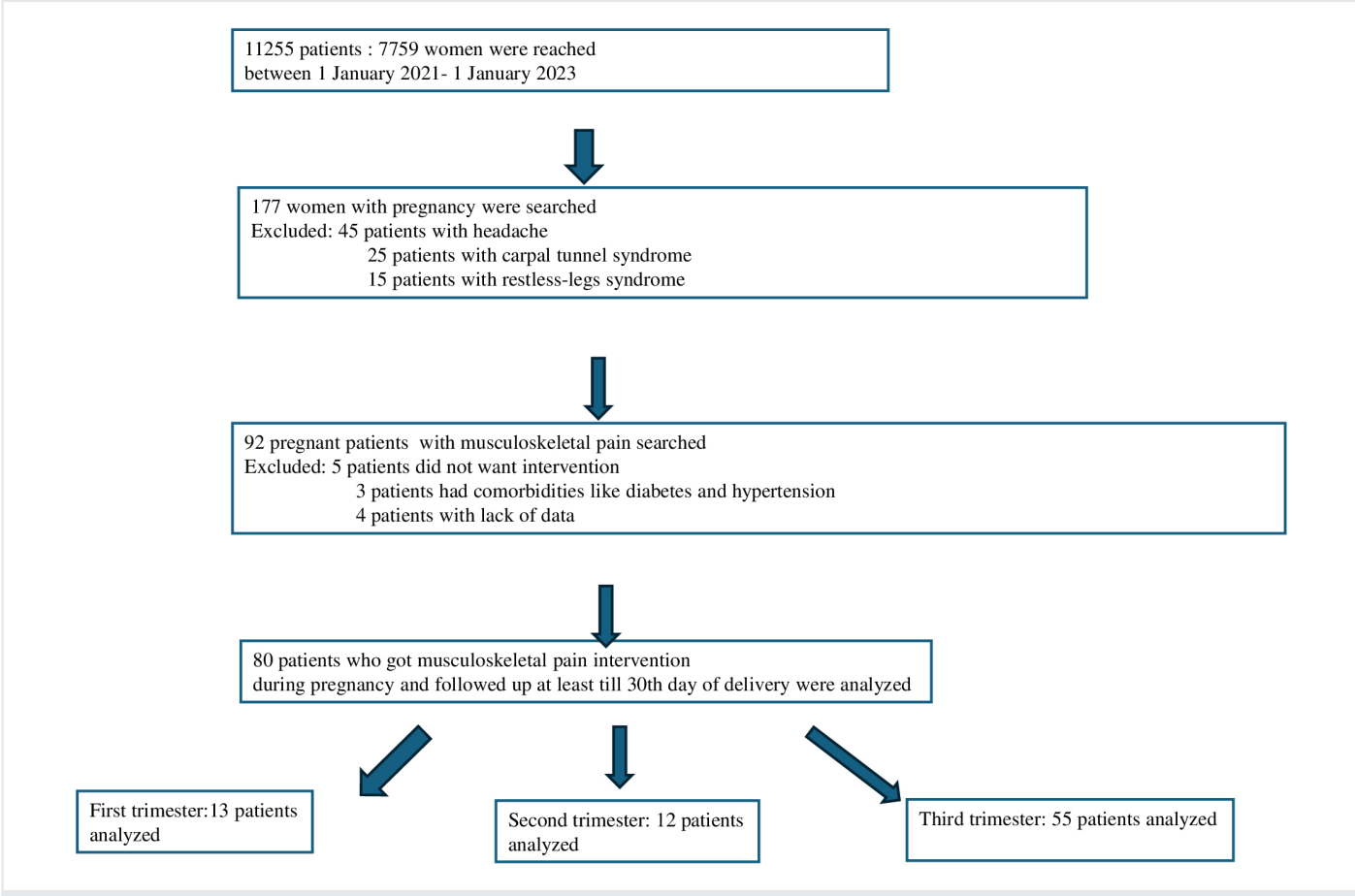

Figure 1. Flowchart diagram of the study

Table 1. Categorical variables of the patients

Variables	Categories	n	%
Patient trimester when admitted to pain department	1. Trimester	13	16.3%
	2. Trimester	12	15.0%
	3. Trimester	55	68.8%
Education level of patients	No education	5	6.3%
	Primary	27	33.8%
	High school	33	41.3%
	University	15	18.8%
Pain region	Neck	6	7.5%
	Back	15	18.8%
	Lower extremity	14	17.5%
	Upper extremity	9	11.3%
	Shoulder	3	3.8%
	Hand/fingers	6	7.5%
	Heel	14	17.5%
	Hip	13	16.3%
Diagnosis	Myofacial pain	16	20.0%
	Priformis syndrome	15	18.8%
	Mechanical sacroiliac pain	5	6.3%
	Subacromial effusion	3	3.8%
	Plantar fasiit	14	17.5%
	Facet syndrome	8	10.0%
	Sacral root radiculopathy	3	3.8%
	Medial/lateral epicodilitis	8	10.0%
	Trochanteric pain	4	5.0%
	Dequervain synovitis	4	5.0%
Has this pain begun during the pregnancy	Yes	35	43.8%
	No. the same as before pregnancy	15	18.8%
	Got worse after pregnancy	30	37.5%
Interventions	Trigger point injection	38	47.5%
	Joint injection	7	8.8%
	Erector spina plane block	6	7.5%
	Faset/medial branch injection	3	3.8%
	Caudal epidural injection	6	7.5%
	Priformis injection	15	18.8%
	Sacroiliac joint enj	5	6.3%
Pregnancy complication	Preterm birth	8	10.0%
	Plasenta anomaly	4	5.0%
	Preeclampsia	4	5.0%
	Other	0	0.0%
	None	64	80.0%
Sex of the infant	Male	31	38.8%
	Female	49	61.3%
How often do you exercise during pregnancy	Regular	8	10.0%
	Irregular	33	41.3%
	Never	39	48.8%
Do you employ during pregnancy?	Yes	37	46.3%
	No	43	53.8%

NRS Score Evaluation According to the Time and Three Trimesters

The correlation between specific numerical variables and time-dependent measurements of the NRS is examined in Table 3. According to this, there is a moderate and significant positive correlation between the first measurement of NRS and weight gain during pregnancy ($r=0.242$, $p=0.031$). The week of delivery and the NRS measurement in the first month show a weak and significant negative correlation ($r=-0.247$, $p=0.027$), while the duration of pain (weeks) shows a weak and significant inverse correlation ($r=-0.238$, $p=0.034$). There was a weak and statistically significant negative correlation between the postpartum NRS and the week of pregnancy in which the intervention was performed ($r=-0.293$, $p=0.008$).

The comparison of the time-dependent change in measurements for each group and the difference in NRS-1, NRS-2, NRS-3, and NRS-4 according to the specific categorical variables are shown in Table 4. Pregnant women who had new pain during pregnancy had a higher NRS-1 score than those who had pain before pregnancy (NRS-1: 8.06 ± 0.73, $p=0.006$). The first week NRS measurement was significantly higher than NRS-2, NRS-3, and NRS-4 in all trimester groups ($p=0.035$).

In non-exercising individuals, each measurement in the test was different, evaluated at baseline NRS, first week NRS, first month NRS, and postpartum NRS ($p<0.001$). The first NRS was significantly higher than the second, third, and fourth NRS in the exercising group, and the third and fourth NRS in the exercising group were significantly higher than the second NRS ($p<0.001$). In contrast, there was no difference between the patients who exercised and those who did not.

In the first month, the NRS score of patients with pregnancy-related complications was significantly higher than that of patients with uncomplicated pregnancies ($p=0.012$).

Table 2. Numeric variables of the patients

Variables	n	Mean	SD	Median	Q1	Q3
Patient age	80	26.96	4.72	27	23	30.5
Pregnancy week when seen in the pain department	80	26.23	7.23	29	22.5	32
The delivery week	80	38.84	1.53	39	38	40
Patient height (cm)	80	164.23	7.61	163	158.5	170.5
Patient weight (kg)	80	73.2	10.81	71	67	79.5
Body mass index (kg/m^2)	80	27.11	3.39	26.57	24.62	28.83
Weight gain during pregnancy	80	13.54	3.15	12.5	11	16
Weight of the infant	58	3492.31	639.39	3715	3000	4000
Pain duration (weeks)	80	3.66	1.32	3.5	3	5
NRS initial	80	7.75	0.72	8	7	8
NRS after treatment in the first week	80	1.81	0.68	2	1	2
NRS 1 month after treatment	80	3.03	0.71	3	3	3
NRS postpartum 1. month	80	4.03	1.09	4	3	5

NRS: Numeric Rating Scale, SD: Standard deviation

Table 3. The correlation between numerical variables and NRS scores during time

		NRS initial (1)	NRS 1-week after the intervention (2)	NRS 1-month after the intervention (3)	NRS 1-month after the delivery (4)
NRS initial (1)	r		-0.126	0.168	-0.009
	p		0.265	0.135	0.934
NRS one week after the intervention (2)	r	-0.126		0.14	0.193
	p	0.265		0.216	0.086
NRS one month after the intervention (3)	r	0.168	0.14		-0.166
	p	0.135	0.216		0.142
NRS one month after the delivery (4)	r	-0.009	0.193	-0.166	
	p	0.934	0.086	0.142	
Patient age	r	-0.117	0.05	-0.115	0.155
	p	0.301	0.658	0.312	0.17
Pregnancy week when seen in the pain department	r	-0.023	-0.203	-0.193	**-0.293****
	p	0.84	0.071	0.086	**0.008**
The delivery week	r	-0.024	0.116	**-0.247***	0.1
	p	0.834	0.304	**0.027**	0.377
Weight gain during pregnancy	r	**0.242***	-0.007	0.093	-0.018
	p	**0.031**	0.947	0.409	0.871
Weight of the infant at delivery	r	-0.096	0.156	-0.184	0.172
	p	0.472	0.243	0.166	0.197
Pain duration (weeks)	r	0.031	-0.001	**-0.238***	-0.158
	p	0.787	0.991	**0.034**	0.162

Spearman correlation test, *p<0.05, **p<0.01, NRS: Numeric Rating Scale

Table 4. The change of NRS at time according to categorical variables

		NRS initial (1)		NRS one week after the intervention (2)		NRS one month after the intervention (3)		NRS one month after the delivery (4)		Dependent test (p)	Meaning
		Mean (SD)	p	Mean (SD)	p	Mean (SD)	p	Mean (SD)	p		
Total		7.75 (0.72)		1.81 (0.68)		3.03 (0.71)		4.03 (1.09)		**<0.001**[c]	**1>4>3>2**
Patient trimester when first admitted	1. Trimester	7.85 (0.8)	0.694[a]	2.23 (0.6)	**0.035**[a] **1>2** 1. trim > 2. trim	3.23 (0.44)	0.19[a]	4.23 (1.17)	0.24[a]	**<0.001**	**1>2, 3 4>2**
	2. Trimester	7.83 (0.83)		1.58 (0.67)		3.17 (0.72)		4.33 (1.07)		**<0.001**	**1>2, 3 4>2**
	3. Trimester	7.71 (0.69)		1.76 (0.67)		2.95 (0.76)		3.91 (1.08)		**<0.001**	**1>2, 3, 4 3, 4>2**
Has this pain begun during the pregnancy?	Yes (1)	8.06 (0.73)	**0.006**[a] Yes > no/ worse	1.69 (0.68)	0.114[a]	3.03 (0.82)	0.609[a]	3.86 (1.22)	0.209[a]	**<0.001**	**1>2, 3, 4 3, 4>2**
	No. the same as before pregnancy (2)	7.47 (0.64)		2.13 (0.74)		3.13 (0.52)		3.93 (1.16)		**<0.001**	**1>2, 3, 4 4>2, 3**
	Got worse after pregnancy (3)	7.53 (0.63)		1.8 (0.61)		2.97 (0.67)		4.27 (0.87)		**<0.001**	**1>2, 3, 4 -3, 4>2**
Pregnacy complication	No	7.72 (0.72)	0.485[b]	1.81 (0.66)	0.952[b]	2.91 (0.61)	0.012[b]	4.03 (1.05)	0.693[b]	**<0.001**	**1>4>3>2**
	Yes	7.87 (0.72)		1.81 (0.75)		3.5 (0.89)		4 (1.26)		**<0.001**	**1>2, 3, 4 -4>2**
Exercise	No	7.74 (0.64)	0.866[b]	1.74 (0.72)	0.327[b]	2.9 (0.68)	0.099[b]	4.21 (0.95)	0.099[b]	**<0.001**	**1>4>3>2**
	Regular-irregular	7.76 (0.8)		1.88 (0.64)		3.15 (0.73)		3.85 (1.2)		**<0.001**	**1>2, 3, 4 3, 4>2**
Do you employ during pregnancy?	Yes	7.76 (0.68)	0.845[b]	1.81 (0.7)	0.953[b]	3.11 (0.84)	0.546[b]	4.11 (0.99)	0.744[b]	**<0.001**	**1>2, 3, 4 3, 4>2**
	No	7.74 (0.76)		1.81 (0.66)		2.95 (0.58)		3.95 (1.17)		**<0.001**	**1>2, 3, 4 3, 4>2**

[a]Kruskal-Wallis H test with Bonferroni-Dunn Prosedure, [b]Mann-Whitney U test, [c]Friedman test with Bonferroni-Dunn Prosedure, NRS: Numeric Rating Scale, 1: NRS initial, 2: NRS one week after the intervention, 3: NRS one month after delivery, 4: NRS one month after delivery

During pregnancy, the first NRS was higher than the second, third, and fourth, with the third and fourth higher than the second in both employed and unemployed women. However, no difference was found between the NRS values of employed and unemployed women.

Discussion

This retrospective cohort study has drawn attention to the effectiveness of US-guided treatments for musculoskeletal pain during pregnancy. The highest frequency of pain interventions was during the third trimester. More intense pain correlated with weight gain during pregnancy. Treatment outcomes in the first month and in the postpartum period worsened with weight gain during pregnancy.

Most patients reported that their pain had occurred before pregnancy, and two-thirds of them reported that their pain had worsened during pregnancy. The most common areas of pain were the back and legs. Myofascial pain syndrome, piriformis syndrome, and plantar fasciitis were the most common diagnoses. Trigger point injections and piriformis injections were the most frequently performed US-guided procedures. From the first appointment to day 30, pain intensity decreased in all patients. The NRS score was consistently similar across the trimesters. Consequently, the therapies were beneficial in all three trimesters.

Patients treated in the first trimester had a higher initial NRS score than those treated in later trimesters. Patients who had no pain before pregnancy or who had gained weight during pregnancy had a higher initial NRS score. The effectiveness of the intervention during the first month was negatively correlated with the week of delivery and the duration of pain. In the postpartum period, pain intensity was inversely correlated with the week postpartum in which the intervention was performed, suggesting that effectiveness decreased as time after the intervention increased. In the first month, patients with pregnancy-related complications had a higher NRS score than patients with uncomplicated pregnancies. One month after the intervention, women who experienced pregnancy-related complications had a higher NRS score than women who did not.

During pregnancy, the cardiovascular, endocrine, renal, and musculoskeletal systems are significantly affected. Although the musculoskeletal system can be damaged at any time during pregnancy, the effects are most pronounced in the third trimester (4). As described in the literature, most of the women who participated in the study were in the third trimester of pregnancy. Increased musculoskeletal complaints in the third trimester of pregnancy have been associated with weight gain, fluid retention, and changes in posture and hormones (8,10,11). Weight gain in the present study also contributed to an increase in initial pain intensity. Treatment outcomes in the first month and in the postpartum period decreased with weight gain during pregnancy. This might be a result of higher initial pain, physical strain, or hormonal factors.

In the past, the need for antenatal exercise as a regular part of prenatal care was emphasized to reduce musculoskeletal discomfort and thus improve the overall health and well-being of pregnant women (12). In the current study, no difference in pain intensity was found between exercising and non-exercising women at any time point, but the intervention reduced pain intensity in both groups.

The interventions were done under US without any side effects or complications. This method was safe for both the mother and the fetus. Because of visualization of the anatomical structures around the injection site, the risk of injury to nerves, vessels, tendons, or any other structure is minimized. The US has no adverse effect on the fetus as previously shown (9).

Given that a biopsychosocial perspective can explain the experience of chronic pain, it is reasonable to assume that psychological factors, such as mental health diagnoses, may contribute to the severity of pain and impaired functioning in general and in those receiving treatment, as previously reported (13,14). In addition, treatment outcomes may be affected by the presence of anxiety and depression (13). However, due to the retrospective design, the current study did not examine the impact of mental illness on treatment outcomes.

Study Limitations

The current study has significant shortcomings, including a retrospective design, inadequate sample size, and lack of a control group. The impact these might have had on the interpretation of results is uncertain. Besides, the findings could have been influenced by other factors such as the placebo effect. The outcome of the treatment was assessed using the NRS. However, pain can also affect patients' overall quality of life, including their emotional state, mobility and sleep patterns. Therefore, no data are available on patient impairment or quality of life. Future research should use more validated methods to examine quality of life and impairment in a larger and more diverse sample of pregnant women, to verify and improve these findings.

Despite these limitations, the present study provides valuable insights into the treatment of musculoskeletal pain during pregnancy using US-guided injections. Fetal, maternal, and neonatal outcomes were monitored by perinatologists and pain physicians from the first appointment through the first month of delivery.

Conclusion

Pregnant women suffer from numerous pains and symptoms of the musculoskeletal system, especially in the third trimester, and often seek help. US-guided pain treatments are safe and effective in any trimester without causing problems for the mother or newborn. Interventional pain management should not be considered contraindicated in pregnancy, as pregnant women can experience significant relief of their symptoms, which impacts their quality of life in the prenatal period. Initial pain intensity was increased by the onset of pregnancy, increased weight gain and complications associated with pregnancy. Weight gain and a complicated pregnancy were associated with a poorer treatment outcome. However, there is still a need to conduct additional studies well-designed to identify predictors of more effective pain treatments during pregnancy. Randomized controlled trials exploring patient-reported outcomes, which could complement the clinical findings, are needed.

Ethics

Ethics Committee Approval: This retrospective cohort study was approved by the University of Health Sciences Türkiye, Van Training and Research Hospital Local Ethics Committee (approval number: 2023/20-03, date: 27.09.2023).

Informed Consent: Before participating in the study, all participants were required to give written and verbal informed consent.

Footnotes

Authorship Contributions: Surgical and Medical Practices - S.A.T., A.A.Y., Z.B., M.K.; Concept - S.A.T., H.T.; Design - S.A.T., A.A.Y., H.T.; Data Collection or Processing - S.A.T., A.A.Y., Z.B., M.K.; Analysis or Interpretation - S.A.T., Z.B.; Literature Search - S.A.T., A.A.Y., Z.B., M.K.; Writing - S.A.T., H.T.

Conflict of Interest: No conflict of interest was declared by the authors.

Financial Disclosure: The authors declared that this study received no financial support.

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