

Evaluation of the effects of maternal anxiety on the duration of vaginal labour delivery

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Summary

Objective: In the present study, the authors aim to investigate the effect of anxiety during late pregnancy periods and during labour on the duration of delivery in patients giving birth vaginally. **Materials and Methods:** In the study we included 50 nulliparous and 35 multiparous patients who were at or above the 28th gestational age and followed-up and admitted for birth at the present hospital. During the admission at the outpatient clinic at third trimester and at the beginning of labour, anxiety levels of patients were detected by performing the Spielberger State-Trait Anxiety Inventory. The duration of the labour stages of pregnant women were recorded and these durations and maternal state-trait anxiety levels were compared. **Results:** The trait anxiety of patients both during the third trimester and labour was similar, while during labour state anxiety was seen to be increased. Statistically, the levels of the trait anxiety of multiparous patients were significantly higher. There was a statistically significant correlation between state anxiety for both periods in nulliparous patients and latent and active phases, the first and the second stages, and total duration of the labour. In addition, there was a significant relationship between trait anxiety levels for both period and total duration of the labour. For multiparous patients, only positive significant correlation was detected with the level of state anxiety during labour. **Conclusion:** It has been seen that the anxiety occurring at the last trimester of pregnancy and labour, and especially acute state anxiety have negative effects on the duration of the phases of labour. It has been considered that the physical care provided for patients at the last trimester and during labour and also evaluation in terms of anxiety and provision of emotional support may cause positive outcomes for the duration of labour.

Key words: Spielberger State-Trait Anxiety Inventory; Maternal anxiety; Duration of labour; Normal vaginal birth.

Introduction

Anxiety, which can be expressed in words such as worry, boredom, an uncomfortable feeling of uneasiness and fear experienced due to danger or possibility of danger caused by internal or external stimuli or any situation viewed and perceived as dangerous by the person. When these feelings - which are healthy within normal limits are surpassed - appear in order to cope with negative situations become severe and prolonged, they can adversely affect lifestyle, activities, social life, and interpersonal relationships of the person. Anxiety after this line appears to create mental problems for the person [1].

Women may face many factors that can cause stress and anxiety during pregnancy, specific physical changes of pregnancy, hormonal factors especially with sudden changes in mood and childbirth, and possible additional stress factors, such as fear of being unable to give birth to a healthy child and pain during labour [2]. Beyond this, factors such as young age, low socio-economic status and education levels, sexual abuse, unwanted pregnancies, inadequate preparation for pregnancy or birth, plus depressive symptoms, and a previous history of psychiatric illness can adversely affect the mental health of pregnant women [3].

Pregnancy is the process of change and adaptation in terms of both psychological and physiological aspects. Biological and psychological differences may occur in different ways for each pregnant woman. In some women, pregnancy does not result in any psychological risk, but in others can create an emotionally vulnerable environment. Anxiety during pregnancy can cause adverse effects on the maternal obstetric status and neonatal health. The last terms of pregnancy and the painful process of labour are periods associated with increased anxiety in the mother [4].

In the present study, the authors plan to investigate whether the duration of labour is affected by anxiety emerging late at the term of pregnancy of the mother and during labour.

Materials and Methods

The present study was planned as a prospective cohort, case-controlled study in patients with 28th gestational week or more admitted to this hospital. Eighty-five women with single gestation, without cephalopelvic discrepancy in the examination, without bleeding diathesis or vaginal infection, with reagent Non Stress Test and occiput anterior presentation, were included in the study. Fifty of these pregnant women were primigravid, 35 of them were multigravid.

Before the study, all patients were informed about the study; their approvals were obtained by giving detailed information

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about the forms that they would complete and the normal vaginal delivery.

First age, height, weight, gestational age, number of pregnancies and births of the patients evaluated in the outpatient clinic were identified and recorded. Then, before the normal obstetric examination, patients were requested to complete the State-Trait Anxiety Inventory developed by Spielberger in order to detect and prevent anxiety in adults and young people aged 14 or more. The degree of frequency of feelings and behaviour suggested by the questions in this inventory were expressed by patients by marking one of the options: (1) almost none, (2) sometimes (3) most of the time, and (4) all of the time. In the inventory, the anxiety levels of individuals were detected as a result of calculations made by using two different types of expression in the form of direct and reversed expressions. Once the inventory had been completed, routine obstetric examinations of the patients were performed.

Spielberger State-Trait Anxiety Inventory was applied again at the latent phase of labour, and after hospitalisation due to labour, for patients whose anxiety levels were determined during third-trimester outpatient examinations. Thus patients during the period of labour were determined and recorded. Patients were included in the routine monitoring of labour and duration of labour stages was calculated.

The beginning of the first phase was accepted as the hour that the patients regularly felt pain. First stage was divided into two parts as latent stage; before three-cm dilatation and active stage; after three-cm dilatation.

The elongation disorder was considered for the nulliparous patients due to less than 1.2 cm / h dilatation, and for the multiparous patients due to less than 1.5 cm / h dilatation. The diagnosis of stand still disorder was considered for patients without progression of dilatation at the end of a two-hour period or level at the end of a one-hour period. Re-evaluation was performed on these patients and the diagnosis of fetopelvic non-compliance was excluded. When hypotonic dysfunction was detected, oxytocin support was performed in order to provide 50 mm Hg or more contractions, coming once every three to four minutes and occurring with active or regular intervals.

The amniotic membranes of all patients were opened artificially in the period of four to eight cm dilatation at the follow up period of labour; bladders were emptied, and except for the period of external fetal monitoring and active straining, the patients were allowed to be in their desired positions.

The first stage of labour was accepted as complete when cervical dilatation of ten cm and effacement became 100% and the durations were recorded. Following the completion of the first phase, the second phase was accepted as the period passing until birth, and the third phase was accepted as the period of birth and the placenta and attachments were discarded and the durations were recorded.

Continuous data were presented as mean ± standard deviation. In data analysis, the dependent and independent samples t-test, Spearman's correlation analysis, and partial correlation analysis were performed. Significance at $p < 0.05$ was accepted.

Results

The present research was carried out on 85 pregnant women including 50 nulliparous and 35 multiparous women. The definitive characteristics of the patients are given in Table 1.

In the comparison of multiparous and nulliparous patients, there was no statistically significant difference in terms of the state anxiety. The trait labour anxiety scores were sig-

Table 1. — *The definitive characteristics of the patients.*

Descriptive features	Nulliparous (Mean ± SD)	Multiparous (Mean ± SD)	<i>p</i> *
Age (years)	22.9 ± 3.5	29.1 ± 5.4	< 0.001
Height (cm)	161.8 ± 5.3	163.4 ± 3.9	0.1
Body weight (kg)	67.1 ± 8.4	76.4 ± 10.1	< 0.001
BMI (kg/cm ²)	25.7 ± 3.2	28.2 ± 3.6	0.01
Weight gaining during pregnancy (kg)	12.2 ± 3.9	13.8 ± 5.4	0.1

Mean ± SD; BMI: Body mass index; cm: centimeter; kg: kilogram; *p**: t-test.

Table 2. — *State Anxiety Scores of the patients.*

		All patients	Nulliparous patients	Multiparous patients	<i>p</i> *
Anxiety scores during admission	State (Mean ± SD)	41.51 ± 11.01	42.16 ± 10.69	40.61 ± 11.52	0.45
	Trait (Mean ± SD)	46.03 ± 7.72	44.32 ± 7.87	48.48 ± 6.88	0.01
Anxiety Scores during labor	State (Mean ± SD)	53.67 ± 9.37**	55.02 ± 9.35**	51.74 ± 9.20**	0.16
	Trait (Mean ± SD)	47.38 ± 8.17#	45.70 ± 8.29#	49.80 ± 7.45#	0.01

State: State Anxiety Score Trait: Trait Anxiety Score; mean ± SD: *p**comparison of nulliparous and multiparous women; t-test, Spearman's correlation analysis.

**The State Anxiety Scores during the admission and the State Anxiety Scores during the labor compared with $p < 0.001$; Spearman's correlation analysis.

#The Trait Anxiety Scores during the admission and the Trait Anxiety Scores during the labor compared with $p > 0.05$, Spearman's correlation analysis.

Table 3. — *The duration of labor of the patients.*

	Min-Max (hours)	Nulliparous	Multiparous	
		Mean ± SD	Min-Max (hours) (Mean ± SD)	
Latent phase (first phase)	1-24	9.60 ± 7.20	1-24	6.18 ± 5.80
Active phase (first phase)	1-15	6.70 ± 3.40	2-20	6.3 ± 3.88
Second phase	0.16-3	0.58 ± 0.49	0.08-2	0.4 ± 0.42
Third phase	0.08-0.50	0.15 ± 0.07	0.08-0.50	0.18 ± 0.11

Min-Max: Minimum-Maximum; mean ± SD: Mean ± standard deviation.

nificantly higher in multiparous patients both during the last trimester as well as labour ($p < 0.05$) (Table 2).

The State Anxiety Scores for labour were statistically significantly higher than the State Anxiety Scores for the third trimester before labour ($p < 0.05$) (Table 2).

There was no statistically significant difference between the Trait Anxiety Scores before labour and during labour ($p > 0.05$) (Table 2).

Latent phase of labour in nulliparous and multiparous patients was calculated as mean 9.6 ± 7.2 hours; 6.18 ± 5.8 hours, respectively (Table 3). Four patients were observed with latent phase of more than 20 hours, which is accepted as the limit for normal duration of the latent phase for nulliparous, and three patients with latent phase of more than 14 hours which is accepted as the limit for normal duration of the latent phase for multiparous.

Mean active phase of labour in nulliparous and multiparous patients was calculated to be 6.7 ± 3.4 hours and

Table 4. — The comparison of the Anxiety Scores of the patients and the duration of the latent phase of labour.

Scores	Nulliparous patients		Multiparous patients		All patients	
	r	p	r	p	r	p
State 1	0.40	0.01	0.35	0.55	0.32	0.01
Trait 1	0.30	0.02	0.10	0.87	0.28	0.01
State 2	0.25	0.29	0.30	0.62	0.27	0.01
Trait 2	0.35	0.02	0.30	0.62	0.20	0.05

State 1: State Anxiety Score during the application; Trait 1: Trait Anxiety Score during the application; State 2: State Anxiety Score during labor; Trait 2: Trait Anxiety Score during labour $p < 0.05$: statistically significant, Spearman's correlation analysis; r: correlation analysis.

Table 5. — The comparison of the Anxiety Scores of the patients with the duration of the active phase of labor without the effects of maternal and fetal factors* which are able to change the duration of labour.

Active phase duration Scores	All patients		Nulliparous patients		Multiparous patients	
	r	p	r	p	r	p
State 1	0.24	0.03	0.32	0.03	0.10	0.59
Trait 1	0.07	0.52	0.08	0.58	0.11	0.53
State 2	0.25	0.04	0.22	0.03	0.12	0.52
Trait 2	-0.07	0.86	0.03	0.83	-0.03	0.86

State 1: State Anxiety Score during the Application; Trait 1: Trait Anxiety Score during the application; State 2: State Anxiety Score during labor; Trait 2: Trait Anxiety Score during labour; $p < 0.05$: statistically significant, Spearman's correlation analysis; p: correlation analysis, r: correlation analysis. * Maternal BMI, maternal age, weight gaining during the pregnancy, fetal weight, fetal head circumference.

6.3 ± 3.8 hours, respectively. Percentile limits of active phase for nulliparous patients were identified as 95% and there were three patients with the duration of active phase of more than 12 hours.

Second phase of labour was detected as the average of 0.5 ± 0.47 hours between five minutes and three hours. For the nulliparous patients who had not received anesthesia, the limit of prolonged second phase was accepted as two hours and there was one patient observed with prolonged second phase. For the multiparous patients who had not received anesthesia, the limit of prolonged second phase was accepted as one hour and there were two patients observed with prolonged second phase.

The mean third phase of labour was 0.16 ± 0.09 hours and patients with prolonged third stage were not detected.

In the correlation analysis performed for all patients, a significant positive correlation between the duration of the latent phase and the State-Trait Anxiety Scores on admission and the State-Trait Anxiety Scores during labour was observed ($p < 0.05$) (Table 4). For nulliparous patients, a significant positive correlation between the duration of the latent phase and the State-Trait Anxiety Scores on admission and the State-Trait Anxiety Scores during labour was observed. For multiparous patients, significant positive correlation between the anxiety scores and the duration of latent phase of labour was not detected ($p < 0.05$) (Table 4).

When the effects of maternal BMI, maternal age, the total weight gained during pregnancy, fetal weight, and fetal head circumference that are able to change the duration of

Table 6. — The comparison of anxiety scores of the patients and the total duration of labor without the effects of maternal and fetal factors* that can change the duration of the active phase and the second phase.

Scores	All patients		Nulliparous patients		Multiparous patients	
	r	p	r	p	r	p
State 1	0.41	< 0.001	0.45	0.002	0.20	0.26
Trait 1	0.26	0.017	0.29	0.046	0.37	0.04
State 2	0.33	0.002	0.26	0.046	0.27	0.14
Trait 2	0.27	0.013	0.41	0.085	0.22	0.23

State 1: State Anxiety Score during the application; Trait 1: Trait Anxiety Score during the application; State 2: State Anxiety Score during labor; Trait 2: Trait Anxiety Score during labor; $p < 0.05$: statistically significant, Spearman's correlation analysis; p: correlation analysis, r: correlation analysis.

* Maternal BMI, maternal age, weight gaining during the pregnancy, fetal weight, fetal head circumference.

Table 7. — The comparison of the anxiety Scores of the patients and the duration of third phase of labor.

Scores	All patients			
	State 1	Trait 1	State 2	Trait 2
r	0.11	0.07	0.25	0.19
p*	0.29	0.48	0.02	0.08

State 1: State Anxiety Score during the application; Trait 1: Trait Anxiety Score during the application; State 2: State Anxiety Score during Labor; Trait 2: Trait Anxiety Score during labor; $p < 0.05$: statistically significant, Spearman's correlation analysis; p: correlation analysis, r: correlation analysis.

labour were controlled, statistically significant positive correlations were observed between the levels of state anxiety at third trimester and during labour, and the duration of active phase of labour in all patients and nulliparous patients ($p < 0.05$). In multiparous patients, statistically significant correlation was not observed ($p > 0.05$).

After controlling the effects of the factors statistically which would be able to affect the duration of the active phase and the second phase of labour, statistically significant positive correlations were observed between the levels of state anxiety for two phases and the total duration of labour in all patients and nulliparous patients ($p < 0.05$). In multiparous patients, only statistically significant positive correlations were observed between the trait anxiety scores of the third trimester and the total duration of labour.

After allowing for the effect of all patients and in patients in both nulliparous periods, the total duration of labour between state anxiety levels and a statistically significant positive correlations were observed only in the third trimester of continuity score in patients with multiparous labour significant correlation was found between the total duration.

The third stage of labour is the period between immediately after the birth of the baby and the time that placenta and its annexes are expelled. In this study, patients with prolonged third stage were not detected. Active management at third stage was performed in all patients. In this study, the correlation between the state anxiety during labour and the duration of the third stage of labour was observed.

On the total duration of labour, it has been seen that the state-trait anxiety of both third trimester and during labour had an effect on the total duration of labour. It has been detected that this effect was caused by nulliparous women and it continued after controlling of the other maternal and fetal factors that could have an effect on the duration of labour. In multiparous patients, only the trait anxiety of third trimester and total duration of labour were observed as correlated.

Discussion

The effect of the mental health of pregnant patients on the pregnancy results is an important but often neglected area of research. It has been seen that with the consideration of the stress factors associated with pregnancy, the conduct of studies for anxiety during pregnancy becomes more important. A variety of mechanisms have been proposed for adverse perinatal outcomes caused by anxiety. Some patients with anxiety have negative habits such as smoking, alcohol intake, or not undergoing prenatal examinations. The direct effects of stress-dependent hormones and psychoimmunological factors are considered as other important mechanisms [5]. The level of trait anxiety determines the severity and frequency of state anxiety that the person will experience in dangerous situations in future. Accordingly, it is expected that, under pressure, individuals with high trait anxiety levels show state anxiety reactions quickly and more frequently than individuals with low trait anxiety levels [6]. In the present study, in support of these hypotheses, levels of trait anxiety during labour (trait two point) were found to be high and numerically close to each other in patients with high levels of trait anxiety in the last trimester (trait one point). The state anxiety of patients showed a significant increase during labour. In addition, it was seen that the levels of state anxiety of the patients with high levels of trait anxiety were also higher.

When the anxiety levels between nulliparous and multiparous women were analysed, the mean State Anxiety Scores for both phases were higher in nulliparous women but there were no statistically significant differences. The trait anxiety was higher in multiparous pregnant. The reason for this was considered to be advanced age and additional tensions due to previous children and life events. The mean age and the number of living children in multiparous patients were significantly higher than nulliparous patients. Similar to this data, in a study performed by Albert *et al.*, it was observed that trait anxiety was associated with duration of marriage, number of children and maternal age [7].

In studies that have been made to determine the level of anxiety during pregnancy, it has been observed that a variety of gestational periods were included. Some authors claimed that the anxiety levels in pregnancy increased from the first trimester to the last trimester. On the other hand, in some publications, it has been reported

that anxiety levels were higher in first and third trimester, but had a downward tendency in the second trimester [8]. Little *et al.*, have not detected differences in the anxiety levels during pregnancy [9].

During labour, catecholamine-mediated maternal stress response emerges. For pain and stress, catecholamines, especially epinephrine are secreted. Stress hormones bind to the β -adrenergic receptors in the myometrial smooth muscle cells and it has been thought that this impairs the development of regular uterine contractions [10]. In a study performed by Lederman *et al.* with primigravid patients, the anxiety levels of the patients in labour and plasma epinephrine levels were evaluated. As a result of this, it has been detected that reduction in uterine activity and prolonged active phase of labour have been identified with the high levels of epinephrine in active phase of labour in primigravid patients [11]. In the present study, it has been observed that state-trait anxiety at the third trimester and state anxiety during labour lengthened the duration of latent phase in all patients. In nulliparous patients, there was statistically significant correlation between state anxiety for both periods and both latent and active phases of labour; the first and the second stages and the total duration of labour. In addition, every two period trait anxiety levels were significantly correlated with the total duration of labour. With multiparous patients, only the levels of state anxiety during labour were significant and positively correlated.

In some studies, the levels of maternal endogenous epinephrine were observed to be associated with pain and anxiety. In fact, in a study by Neumark *et al.* into the progress of labour, an increase in plasma catecholamine and cortisol levels was detected [12]. In another study, plasma catecholamine levels measured at the second stage of labour were higher than the initial levels [13]. It has been detected that administration of epidural analgesia during labour reduced the level of plasma epinephrine, provided the inactivation of sympathetic system and shortened the duration of labour by reducing pain [12, 14]. Maltau *et al.* have suggested that an increase in sympathetic activity causes irregular uterus contractions and epidural analgesia, by reducing sympathetic activity, may promote more regular uterine activity and cervical dilatation and shorten the duration of labour [15].

As a result of the present statistical analysis, an important correlation was observed with state anxiety of both periods of second phase of labour in nulliparous patients. In multiparous patients, it has been detected that state anxiety during labour had an effect on the second stage of labour. Some increases detected for state anxiety during labour have been thought to be the result of uncoordinated movements of the mother and an inability to provide effective straining. The relation between the second stage duration and state anxiety was more in nulliparous patients where straining had a more important role. This would appear to support our opinions.

A study performed by Grimm with 95 nulliparous and 142 multiparous patients investigated the effects of psychological tension on first and second phases of labour and delivery complications [16]. Grimm detected that the tension was not associated with the first phase of labour and delivery complications, but had an effect on the second phase of labour. It has been claimed that ineffectiveness on the first phase was surprising and the reason for reaching such a conclusion might have been that the initial time of labour was determined based on the patient's own words. In a study by Mei *et al.* with 180 primigravid patients, it has been detected that, first and second stages of labour were longer in patients with high anxiety and depression scores [17].

In two different studies performed by Sosa *et al.* and Langer *et al.*, it has been detected that the companionship of caregivers who gave patients special psychological support during labour, and provided information, physical and emotional support shortened the duration of labour and caused positive effects on the mothers' breastfeeding [18, 19]. As well as these studies, Scott *et al.* have reported that continuous emotional and physical support during labour reduced the continuous state anxiety, shortened the duration of labour and prevented the request of birth by caesarean section [20].

In this study, as a result of all of this data and the assessments, the authors observed that the anxiety during the third trimester and labour caused elongation of all stages of labour, especially in nulliparous patients. The authors concluded that this situation may be related to the secretion of stress hormones and insufficient active straining due to patient noncompliance. They thought that the psychological support provided for patients during pregnancy and labour and application of epidural analgesia for developing anxiety due to fear of pain may positively affect the duration of labour.

Conclusion

It has been seen that the anxiety occurring during the last trimester of pregnancy and labour, and especially acute state anxiety have negative effects on the duration of the phases of labour. It has been considered that the physical care provided for patients during the last trimester and during labour and an evaluation in terms of the anxiety and provision of emotional support may cause positive outcomes for the duration of labour.

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