Research Article

Sacroiliac Joint Pain and its Peak Time during the Three Trimesters of Pregnancy: A Cross Sectional Study

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Abstract

Introduction: Changes in body load and mechanics occur, shifting body's center of gravity anteriorly leads to SI joint pain in pregnancy. The objective of the study is to determine the frequency of Sacroiliac joint pain during the three trimesters of pregnancy and the association of severity of sacroiliac pain with first, second and third trimesters of pregnancy. **Methodology:** This was a cross sectional analytical study conducted at Nur International University, Lahore. The data was collected from gynecological department of different hospitals and clinics in Lahore. An informed consent was obtained from the patients for inclusion in my study. For diagnosis Laslett's criteria which includes series of 5 tests, was performed on the patients meeting inclusion criteria and pain was measured using Numeric Pain Rating Scale (NPRS). Pelvic Girdle Questionnaire (PGQ) was filled by the patients. Statistical Package for Social Sciences (SPSS 28.0) was used to analyze the data. Descriptive statistics include frequencies and percentages were extracted. Spearmen's rho and Pearson's correlation was used to test for association of severity of pain with three trimesters of pregnancy and quality of life respectively. **Results:** 45 subjects were included in the study, 64.44% suffered from SI joint pain. There is a weak correlation between severity of pain and trimester of pregnancy and there is a strong correlation between Numeric pain Rating Scale and Pelvic Girdle Questionnaire. **Conclusion:** Majority of the pregnant females have SI pain in the second trimester of pregnancy. The intensity of pain increases with the trimester of pregnancy and pelvic girdle questionnaire increased score which decreases the quality of life of pregnant females. In the light of these results pregnant females should seek physiotherapy along with their medical treatment to reduce SI pain.

Keywords: Numeric pain rating scale; Pelvic girdle pain; Posterior pelvic pain; Sacroiliac joint; Lower back pain

Introduction

The prevalence of SI joint pain in pregnant women is 20% in the West and the global prevalence spans from 24% to 90%. [1] Some of the literature suggests that the pain does not increase with progression of pregnancy whereas others have researched that it does increase with the course of pregnancy. [2] This study is conducted to provide a better understanding about pregnancy induced SI joint pain and to correlate the concept of pregnancy related back issues among healthcare providers. The objective of the study is to determine the frequency of Sacroiliac joint pain during the three trimesters of pregnancy and to find out the association of severity of sacroiliac pain with first, second and third trimesters of pregnancy and quality of life.

Sacroiliac joint dysfunction causes pain between the posterior iliac crest, gluteal folds and lower back which may radiated to posterior thigh. [3] The causes may be pregnancy, osteoarthritis, gout or gouty arthritis, traumatic injury, ankylosing spondylitis, metabolic factors, hormonal change, inadequate motor control and etc. [4] The SI pain usually starts with the pregnancy or within 3 weeks after delivery. [5]

A series of provocative tests are performed to diagnose SI joint pain. Provocative tests are non-intrusive techniques performed by a clinician such as physical therapist, health specialist or pain management specialist. A number of at least three to five positive provocative tests result indicate that the SI joint is causative factor of SI joint pain. The five provocative tests include distraction, thigh thrust, FABER (Flexion, Abduction, External Rotation), Gaenslen's and compression [6] The intensity of the pain is usually measured with Numeric Pain Rating Scale (NPRS). Pelvic girdle questionnaire, provocation tests and Oswestry Disability Index (ODI) are used for diagnosis and association of pain with severity of SI joint pain in pregnancy. [7]

In one of the previously done studies, it showed that during the first trimester of pregnancy, all the pregnant women with SI joint pain reported of mild pain only. In the second trimester, some of them (92.5%) reported that the pain was moderate and severe in others (7.5%) whereas in the third trimester, the intensity of pain was moderate in 44.7%. and severe in 55.3%. [8] This study shows a gradual increase in the pain intensity from the beginning to the end of the pregnancy. But in the literature, there are some contradictory reports against this matter.

In a research study, it was found that women with hypermobility

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are more at risk of developing SI joint pain in pregnancy and persistent pain in postpartum. [9] In some of the studies, previous pregnancies have also been identified as a risk factor for pelvic girdle pain in a subsequent pregnancy. [10] Ramachandra et al. observed that the pain in first trimester was lower as compared to the pain in second and third trimester of pregnancy. [11] This is because of ligamentous laxity and increase in the hormone levels. But the researcher also stated that the pain in second trimester was more as compared to the third trimester as women tend to take more rest in the third trimester of pregnancy.

Studies conducted in western countries have brought out that the prevalence of pregnancy-related low back pain and PGP varies between 3.90% and 89.88%. [12] According to a study in Australia, almost half of the pregnant women and one-quarter of postpartum women report of Lumbopelvic pain (13). A Cross sectional survey in Sargodha, Pakistan had a sample of 200 pregnant females. Out of which 51% of the pregnant women suffered SI joint pain during second and third trimester of pregnancy whereas there were only 5% of the pregnant women with SI joint pain in first trimester. [7]

Methodology

The research work location was at department of physical therapy, Nur International University, Lahore. The study population consisted of pregnant women in their first, second or third trimester in primipara or multipara pregnancy in Lahore. The sample size was calculated using G*Power version 3.1.9.7. Correlation point biserial model was calculated using one tail with effect size=0.50, alpha error=0.05, power=0.95. The calculated sample size was n=34. The sampling technique used was Non probability convenient sampling.

Generalized primiparous or multiparous pregnant women in first, second or third trimester of pregnancy were included in inclusion criteria of this study. Pregnant women with a recent history/signs or symptoms of pelvis instability, inflammatory infection, trauma, neoplastic disease, degenerative or metabolic disease, low back pain which needs to be treated surgically were excluded.

This was a Cross sectional analytical study. The research followed the rules of declaration of Helsinki 1964. All the participants were fully informed about the research being conducted. The study was completed within six months after the approval of synopsis.

A thorough interview of the pregnant women was conducted to know about the pain, its course of nature, intensity, duration and how it affected their daily living activities. Pain was measured using Numeric Pain Rating Scale (NPRS) ranging between mild, moderate and severe. A series of tests of Laslett's cluster such as FABER test, thigh thrust test, Gaenslen's test or compression test, were performed on the participants. A result of three to five positive tests indicated that the participant had SI joint pain. With consent from each participant, Pelvic Girdle Questionnaire (PGQ) was filled by them for association of pain with severity in three trimesters of pregnancy and quality of life.

For data collection a permission letter was issued from the university to conduct the research. Different hospitals and clinics in Lahore were visited. Pregnant female participants were informed about the research and its purpose. There was a proper interview with the participants in which cross questioning was done. All the information was shared and queries were solved. The participants meeting the inclusion criteria were tested for the diagnosis of sacroiliac pain using Laslett's cluster including the five provocation tests which were compression test in which the participant was inside lying position, the researcher compressed pelvis with pressure applied on iliac crest which was directed at the opposite iliac crest, thigh thrust where the participant was in supine position. The researcher placed the hip in 90 degrees flexion and adduction. The force applied through femur was directed posteriorly at varying angles of abduction and adduction, distraction test in which the researcher applied postero lateral pressure to bilateral anterior superior iliac spine in supine position, Gaenslen's test where the participant was lying in supine position with both legs extended. The testing leg was passively moved into full flexion while the opposite leg remained in extension. Overpressure was applied onto the flexed side and lastly Faber test in which the participant was in supine position. The researcher asked the patient to place one foot over the knee of the opposite limb. The researcher applied force on medial side of the knee posteriorly.

After the diagnosis, Numeric Pain Rating Scale (NPRS) was used to rate the pain intensity according to the perception of each participant. Pelvic Girdle Questionnaire (PGQ) was be filled by the participants for association of pain severity with the three trimesters of pregnancy and results were noted.

The data was entered and analyzed using standard SPSS software version-28 for statistical analysis. Descriptive statistics including frequencies and percentages were extracted for the continuous variables (SI pain, NPRS score, PGQ score). Mean ± standard deviation was used for SI pain in the three trimesters of pregnancy. For association of severity of sacroiliac joint pain with the trimester of pregnancy and quality of life, Spearman's rho and Pearson's correlation was used. Spearman's rho showed the correlation between ordinal (trimester of pregnancy) and dichotomous (yes/no) variables of data. Pearson's correlation was used to show correlation between two continuous variables (NPRS and PGQ scores). Bar charts were used for nominal (trimesters of pregnancy) and dichotomous (presence of SI pain) variables. Scatter plot was used to show the relationship between two continuous variables (NPRS and PGQ scores).

Research Tools

Numeric Pain Rating Scale (NPRS) is a tool used to measure pain in the form of score out of 10 where 0 means no pain and 10 means the worst pain. The number that describes the pain dimension in best way is picked by the patient. It has a reliability of 0.96 and 0.95. [13,14] Quality of life is defined as an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns. [15] It is calculated using Pelvic Girdle Questionnaire (PGQ) scoring. Pelvic girdle questionnaire is a condition specific measuring tool used in research and clinical practice to assess the symptoms and activity limitations in patient with posterior pelvic pain during pregnancy and postpartum. The questionnaire is self-reporting

and consists of 20 activity items and 5 symptom items. It has a 4-point response scale from "Not at All" (0) being the lowest to "To a Large Extent" (3) being the highest.

Results

The research outcome was interpreted with SPSS (Statistical Package for Social Sciences) version 28. The data was collected from gynecology department of various hospitals and clinics in Lahore. Sample size was 34 pregnant females. Different charts and tables were designed to show the statistical data. The mean and standard deviation of numeric pain rating scale, trimester of pregnancy, pelvic girdle questionnaire and age of patient were 3.58 ± 2.011, 2.22 ± 0.735, 28.67 ± 24.027 and 29.49 ± 6.416 respectively. The minimum pain score recorded using numeric pain rating scale was 0 and the maximum pain score recorded was 8. The graph 2 of numeric pain rating scale reveals that 16 of the patients with 0 pain score were in first trimester. The maximum score of pelvic girdle questionnaire was 68 and minimum score was 0. 16 of the patients with 0 score of pelvic girdle questionnaire were in their first trimester of pregnancy as shown in graph 3. Out of 45 patients, 8 females were in first trimester of pregnancy, 19 in second trimester of pregnancy and 18 in third trimester of pregnancy as displayed in Tables 1 and 2. Second trimester had the greater number of patients as compared to the others.

The Table 3 demonstrates the frequency of SI joint pain in pregnancy. After assessing 29 out of 45 showed presence of SI pain. 3 out of 8 were diagnosed with SI pain in first trimester, 14 out of 19 had SI pain in second trimester which is the highest incidence and 12 out of 18 had SI pain third trimester of pregnancy which is explained in Table 4.

There is a weak positive correlation between severity of pain and trimester of pregnancy, spearman, ρ=0.24. The value of P in this case is 0.1 which is greater than 0.05 which shows a non-significant relationship between severity of pain and trimesters of pregnancy.

The Table 5 shows strong positive correlation between numeric pain rating scale and pelvic girdle questionnaire score, Pearson's r=0.952. The value of P in this case is less than 0.01 which shows a significant relationship between severity of pain and pelvic girdle questionnaire score. It interprets that as the intensity of the pain increases the pelvic girdle questionnaire score also increases which negatively affects the quality of life of pregnant females.

Discussion

The objective of the study was to determine the frequency of Sacroiliac joint pain during the three trimesters of pregnancy and to determine the association of severity of sacroiliac pain with first, second and third trimesters of pregnancy and quality of life. The women in this study were in first, second and third trimester of pregnancy ranging from 19 years to 49 years of age. It is recorded that in pregnancy 8 out 10 females suffer from SI joint pain. [16] Studies previously conducted suggest that 65% pregnant women reported of sacroiliac pain in pregnancy which correlates with our study. [17]

The result findings by Rizwan et al. in 2018 are aligned with our study findings in which it was stated that SI joint pain is more prevalent in 2nd trimester as compared to rest of the trimesters. [7] In comparison to research done in 2012 by Aldabe, it was recorded that the pregnant females in first trimester have low incidence of SI joint pain and highest incidence in second trimester. This also corresponds to our study that shows the lowest possibility of SI joint pain is in first trimester and highest in second trimester. [18]

Spearman's rho correlation was used to find the association of severity of pain with the three trimesters of pregnancy. It showed weak association with insignificant p value=0.1. Post Hoc

Table 1: Descriptive statistics.

	Subject= N	Minimum	Maximum	Mean	Std. Deviation
Numeric pain rating scale	45	0	8	3.58	2.911
Trimester of pregnancy	45	1	3	2.22	0.735
Pelvic girdle questionnaire	45	0	68	28.67	24.027
Age of patient	45	19	49	29.49	6.416

Table 2: Shows the frequency of patients in each trimester of pregnancy.

Trimester of pregnancy	Frequency	Percentage
First trimester	8	17.8
Second trimester	19	42.2
Third trimester	18	40
Total	45	100

Table 3: Shows the frequency of SI joint pain.

		Frequency	Percent
Pain	Yes	29	64.44
	No	16	35.6
Total		45	100

Table 4: Shows the number of patients with SI pain in each trimester of pregnancy.

		First trimester	Second trimester	Third trimester	Total
Pain	Yes	3	14	12	29
	No	5	5	6	16
Total		8	19	18	45

Table 5: Shows the* spearman's correlation between severity of pain and Trimesters of pregnancy and **Pearson's correlation between severity of pain and Pelvic Girdle Questionnaire.

	Severity of pain correlation	P value
Trimester of pregnancy	0.246*	0.104
Pelvic girdle questionnaire score	0.952**	<0.001

analysis was done which showed less power for determining association between severity of pain and trimester of pregnancy. This is in correspondence to Mahishale et al. study conducted in 2016 in which sample size was 457, incidence of SI joint pain was 65% and severity of pain increased with trimester. [6] Hence, it is suggested that if more sample size would have been taken it would show a significant relationship.

The Pelvic Girdle Questionnaire (PGQ) is a tool developed to calculate the quality of life and symptoms of SI pain in pregnancy. It includes the questions regarding daily activities and participation as well as bodily symptoms. [19] Research conducted in 2017, concluded that sacroiliac pain decreases physical health and affects the quality of life during pregnancy. Similarly in our study, the results from Pearson's correlation between numeric pain rating scale and pelvic girdle questionnaire score highlight how the intensity of pain compromises the quality of life. As the SI pain score increases, the PGQS increases, leading to the decrease of quality of life. Wang et al. stated in their study that nearly 30% of pregnant females had to stop performing at least one daily activity due to SI pain and reported that pain also impaired the quality of daily life.

Due to the ongoing pandemic of corona virus, many pregnant females were reluctant to participate in the research which led to small sample size. There is lack of evidence and previous data due to a smaller number of studies conducted in Pakistan. The patients faced difficulty in interpretation of questions in the questionnaire due to language barrier. So, it is important to develop or translate the questionnaire in native languages of Pakistan.

It is recommended that the questionnaire should to be devised in native languages of Pakistan for better interpretation so that more studies can be conducted in Pakistan to support the result findings. The sample size should be large enough to show the significant relationship between numeric pain rating scale and pelvic girdle questionnaire. The study design of prospective cohort should be used in the future studies.

Conclusion

Majority of the pregnant females have SI pain in the second trimester of pregnancy. The intensity of pain increases with the trimester of pregnancy and pelvic girdle questionnaire increased score which decreases the quality of life of pregnant females. In the light of these results pregnant females should seek physiotherapy along with their medical treatment to reduce SI pain.

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