

Pelvic Pain During Pregnancy

A Descriptive Study of Signs and Symptoms of 870 Patients in Primary Care

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Study Design. The authors conducted a cross-sectional analysis.

Objective. The objective of this study was to describe the signs and symptoms of pregnant women with pain and dysfunction in the pelvic area.

Summary of Background Data. Pelvic pain during pregnancy is common with incidence rates of 48% to 56%. The exact cause of pelvic pain during pregnancy is still unclear. Also unclear is the association between physical examination and the occurrence of pelvic pain during pregnancy.

Methods. Pregnant women with pelvic pain were sent for treatment to 2 physical therapy practices between January 1997 and January 2002. A standardized clinical examination protocol and an extensive questionnaire were used to obtain relevant clinical and demographic characteristics.

Results. In total, 870 women were included. The average score of the overall severity of the complaints was 7.8 (scale 0–15). Main complaints were located around the sacroiliac joints (76.6%) and the pubic symphysis (57.2%). The area of pain was not related to positive signs in passive hip movements and sacroiliac tests. The highest positive test results were found for Patrick sign (71.7%), active straight leg raise (ASLR) test (66.4%), resisted adduction (54.4%), and passive hip abduction (36.9%). Overall severity of complaints was related to age, number of weeks pregnant, passive hip flexion and internal rotation, and swimming. The total explained variance of these factors was 15.9%. No relationship was found between overall complaints and sacroiliac tests, pelvic pain during a previous pregnancy, extremely painful or type of previous deliveries.

Conclusions. Pregnant patients with pelvic pain show a considerable level of complaints. The overall severity of complaints is not related to previous peripartum pelvic pain or type of deliveries or to commonly used tests. Further study on the role of clinical examination, including passive flexion and internal rotation of the hip joints, is recommended.

Key words: pregnancy, pelvic pain, pubic symphysis, sacroiliac joint, sacroiliac tests. **Spine 2004;29:2567–2572**

Pelvic pain during pregnancy is quite common. Incidence rates of 48% to 56% are presented in the literature.¹ Pelvic pain often seems to start in the first trimester of the first pregnancy and to worsen with subsequent pregnancies.² The pain often causes major incapacity and lifestyle changes.^{2–4}

Although it has been suggested that this disorder has the highest incidence in the northern European countries,⁵ a more recent study has found no geographic differences among Finland, Sweden, and Tanzania and an overall similarity of localization and degree of pain, irrespective of the socioeconomy of the countries.⁶

A number of studies have been done over the past decade to gather information about pelvic pain syndrome, searching in different directions for causes, signs, and symptoms. Measurement of sacroiliac joint stiffness with Doppler imaging of vibrations showed that asymmetric laxity of the sacroiliac joints could be related to low back pain and pelvic pain during and after pregnancy.^{7,8} According to Bjorklund et al.,⁹ there is no evidence that the degree of symphyseal distension determines the severity of pelvic pain during pregnancy or after childbirth. Another study, however, reveals that the majority of pregnant women with a symphyseal width of more than 9.5 mm experience symphyseal pain.¹⁰

The exact cause of pelvic pain during pregnancy is still unclear. Possible causes are proposed in a number of studies.^{1,2,5,11} Some authors suggest that strain of ligaments in the pelvis and lower spine resulting from a combination of damage to ligaments, hormonal effects, muscle weakness, and the weight of the fetus may cause pelvic pain.¹ Because the levels of the hormone relaxin in pregnant women with pelvic pain do not differ from levels in other pregnant women, relaxin can be excluded as an important cause of pelvic pain during pregnancy.¹⁰

A number of tests to diagnose irritation of the pelvic and lumbosacral ligaments have been proposed. These include, among other tests, the modified Gaenslen test (supine position, flexion of 1 hip), posterior pelvic pain provocation test (supine, 90° hip flexion, axial compression), internal and external rotation in 90° hip flexion, resisted adduction of the hips, Patrick's test and the active straight leg raise (ASLR) test.^{12,13} The precise association between the outcome of these tests and the occurrence of pelvic pain during pregnancy is not clear.

The aim of this study was to gather more information about pelvic pain during pregnancy. We evaluated 2 questions: 1) What are the main complaints of pregnant

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Table 1. Index* for the Overall Severity of Complaints During Daily Activities

Score	A = Walking	B = Standing	C = Sitting	D = Lying Down	E = Changing Posture
0	>30 Minutes without pain	Pain-free and no dysfunction			
1	16–30 Minutes without pain	Difficult but pain-free			
2	1–15 Minutes without pain	Easy but painful			
3	Always painful	Always painful	Always painful	Always painful	Difficult and painful

* Scale 0–15, higher score indicates more severe complaints. Overall level of complaints = A + B + C + D + E.

women with pelvic pain? 2) Is there a relationship between the self-reported severity of the complaints and history or clinical findings?

■ Methods and Patients

Patients. During a period of 5 years, starting from January 1997 to January 2002, pregnant women with pelvic pain were sent for treatment to 2 physical therapy practices in The Netherlands. Women consulting the physical therapists because of pelvic pain during pregnancy and who had no other major health problems such as malignancies or multiple sclerosis were consecutively included in this study.

Questionnaire. A questionnaire was completed by the physical therapists in a standardized manner. The original questionnaire contained 46 questions, including questions about the patient's age, profession, and localization of pain, walking pattern, use of pelvic supports, other complaints, and general health. History findings of orthopedic problems, traumas, sports, former pregnancies and former deliveries, as well as experienced extreme pelvic pain during previous deliveries were gathered. In 1998, 6 questions about the maximum time of pain-free walking, standing, sitting, lying down, cycling, and driving, plus 3 questions about sleeping difficulties, dyspareunia, and changes in posture were added to the original questionnaire.

Clinical Examination. A clinical examination was also performed by the physical therapists in a standardized manner. Clinical examination included inspection and palpation of the height of the iliac crests, posterior superior iliac spines (PSIS) and greater trochanters in standing. Differences in height as well as a rotational difference between both upper legs (palpated at the femoral condyles) were considered to be positive clinical signs.

Pelvic Tests. The ASLR test¹² was done to evaluate the dysfunction in transferring loads between the lumbosacral spine and legs. Active lifting of 1 extended leg is performed and compared with lifting of the other leg in the supine position. Any subjective or objective difficulties were recorded as positive. Based on subjective reports such as "This leg feels heavier while lifting," the test was counted as positive.

Pain provocation tests such as Patrick's sign (1 leg is flexed, passively abducted and externally rotated, so that the heel rests on the opposite kneecap) were used. Resisted adduction was tested manually by placing the therapist's hand between the knees of the patient in a supine position (hips and knees resting on the couch).

The posterior pelvic pain provocation (PPPP) test was tested whenever possible; the patient was in a supine position with

90° hip flexion and the physical therapist performed manual axial compression.^{13,16} In cases in which the pregnant abdomen hindered the testing procedure, we did not use this test. In all tests, pelvic pain or the patient's unwillingness to perform the test was counted as a positive sign.

Hip Tests. Passive hip abduction was performed manually in a supine position. Evidence of pain, unwillingness or restricted movement during this maneuver was recorded as positive. Adduction (supine, from rest position legs), flexion (supine, from rest position legs), extension from a position of flexion,^{13,14} internal and external rotation (in 0° and 90° hip flexion) was performed in the same way. In all of the previously mentioned hip tests, pelvic pain or unwillingness was recorded as a positive sign.

Resistance tests for hip flexion, extension and abduction were performed in side lying (1 try, maximum strength). Provocation of pelvic pain, as well as clear asymmetric strength differences as judged by the therapist, were counted as positive.

Total duration of questionnaire and clinical examination was 60 to 75 minutes.

Severity of Complaints. To measure the influence of the pelvic pain on daily activities, we calculated an index for the overall severity of complaints using 5 questions. In these questions, the maximum amount of pain-free minutes was asked when performing the following daily activities: walking, standing, sitting, lying down, or pain provocation/difficulties in changing posture (Table 1). A minimum score of 0 on the "overall complaints index" (OCI) means that the patient is able to do all of the aforementioned activities for at least 30 minutes without experiencing pain. The maximum score of 15 on the OCI means that the patient continuously experiences pain in all the aforementioned activities plus she has difficulties in changing posture.

Analysis. Frequencies and correlation coefficients were calculated of overall complaints, history findings, and physical examination. A linear regression analysis was used for calculating the association between severity of pelvic pain and relevant clinical and demographic variables. Dependent variable was the overall severity of complaints. First, a univariate regression analysis was performed. Secondly, variables that showed a relation to the overall severity of complaints were entered in a multivariate analysis.

■ Results

Study Population

In total, 870 pregnant women were included, of which 748 women completed the final questionnaire that con-

Table 2. History Findings

Population (n = 870)	
Mean age (range 18–50 years)	31.9 (SD 4.0)
In paid employment	85.3%
Mean number of pregnancies (range 1–8)	2.0 (SD 1.0)
First pregnancy	31.5%
Second pregnancy	46.0%
Third pregnancy	14.4%
Weeks pregnant (range 6–41)	26.3 (SD 7.0)
Overall complaints (range 0–15)	7.8 (SD 3.7)
Mechanical support	
Device to support abdomen	20.0%
Pelvic belt	13.3%
Wheelchair	1.3%
Crutches	1.0%

tained extra questions about the severity of the complaints. In Table 2, we present the characteristics of the study population.

At initial presentation, the duration of pregnancy varied from 6 to 41 weeks gestation with a mean gestation of 26.3 weeks. Mean age of the women was 31.9 years, and most women were pregnant for the first or second time. One woman was 50 years old and pregnant with her seventh child. Before the current pregnancy, 66 women (7.6%) had been pregnant at least 3 times. Abortions and miscarriages were counted as pregnancies. A small number of the women had never experienced pain or dysfunction of the pelvis, lower back, or lower extremities before the onset of their pregnancy. The complaint that was most often experienced in any period before the women were pregnant was back pain (60.6%). During their lives, 45.3% of the women had been either involved in an accident (20.8%) or made a severe fall they could still remember well (28.7%). Some of these women had experienced both an accident and a severe fall. A large majority of the women (76.6%) received physical therapy treatment at least once before

this pregnancy, mostly for back, pelvic, neck, or knee problems not related to pregnancy. A small percentage (10.4%) of the women did not, in any period of her life, participate in sport. The most commonly mentioned sports activities were swimming, fitness, aerobics, and tennis.

Multipari Women

For 68.3% (n = 594) of the group, this was the second or subsequent pregnancy, including miscarriages and abortions (n = 106). More than half (58.9%) also experienced pelvic pain in their first pregnancy. One woman reported pelvic pain in all 6 previous pregnancies. A previous delivery had been extremely painful in 14.8%.

Main Complaints

On average, the women did not experience continuous pelvic pain, but daily life (activities of daily living) activities such as walking, standing, sitting, lying down, and changing positions became painful after a certain number of minutes. On an index from 0 to 15 (Table 1), the average score of the overall severity of the complaints is 7.8. This is a considerable level of complaints; the pelvic pain starts during several daily activities within 30 minutes in many patients. The pain is mainly located in 2 different areas in the pelvic region. Localization A, the pubic area, is painful in 57.2% of the women. Localization C, the sacral area, unilateral or bilateral around the sacroiliac joints or at the sacral bone, is mostly mentioned (76.6%). Both pain areas combined are present in over 30% of the women (Figure 1). Occasionally, referred pain in 1 leg was mentioned.

Physical Examination

In Table 3 the main results of the physical examination are presented.

Most women experienced difficulties in walking. Only

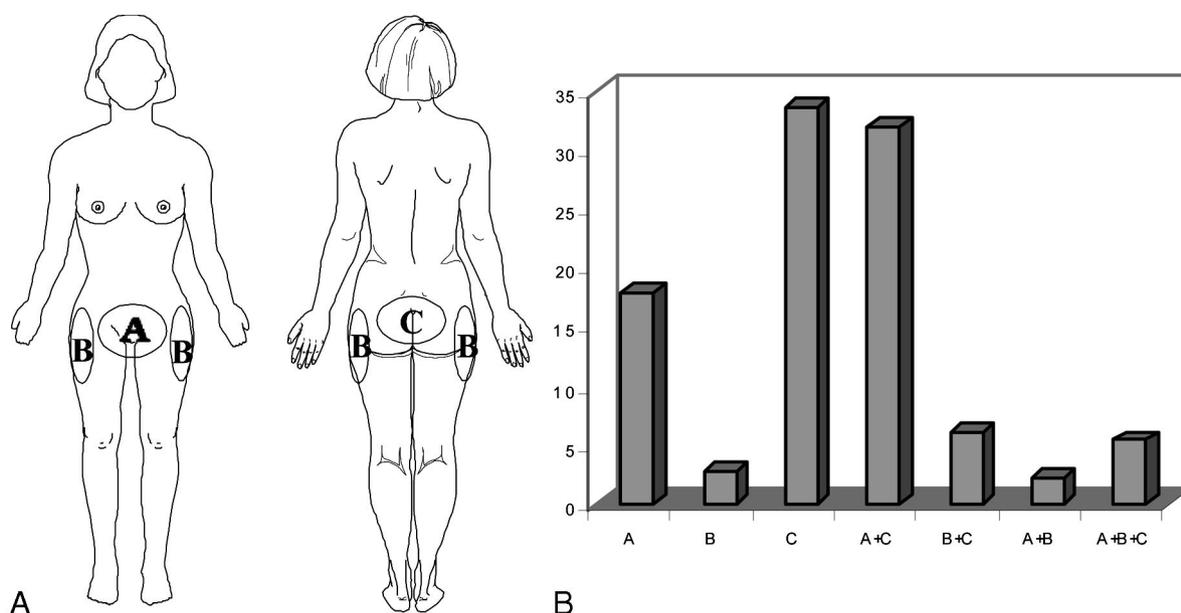


Figure 1. Localization of pelvic pain.

Table 3. Clinical Findings

Examination (n = 870)	
Difficulties in walking	
Waddling gait	59.9%
Unstable	21.4%
Dragging a leg	15.6%
Inspection, patient standing	
No asymmetries	44.2%
Tests	
Patrick sign	
One-sided positive	35.8%
Two-sided positive	35.9%
ASLR	
One-sided positive	51.3%
Two-sided positive	15.1%
Resisted adduction	54.4%
Passive hip abduction	36.9%

1% used crutches. Another 1% used a wheelchair. Inspection and palpation while the patient is standing often showed positive signs.

Concerning physical examination, the positive score most often found was the Patrick sign. The ASLR test scored positive in two thirds of the women. Over half of the women showed positive signs. As a result of the pregnant abdomen (pain or compression), the therapists choose not to perform the PPPP test in 418 women.

Passive movements of the hip joints in flexion, from flexion to rest position (extension), in abduction, from a position of abduction to rest position (adduction), in internal or external rotation (0° flexion), were frequently positive according to the therapist.

We expected that the results of the sacroiliac and hip tests would show distinct outcomes for each pain localization. However, the positive signs of these tests did not differ much between those women who experienced sacral pain, pubic pain, or lateral pelvic pain (Figure 2).

Correlations Between Severity of the Complaints and Other History Findings or Test Results

No strong correlations were found between the OCI and other history findings. The strongest association was between overall complaints and walking disabilities ($r = 0.3$).

Also, no strong correlations were found between OCI and clinical test results of passive hip movements, re-

sisted hip movements, ASLR, internal and external rotation of the leg in 90° hip flexion. All correlation coefficients were ≤ 0.3 .

Regression Analysis

In Table 4, we present the results of univariate and multivariate analyses.

First, a univariate regression analysis was performed on 44 potentially relevant variables according to the literature. As a dependent variable, we used the OCI. No significant univariate association was found of history items like details of former deliveries (medical assistance, duration of partus, extreme pain during partus), difference in leg length, profession, use of pelvic/abdomen belts, traumas, and general hypermobility. The overall severity of complaints does not seem to be related to pelvic pain during previous pregnancy or to extremely painful previous deliveries.

All hip movements appeared to be significantly related to the OCI. Because of the possible lack of muscular stability in the pelvic girdle in these patients, we took special interest in 3 sports that showed a qualitative relationship to pelvic pain in a not-published former study: swimming, horse riding, and gymnastics. All 3 were shown to be univariately related with OCI.

After the multivariate regression, 5 predictors remained significant. A higher score on the OCI was associated with a higher number of weeks of gestation, a younger age, positive passive hip flexion, positive passive internal rotation (0° flexion), and a history of swimming as sports activity. These factors explain 15.9% of the total variance.

Discussion

From 1996 on, a large group of pregnant patients with pelvic pain started to come for treatment to our clinics for physical therapy. We started to collect all the data in a standardized manner because we wanted to study the complaints of these patients. This resulted finally in the present study.

A wide variety was found in localization of pain, in type and number of walking problems, and in the maximum time of pain-free walking, sitting, standing, or ly-

Figure 2. Test results of sacroiliac tests. Pain localization A, B, C like in Figure 1 (n = 870).

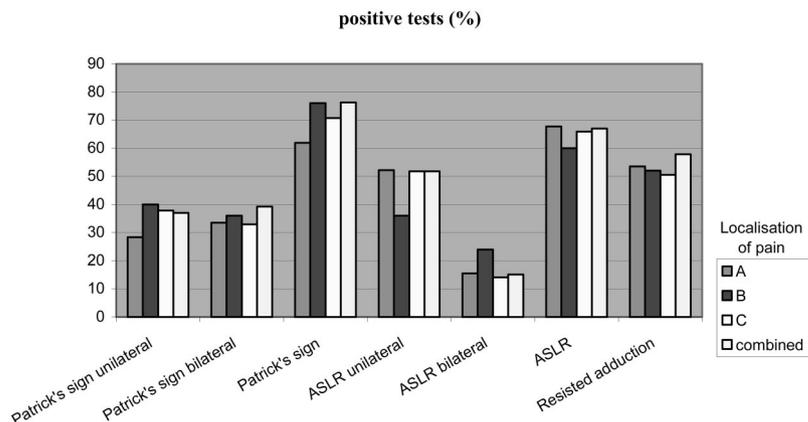


Table 4. Results of Regression Analysis

Predictors	Beta, Univariate	B
Age	-.090*	-.111*
No. of weeks pregnant	.226†	.245†
Having a paid job	-.014	—
Accident in history	-.024	—
Severe fall in history	-.022	—
Active sporting in history	.029	—
Horse riding in history	.056	.026
Gymnastics in history	.106‡	.055
Swimming in history	.111‡	.130*
Extremely painful previous deliveries	.000	—
Medical assistance in ≥ 1 partus	-.015	—
Total duration of former partus	.030	—
Pain during former pregnancies	.026	—
Slow or incomplete recovery postpartum	-.031	—
Using a pelvic belt	.027	—
Using abdominal support material	-.036	—
General hypermobility	-.042	—
Walking problems	.020	—
Pain localization A	-.015	—
Pain localization B	.013	—
Pain localization C	.068	.031
Height difference iliac crests	-.015	—
Height difference SPIS	.041	—
Height difference greater trochanter	.003	—
Internal rotated position femur	.100‡	.015
Flexed hip, patient in supine position	.011	—
Passive hip external rotation	.183†	.060
Passive hip internal rotation	.168†	.134*
Passive hip abduction	.160†	-.092
Passive hip adduction	.175†	.023
Passive hip flexion	.181†	.135*
Passive hip extension	.205†	-.011
Resisted abduction	.128†	-.011
Bilat. positive resisted adduction	.175†	.676
Bilat. positive hip exorotation in 90° flexion	.034	—
Bilat. positive hip endorotation in 90° flexion	.099‡	-.011
Bilat. positive Patrick sign	-.099‡	-.119
Bilat. positive PPPP	-.029	—
Bilat. positive ASLR	.088*	-.092
Unilat. positive resisted adduction	.178†	-.673
Unilat. positive hip external rotation in 90° flexion	.134†	-.062
Unilat. positive hip internal rotation in 90° flexion	.193†	.138
Unilat. positive PPPP	.087	.082
Unilat. positive Patrick sign	.124†	.088
Unilat. positive ASLR	.198†	.144

— = Variable not taken into multivariate analysis ($p > 0.2$).
* $p < .05$, † $p < .001$, ‡ $p < .01$.

ing down. Most women experienced difficulties in walking and movements of the hip joints were frequently painful. All women were sent for treatment of pelvic pain, but the complaints varied in severity. Although many women have pain-free periods, their daily life activities are often hindered by pelvic pain.

We needed a severity index to be able to answer the second question of whether there is a relationship between the self-reported severity of the complaints and history or clinical findings. We choose to combine scores concerning the maximum time women could perform daily activities without pain into an index of overall severity of complaints as a main outcome measure. It is unclear whether the score on the OCI is comparable with the intensity of the pain felt by the women.

The clinical tests were chosen in a physical therapy practice according to the usual daily testing procedures.

For some tests, the interobserver reliability is known but appeared to be low,^{14,15} this concerns especially palpation of PSIS and greater trochanter heights. For some other tests, no information about interobserver reliability was available. The test results could be strongly influenced by a low or unknown interobserver reliability.

Pregnancy and delivery require loosening of the pelvic ligaments and joints to a certain extent. The pelvis of a pregnant woman is in a way always unstable, being less stabilized by muscle activity and ligamental stress.¹⁶ Although the ASLR test is found to be a reliable test to quantify and qualify dysfunction in diseases related to mobility of the pelvic joints,¹² we could not find any studies about the reliability tested on pregnant women.

Patrick sign and the PPPP test are found to be sensitive and reliable tests to evaluate pelvic pain during pregnancy.^{14,17} In our study, the ASLR and sacroiliac tests appeared not to be strongly related to the overall complaints during pregnancy, but these tests often appear to be positive in this population. Other studies showed a relation between pelvic pain and positive signs of Patrick sign, hip abduction, adduction, flexion, and the PPPP test.^{14,17} Because we did not take the subjective amount of pain, but the amount of time to get pain during daily activities as a measure for the overall complaints, the results may not be exactly comparable.

In the present study, almost half of the women were excluded from the PPPP test because the pregnant abdomen hindered the test procedure. We conclude, therefore, that the PPPP test is not an appropriate instrument during pregnancy.

The relatively low explained variance of 15.9% shows that the tests we used cannot be used to indicate the OCI. These tests do not add extra information concerning the severity of the complaints, because in normal medical practice, pain was not always present at the time of testing and the amount of pain may well be influenced by the amount of time the women had to sit, stand, or lay down in the period before the examination.

The present study describes the test results in pregnant patients who sought treatment for pain and dysfunction in daily activities. Other studies included women who had symptoms of pain in the pelvic areas.^{13,16} Compared with the study of Kristiansson and Svårdsudd,¹⁴ we found a much higher number of difficulties or pain in passive hip mobility tests. This might be because patients in our study not only had pelvic pain, but also scored relatively high, over 50% of the OCI, in overall complaints. Passive hip adduction and abduction score high in sensitivity for the pelvic girdle syndrome, as described by Albert et al.¹⁷ Albert performed the tests at 33 weeks of gestation; we performed testing at day of intake, the weeks of gestation varied from 6 to 41, making it hard to directly compare the test results.

There was little correlation between the test results and the overall complaints. This seems surprising because many of the tests used do seem to correlate to pelvic pain during pregnancy in other studies.^{14,17} How-

ever, we did not use the tests to discriminate between pain and no-pain groups. More research in this area is needed, so that we can interpret these findings and have a better opportunity to understand pelvic pain in pregnant women.

■ Conclusions

Pregnant women who consult physical therapists because of pelvic pain show a considerable level of complaints in activities of daily living. The overall severity of complaints does not seem to be related to pelvic pain during previous pregnancies, extreme pain in partus, or to type of previous deliveries. Positive examination signs are independent of the pain localization (anterior, posterior, or lateral). Although commonly used tests like Patrick sign, ASLR, and resisted adduction are often positive in this population, they are not related to the overall severity of complaints. Variables that are related to the severity of the complaints are younger age of the woman, more weeks gestation, swimming (as sports activity), and painful or limited passive flexion and internal rotation of the hip joint.

■ Key Points

- Pregnant women who consult physical therapists because of pelvic pain show a considerable level of complaints in activities of daily living.
- There appeared to be no relationship between overall complaints and pelvic pain during a previous pregnancy, extremely painful or type of previous deliveries.
- The overall severity of complaints is not related to any findings in the clinical examination.

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