

BACK PAIN DURING PREGNANCY: A LONGITUDINAL STUDY

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Abstract

Objective: The goal of the present study was to evaluate the prevalence of back pain during four different periods of pregnancy and its action on each woman during this stage.

Methods: The sample comprises of a group of 49 pregnant women aged between 20 and 39 years. The presence of back pain symptoms and severity were evaluated at 12, 20, 32 and 37 weeks of gestation in each woman, using one question of the NIH Record Activity (ACTRE).

Results: The ANOVA for repeated measures was used to compare the four moments of evaluation (12 weeks, 20 weeks, 32 weeks and 37 weeks) in relation to back pain. A significant difference between the pain scores over the four moments were observed, being that higher pain scores were noted at 12, 32 and 37 weeks of gestation. We also verified that at 12 weeks of gestation 71.4% of women had back pain, while at 20 weeks only 16.3% confirmed pain. At 32 weeks 91.7% of women reported pain and at 37 weeks, 98% reported the same.

Conclusion: We found that back pain is prevalent during pregnancy and its intensity varies throughout this period.

Keywords: Women; Pregnancy; Back pain

Introduction

Pregnancy is a state during which severe physiological changes occur in the muscle and skeletal system, physical and emotional life of the woman

whose body adapts to the general and local modifications that take place throughout this period¹.

Back pain is a considerable problem in the general population², and it is thought to be even more common among pregnant women. Back pain is a common symptom in normal pregnant women and studies have reported that between 35 and 76% of pregnant women experience back pain³. Although many women experience back pain during pregnancy, it has not been considered an important health problem³.

A Swedish survey reports that 66% of women between the ages of 38 and 64 experience back pain⁴. Interestingly, the majority of these women reported that their first episode of back pain occurred at a certain time during their pregnancy^{5,6}. Several other studies also indicate that women with severe pain during pregnancy are at extremely high risk for developing a new episode of severe pain during a subsequent pregnancy as well as later in life⁷⁻¹⁰.

Pregnancy is considered a normal physiological condition and the pregnant woman is expected to go on with her life and work as usual¹¹. However, back pain in pregnancy is a significant problem given its significant negative impact on how women function and their well-being during pregnancy^{3,12}. Previous studies reported that back pain affects the pregnant woman's daily activities. Mens *et al.*¹³ reported that more than 80% of pregnant women with back pain experience discomfort in daily activities and difficulties in housework, child-rearing and job performance³. Many women report that back pain not only compromises their ability to work during pregnancy but also interferes with activities of daily living¹⁴.

Not only does the problem persist well beyond pregnancy in a significant number of women, but many women with chronic back pain link its onset to pregnancy¹⁴.

In order to identify the causes of that pain in an attempt to develop effective intervention programs targeted at the different stages of pregnancy it is im-

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portant to bear in mind the above mentioned facts, as well as understand the action of back pain during pregnancy in each woman. Thus, the aim of this study was to identify the prevalence of back pain in four different stages of pregnancy: 12, 20, 32 and 37 weeks of gestation.

Materials and Methods

This study is part of a broader project which seeks to identify both the biomechanical changes of the spine that occur throughout pregnancy and the factors correlated with these changes. The one aspect that was discussed and accordingly presented as an independent study was the prevalence of back pain during pregnancy.

The study was approved by the Portuguese Ethics Committees of the Faculty of Medical Sciences of New University of Lisbon (*"Comissão de Ética da Faculdade de Ciências Médicas da Universidade Nova de Lisboa"*), the Maternity Hospital Dr Alfredo da Costa (*"Maternidade Dr. Alfredo da Costa"*) and the Regional Health Administration of Lisbon and Vale do Tejo (*"Administração Regional de Saúde de Lisboa e Vale do Tejo"*).

All the data was collected between October 2008 and January 2010, and our sample comprises of pregnant women that were being followed at the obstetric services at the Health Institution Center of Sete Rios, in Lisbon, Portugal (*"Centro de Saúde*

de Sete Rios").

Each subject was previously informed about the procedures and objectives of the study and signed an informed consent form. The NIH Activity Record (ACTRE) for evaluating the existence or lack of back pain and the intensity of the same in pregnant women during the four stages of pregnancy was used: 12, 20, 32 and 37 weeks of gestation in the same woman.

In this article, the questions of that instrument that address back pain were analyzed. They cover four possible answers, presented in a Likert scale, from which the subject must indicate the answer closer to her degree of concordance. The subjects evaluated the intensity of each symptom experienced during the moment of evaluation. Each response, which ranges from a minimum of 1 (without) a maximum of 4 (very), was added to the total score.

The sample comprised of 49 pregnant women with no associated pathology. Their ages ranged from 20 to 39 years. Table I shows additional characteristics of the sample: race; status and qualifications.

Statistical Analysis

The statistical data was obtained through the use of the 17.0 version of the SPSS (*Statistical Package for Social Sciences*) program.

The ANOVA for repeated measures was used to compare the four moments in relation to back pain

Table I. Characteristics of the sample: race; status and qualifications

	Min= 19 Average = 30,61	Max=40 Standard Deviation = 5,46
	Freq.	%
Race		
Caucasian	43	87,8
Biracial	5	10,2
Status		
Married	40	81,6
Single	8	16,3
Divorced	1	2,0
Qualifications		
1st stage of basic education (1st - 4th year)	1	2,0
3rd stage of basic education (7th - 9th year)	6	12,2
Secondary Education (10th - 12th year)	21	42,9
Higher Education	21	42,9

Table I: Sample Characteristics (N =49)

Table II. ANOVA Repeated samples: comparison of 4 assessment moments regarding this variable

Back Pain	Average	Standard Deviation	N	ANOVA SAMPLE REPETIDAS	Observed Power*
Moment 1 12 weeks of gestation	1,81	,56	49		
Moment 2 20 weeks of gestation	1,23	,46	49	F(3) = 55,343	1,00
Moment 3 32 weeks of gestation	2,12	,47	49	p = 0,000	
Moment 4 37 weeks of gestation	2,21	,48	49		

*Calculated for an alpha 0,05

(12 weeks, 20 weeks, 32 weeks and 37 weeks). The feasibility of this parametric test results from the presence of a normal distribution at different moments of evaluation was obtained with the use of normality tests: Shapiro-Wilk and Kolmogorov-Smirnov test. It was also important to examine the observed power of the test in association with the ANOVA. The power represents the probability of correctly rejecting H_0 (i.e. when H_0 is false). Thus, the greater the observed power, the greater the degree of confidence in the conclusion obtained. If the observed power of the test is low (less than 0.80) the results must be interpreted with caution (Maroco 2003). ANOVA revealed a significant result at $p \leq 0.001$ which indicates the existence of differences between the different periods, and the excellent power of the test (above 0.80). In order to identify the distinct moments, the Bonferroni test was used.

Results

The first analysis of the ANOVA revealed a significant result at $p \leq 0.001$ which indicates the existence of differences between the different periods, thus the power of the test was considered excellent (above 0.80).

Significant differences between the four stages of evaluation: 12, 20, 32 and 37 weeks of gestation, were observed. Table II shows that the standard deviation in the 1st moment of evaluation is 0.56, the 2nd moment is 0.46, whereas in the 3rd and 4th moments the standard deviation points are 0.47 and 0.48, respectively.

A significant decrease of the pain score (1.23)

was observed at 20 weeks of gestation and (1.81) at 12 weeks (Figure 1). This score tends to increase again at 32 weeks (2.12) and remain almost the same throughout the 3rd trimester of pregnancy.

During the four stages of data collection, it was possible to establish that the maximum and minimum scores of the following pain values varies in each period: 12 weeks - 3.50 and 1.00, and 1.00 - 3.00 20 weeks, 32 weeks - 3, 50, and 1.00, and 1.36 - 3.56 37 weeks.

All women reported pain in the lumbar region and it was also ascertained that the pain score tends to increase later in the day.

The Bonferroni test (Table III) was used in order to identify the different moments.

The Bonferroni test confirmed that there is a significant decrease in back pain during the first and second moments of evaluation (from 1.81 to 1.21, $p \leq 0.001$), with a significant increase during the third moment (from 1.23 to 2.12, $p \leq 0.05$), indicating a stabilization of the level of back pain

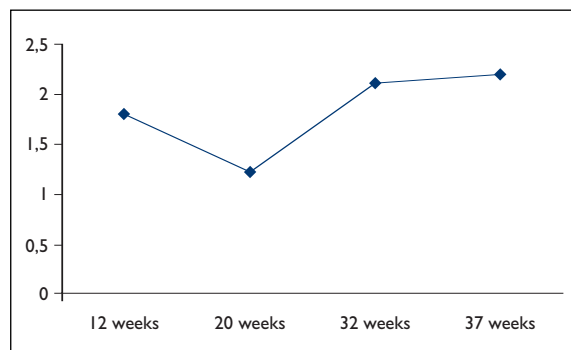


Figure 1. Back Pain at the 12, 20, 32 and 37 weeks of gestation

Table III. Bonferroni test (Post-Hoc ANOVA): multiple comparisons of the 4 time periods regarding the Back Pain variable

Bonferroni Test	2nd Moment 20 Weeks X = 1,23	3rd Moment 32 Weeks X = 2,12	4th Moment 37 Weeks X = 2,21
1st Moment 12 Weeks X = 1,81	Difference in Averages = 0,58 p = 0,000***	Difference in Averages = -0,31 p = 0,015*	Difference in Averages = -0,40 p = 0,000***
2nd Moment 20 Weeks X = 1,23	–	Difference in Averages = -0,89 p = 0,000***	Difference in Averages = -0,98 p = 0,000***
3rd Moment 32 Weeks X = 2,12	–	Difference in Averages = -0,09 p = 1,000 (n.s)	

(*significant $p \leq 0,05$, *** significant $p \leq 0,001$, n.s : not significant)

from the 3rd to the 4th moment of assessment (from 2.12 to 2.21 ns). The pain is lower in the second stage of evaluation (at 20 weeks) and significant differences were recorded in regards to all the other periods.

Subsequently, during the four moments of assessment it was possible to examine the percentage of pregnant women that reported permanent back pain, those that reported the onset of back pain for the first time (in any of the four moments), those that ceased to have back pain and those that continued to have no pain (Table IV).

At 12 weeks of gestation 39 women (71.4%) reported having their first back pain while 16 women (28.6%) remained without pain.

In regards to the 20th week of gestation, only seven women (14.3%) reported back pain, 27 women (55.1%) ceased to have pain, 14 reported no pain

and only one woman reported having pain for the first time during her pregnancy.

At 32 weeks, 36 women (75%) reported having back pain, whilst 8 (16.7%) reported unremitting back pain and 4 women (6.3%) remained pain free and no longer felt any pain at this moment of the assessment.

At 37 weeks of gestation, 44 women (91.7%) reported having back pain. Three women (6.3%) reported their first signs of pain at this moment, whereas one woman (2.1%) did not refer to permanent pain, and actually showed no signs of this symptom during this period.

Observation of the collected data revealed that only 1 (2.1%) woman never had back pain during pregnancy, whereas 7 (14.3%) women reported having pain during every moment of the evaluation. 10 (20.4%) women reported pain only in the 3rd

Table IV. The percentage of pregnant women that reported permanent back pain, those that reported the onset of back pain for the first time, those that ceased to have back pain and those that continued to have no pain

Differences Between ↓	Maintained Back Pain	Onset of Back Pain	Stopped having back Pain	Remains without Back pain
12 Weeks Vs 20 Weeks	14,3% (7)	2% (1)	55,1% (27)	28,6% (14)
20 Weeks Vs 32 Weeks	16,7% (8)	75% (36)	0% (0)	6,3% (4)
32 Weeks Vs 37 Weeks	91,7% (44)	6,3% (3)	0% (0,)	2,1% (1)

quarter.

We analyzed the prevalence of pain in only one of the moments of evaluation and noted that only two (4.1%) women suffered from this condition; referring to pain only at 37 weeks of gestation.

Data analysis revealed that the percentage of pregnant women with back pain varies greatly throughout pregnancy. We observed that at 12 weeks of gestation 71.4% of women had back pain, whereas at 20 weeks only 16.3% reported pain. However, at 32 weeks 91.7% of women reported pain, and at 37 weeks, 98 % mentioned pain.

Discussion

The purpose of this longitudinal study was to identify the levels of back pain during pregnancy. For that purpose the NIH Activity Record was applied to each woman in four differences moments of pregnancy: 12, 20, 32 and 37 weeks of gestation.

Several studies in different parts of the world have reported a high incidence of back pain during pregnancy, and it is predicted that approximately half of all pregnant women suffer from back pain at some point in their pregnancy – a large number of them severely enough to hinder their normal activities¹.

Data analysis revealed that the prevalence of back pain varies significantly throughout pregnancy and that this difference is more apparent during the 2nd (20 weeks) and 3rd trimesters (32 and 37 weeks). This result is contrary to the results obtained by Carvalho whose study did not establish a significant relationship between trimesters¹⁵.

It was also possible to establish that at 12 weeks of gestation 71.4% of women had back pain, whereas at 20 weeks only 16.3% reported pain. At 32 weeks, 91.7% of women reported pain and at 37 weeks, 98% mentioned this symptom.

This data is not in accordance with studies that indicate a prevalence of 80% for back pain during pregnancy¹⁶ in view of the fact that our study indicates that over 90% of pregnant women suffer from back pain in the third trimester (32 and 37 weeks).

Kilstrand *et al.* report a 20% increase of back pain in pregnant women. These authors also state that this increase may result from the greater concern regarding the quality of life in the present day, especially concerning the welfare of pregnant women. This factor has produced more detailed and

objective research on the diagnosis¹⁷.

Our results point to a greater prevalence of pain during the 1st and 3rd quarters. This result is contrary to the results obtained by Sihvonen *et al.*, who ascertained that the highest incidence was not in those trimesters¹⁸.

We also verified that the higher incidence of back pain occurs during the third quarter which is contrary to the study by Martins and Silva¹⁶ who established that pain was more common in early pregnancy.

According to Orvieto *et al.*, women in their last month of pregnancy reported higher incidences of back pain¹⁹.

This study is in agreement with others published in medical literature as it also concluded that musculoskeletal pain is frequent symptom during pregnancy^{20,21}.

The results revealed a considerable decrease in the number of pregnant women who have back pain during the second stage of evaluation (20 weeks of gestation). This finding is contrary to data that indicates a higher incidence of back pain between the 5th – 7th months of pregnancy. This factor represents a common reason for sick leave¹⁰.

In contrast to the existing literature that indicates that back pain mainly occurs mainly during the first 5–7 months of pregnancy, we determined that back pain may be occur any time during pregnancy.

Nearly 30% of the women with back reported that they had to discontinue at least one daily activity because of back pain. For all other daily activities, they reported mild-to-severe degrees of difficulty because of back pain¹¹.

This study revealed that back pain is not a stationary aspect but rather a condition that undergoes alterations during gestation. It was also established that back pain decreases at 20 weeks of gestation and increase again during the 3rd trimester.

As the structure of society changes, back pain in pregnancy extends its negative impact across many areas of women's daily lives, including work, household responsibilities, leisure activities, and sleep¹¹.

This specific pain has an impact not only on the individual woman but also adversely affects those she cares for by limiting her daily activities, as well as adversely influencing her work productivity. We call upon researchers to contribute to the improvement of women's health through research focu-

sed on the prevention and treatment of lower back pain during pregnancy.

In conclusion, the data clearly indicates that back pain during pregnancy is a common problem that should not be ignored.

We consider it imperative that health professionals become familiar with the frequency and characteristics of these complaints, because a greater awareness of this problem will help minimize its consequences on the one hand and, possibly reduce its prevalence, on the other¹⁶. Thus, we suggest that further studies verify the effectiveness of different treatments available in order to help solve or decrease its impact on the welfare of pregnant women and allow for their integration in more homogeneous activities, domestic and professional¹⁶.

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