

# The Effect on the Birth Process of Endogenous Oxytocin Release Via Coitus at Home in Pregnant Women in the Latent Phase

## Authors

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## ABSTRACT

**Objectives** This study was conducted to determine the effect of endogenous oxytocin release via coitus at home on the delivery process in pregnant women who were not hospitalized in the latent phase.

**Background** For healthy pregnant women who can deliver spontaneously, it is recommended to be admitted to the delivery room during the active phase of labor. When the pregnant woman is admitted to the delivery room in the latent phase before the active stage, pregnant women spend more time in the delivery room, which makes medical intervention inevitable.

**Methods** 112 pregnant women for whom hospitalization in the latent phase was recommended were included in the randomized controlled study. They were divided into two groups in which sexual activity in the latent phase was recommended (n = 56) and the control group (n = 56).

**Results** In our study, the duration of the 1st stage of labor was found to be significantly shorter in the group in which sexual activity in the latent phase was recommended, compared to the control group (p = 0.001). Again, the need for amniotomy, labor induction with oxytocin, analgesics and episiotomy decreased.

**Conclusion** Sexual activity can be considered as a natural way to speed up labor, reduce medical interventions, and prevent postterm pregnancy.

## Introduction

Interventions in labor usually start after the pregnant woman's admission to the hospital. For healthy pregnant women who can deliver spontaneously, it is recommended to be admitted to the delivery room during the active phase of labor. When the pregnant woman is admitted to the delivery room in the latent phase before the active stage, pregnant women spend more time in the delivery room, which makes medical intervention inevitable [1].

However, most pregnant women are hospitalized in the latent phase [2]. Hospitalization in the latent period in pregnant women increases anxiety and decreases self-confidence [3], which may lead

to the use of more synthetic oxytocin and analgesics, longer fetal monitoring, prolongation of labor, and many negative conditions [4–6].

Studies on synthetic oxytocin induction, the use of which increases with hospitalizations in the latent period, revealed the complication rates of elective induction in pregnant women (hyperstimulation, need for emergency cesarean section, hypotension, antidiuretic effect, neonatal hyperbilirubinemia, uterine rupture, fetal distress, fetal and maternal death, etc.) show an increase [7–11]. At the same time, it was determined that dystocia, cesarean section, amniotomy, episiotomy, and induction rates with ox-

ytocin were higher in pregnant women admitted to the delivery room in the latency period compared to pregnant women in the active phase [4, 6].

Despite many complications of synthetic induction use, endogenous oxytocin, which is natural oxytocin released by the body, is essential for labor [12]. Although their structures are similar [13], the release of endogenous oxytocin, in contrast to synthetic oxytocin, reduces pain by increasing the release of endorphin, a natural pain reliever released by the body [14–17]. Endogenous oxytocin release increases the Bishop score and increases the rate of spontaneous vaginal delivery [12].

Coitus is among the methods that increase endogenous oxytocin release during labor [18, 19]. During orgasm, endogenous oxytocin release, breast stimulation, prostaglandin content of semen, and mechanical stimulation of the uterus and cervix accelerate labor by providing induction [19, 20]. Sperm are rich in prostaglandin E and F<sub>2a</sub> [21, 22], and prostaglandin concentration in the cervical mucus of pregnant women is higher than expected after coitus [23].

Nipple stimulation supports cervical maturation by increasing endogenous oxytocin secretion and increases the rate of spontaneous onset standard delivery [19]. Coitus mechanically stimulates the cervix and the lower uterine segment, and at the same time, endogenous oxytocin is released during orgasm, thereby increasing uterine contractility [24].

Health professionals should seek new alternative methods to reduce latent phase hospitalization, elective labor induction, and complications. They should support spontaneous vaginal delivery by providing endogenous induction of labor. This will help the mother feel less pain by stimulating the release of endorphins and increasing endogenous oxytocin and will contribute to the increase of pregnant and fetal health by reducing the use of synthetic oxytocin [12]. For this reason, it is essential to investigate the effect of coitus application, which is thought to increase the release of endogenous oxytocin. Thus, unnecessary pain and interventions will be prevented for pregnant women, labor will be perceived more positively, unnecessary drug use and side effects/complications of synthetic oxytocin on mother and fetus will be prevented, and the family-country economy will be contributed.

This study was carried out to determine the effect of endogenous oxytocin release on the delivery process through coitus at home in pregnant women who were not hospitalized in the latent phase.

## Materials and Methods

### The universe and sample of the study

In 2020, there were 579 normal vaginal deliveries at Gynecology and Children's Hospital, where the research was conducted, and 2,347 at State Hospital. The sample size used in this study was calculated using power analysis. In a reference study among women who underwent augmentation, cesarean delivery was found to be 54% in the latent phase and 23% in the active phase [4]. With the Sample volume representing the universe and accompanied by information from the reference study, at  $\alpha = 0.05$  significance level,

$1-\alpha = 0.95$  confidence interval,  $\beta = 0.10$  error risk, and  $1-\beta = 0.90$  power, the total number of individuals was 112, with  $n:56$  for each group.

### Criteria for the selection of pregnant women

1. Single fetus in vertex presentation;
2. 38th–42nd week of gestation;
3. Having normal non-stress test (NST) findings;
4. Being in the latent phase of the 1st stage of birth;
5. Being hospitalized for spontaneous vaginal delivery;
6. No pregnancy complications diagnosed during pregnancy;
7. Not having a systemic disease (heart, kidney, pulmonary, endocrine, etc.);
8. Absence of conditions that affect the ordinary course of labor (polyhydramnios, premature rupture of membranes, chorioamnionitis, intrauterine growth retardation, Rh incompatibility, expiration, fetal death, fetal anomaly, fetal distress, ablatio placenta, placenta previa or presence of vasa previa, insufficient uterine activity, prolonged labor, active genital herpes infection, cord prolapse, fetal malpresentation);
9. Living close to the health institution;
10. Having a signed consent form agreeing to participate in the study.

Pregnant women meeting the above criteria were randomly divided into groups.

### Data collection tools

The data of the study were collected with the “Personal Information Form” and “Birth Action Evaluation Form” created by the researchers in line with the literature.

**Personal Information Form:** In the questionnaire, there were 21 questions about obstetric characteristics on age, family type, income status, socio-demographic characteristics, pregnancy, and number of children.

**Birth Evaluation Form:** In the questionnaire form, there were 10 questions on the duration of the birth, the practices, and the characteristics of the newborn.

### Application of research and ethics

Every stage of the research was carried out in accordance with ethical principles. Written permission was obtained from the ethics committee (Decision No: 2021–02/48, Date: 10.02.2021). Among all the pregnant women interviewed with the pre-evaluation form before starting the study, pregnant women who met the criteria for inclusion in the study were determined. Written consent was obtained from all pregnant women who met the criteria, and completion of labor evaluation forms was initiated for pregnant women who gave consent. The documents were used by the researcher using the face-to-face interview technique. Women were divided into intervention and control groups using simple randomization using a random number table. The pregnant women who were in the latent phase and were assigned to the intervention group were asked to be sent home to experience coitus with their partners and to come to the health institution immediately when contractions

became more frequent. The effacement and dilatation status were recorded before the pregnant women were sent home, and when the contractions became more frequent, the wiping and dilatation of the pregnant women were examined again. Progress in dilatation and deletion showed that oxytocin release increased during coitus. Since its half-life is very short, the oxytocin hormone was not examined, and no invasive procedure was used in pregnant women. The effect of endogenous oxytocin release via coitus at home on the delivery process was evaluated in pregnant women who lived close to a health institution and were not hospitalized in the latent phase. In both groups, synthetic oxytocin use, cesarean delivery rates, duration of birth stages, dystocia and assisted delivery, and Apgar scores were evaluated.

## Evaluation of data

In the evaluation of the data, the conformity of the quantitative variables to the normal distribution was examined with the Kolmogorov–Smirnov test. Comparisons of two groups in the variables not showing normal distribution were analyzed with the Mann–Whitney U test. The differences between the frequency distributions of the groups in categorical variables were examined with the chi-square test and the exact test. Statistical parameters were expressed as median (25 % quartile–75 % quartile) and n (%). Statistical significance was accepted as  $p < 0.05$ . IBM SPSS version 23 (IBM Corporation, Armonk, New York, USA) and R.3.3.2 software were used to evaluate the data.

► **Table 1** Distribution of sociodemographic characteristics of pregnant women (n: 112).

		Groups				p
		Intervention		Control		
		n	%	n	%	
Age	19 years and under	3	5.4	6	10.7	0.045*
	20–24 years	12	21.4	22	39.3	
	25–29 years	21	37.5	14	25.0	
	30–34 years	16	28.6	7	12.5	
	35–39 years	4	7.1	7	12.5	
Education status	Literate	4	7.1	4	7.1	0.053
	Primary education	17	30.4	30	53.6	
	High school	28	50.0	15	26.8	
	University	7	12.5	7	12.5	
Employment status	Not working	52	92.9	53	94.6	1.00
	Working	4	7.1	3	5.4	
Partner's age	20–24 years	2	3.6	10	17.9	0.163
	25–29 years	16	28.6	15	26.8	
	30–34 years	26	46.4	19	33.9	
	35–39 years	8	14.3	7	12.5	
	40 years and older	4	7.1	5	8.9	
Partner's education status	Primary education	13	23.2	25	44.6	0.061
	High school	35	62.5	24	42.9	
	University	8	14.3	7	12.5	
Partner's employment status	Working	56	100.0	56	100.0	–
Health insurance status	Social Security Agency	51	91.1	41	73.2	0.001*
	Special insurance	2	3.6	11	19.6	
	No health insurance	3	5.4	4	7.1	
Monthly income status	Income less than expenses	18	32.1	27	48.2	0.123
	Income balanced against expenses	38	67.9	29	51.8	

Exact test:  $\alpha: 0.05$ ; \* distributional difference statistically significant.

## Results

The difference between the groups in terms of socio-demographic characteristics, age, and health insurance status was statistically significant ( $p < 0.05$ ). Women between the ages of 20–29 and who had SSI health insurance were seen to be at a higher rate in the groups (► **Table 1**). In addition, all pregnant women lived in the city center close to the hospital.

In ► **Table 2**, the difference between the groups in terms of obstetric characteristics (number of pregnancies, intentional pregnancy, etc.) of pregnant women was not statistically significant ( $p > 0.05$ ).

Cervical dilatation rate (Q1–Q3) was higher in the control group than in the intervention group when the pregnant women who came because of the onset of labor first came to the delivery room ( $p < 0.05$ ). In addition, the vital signs (blood pressure, pulse, respiration, fever) and fetal heart rate of the women in the groups when they came to the delivery room, during the delivery and postpartum period, were within normal values (► **Table 3**).

After the pregnant women in the intervention group were sent home in the latent phase, it was determined that 58.9% had sexual intercourse within 1–6 hours, and 55.4% had sexual intercourse once. Cervical dilatation after sexual intercourse was 4–5 cm in 46.4% of pregnant women (► **Table 4**).

The birth and newborn characteristics of the women in the groups were examined. 83.9% of the women in the intervention group and 62.5% of the women in the control group had normal vaginal spontaneous delivery without episiotomy, vacuum, or forceps. The first stage of labor was 1–4 hours in 66% of those in the intervention group and 7 hours or more in 69.6% of those in the control group. In both groups, it was determined that the second stage of labor was 1–2 hours (100%), and the third stage of labor was between 5 and 30 minutes ( $p < 0.05$ ).

The intervention group and the control group were compared in terms of some practices during labor. Amniotomy was detected in 30.4 versus 58.9%, oxytocin induction in 23.2 versus 73.2%, analgesic administration in 19.6 versus 60.7%, and episiotomy in 23.2 versus 48.2%. There was no statistical difference between the groups in terms of newborns' weight, gender, and 5<sup>th</sup>-minute Apgar scores ( $p > 0.05$ ). The 1<sup>st</sup>-minute Apgar score was higher in the intervention group than in the control group (8.00) ( $p < 0.05$ , ► **Table 5**).

Cervical dilatation rates of women who were sent home in the latent phase and who had sexual intercourse once were measured as 4–5 cm in 64.5% (20 persons). It was measured as 5–6 cm in 57.1% (8 people) who had intercourse twice, and 7–8 cm in 27.3% (3 people) who had intercourse 3 times ( $p < 0.05$ ). Normal vaginal spontaneous delivery was observed in women who had sexual intercourse one to three times ( $p > 0.05$ ). The difference in the intervention group

► **Table 2** Distribution of obstetric characteristics of pregnant women (n: 112).

		Groups		p
		Intervention	Control	
		Median (Q1-Q3)	Median (Q1-Q3)	
Number of pregnancies		1.50 (1.00–2.50)	1.50 (1.00–2.50)	1.00 <sup>c</sup>
Number of abortions		0.00 (0.00–0.00)	0.00 (0.00–0.00)	1.00 <sup>c</sup>
Number of dilatation and curettage procedures		0.00 (0.00–0.00)	0.00 (0.00–0.00)	1.00 <sup>c</sup>
		n (%)	n (%)	
Willingly conceived	Yes	41.00 (73.20)	48.00 (85.70)	0.102 <sup>a</sup>
	No	15.00 (26.80)	8.00 (14.30)	
Problems during pregnancy	No	56.00 (100.00)	56.00 (100.00)	–
Checks during pregnancy	Yes	56.00 (100.00)	56.00 (100.00)	–
Place of examination	Hospital	56.00 (100.00)	56.00 (100.00)	–
Examining person	Doctor	56.00 (100.00)	56.00 (100.00)	–
		Median (Min-max)	Median (Min-max)	
Number of check-ups		8.00 (2.00–10.00)	8.00 (0.00–10.00)	0.948 <sup>c</sup>
		n (%)	n (%)	
Obtained birth-related education	Yes	25.00 (44.60)	21.00 (37.50)	0.442 <sup>a</sup>
	No	31.00 (55.40)	35.00 (62.50)	
Trainer	Midwife	20.00 (80.00)	18.00 (85.70)	0.710 <sup>b</sup>
	Doctor	5.00 (20.00)	3.00 (14.30)	

<sup>a</sup>Chi-square test; <sup>b</sup>Exact test: Mann–Whitney U test; a:0.05; \* distributional difference is statistically significant; Q1 (25% quartile): 1st quarter value; Q3 (75% quartile): 3rd quarter value.

was not statistically significant in terms of first, second, and third stage durations of labor; 1<sup>st</sup>- and 5<sup>th</sup>-minute Apgar scores; time spent in hospital; applied oxytocin induction; amniotomy; analgesia; and episiotomy according to the number of times of sexual intercourse and cervical dilatation level ( $p > 0.05$ , ► **Table 6**).

## Discussion

In the third trimester of pregnancy, sexual activity tends to decrease. Both women and their partners have concerns about the complications that may occur during pregnancy as a result of coitus [25]. Studies have shown that coitus at term is safe in uncomplicated pregnancies, and sexual intercourse and orgasm are not associated with adverse pregnancy outcomes [26].

Coitus has been associated with the onset of labor [18]. However, studies to determine the effect of sexual activity on the onset of labor in term pregnancy are very limited and insufficient [27–32]. While studies show that sexual intercourse during pregnancy is associated with earlier onset of labor and a reduced need for labor induction at 41 weeks [29, 33], there are also studies showing that coitus does not cause any increase in the rate of spontaneous delivery or has any effect on the acceleration of labor and cervical ripening [28, 30].

Sekhvat et al. stated in their study that the prostaglandin concentration in the cervical mucus two hours after sexual intercourse is 10 to 50 times higher than normal values, sexual intercourse at term reduces prolonged pregnancy and labor induction, and stimulates the onset of labor [33]. Tan et al., in their study with 200 pregnant women, emphasized that sexual intercourse at term leads to earlier initiation of labor and a decrease in the need for induction of labor at 41 weeks [29]. Similarly, Atrian et al. and Foumane et al. pointed out in their studies that sexual activity in healthy term pregnancy may be associated with the onset of labor, that it is a natural way to prevent post-term pregnancy, and that it increases the rate of having a higher spontaneous birth rate [31, 32].

According to our study findings, in the latent phase, which is generally longer than the other phases, the first phase of labor was

shorter in the post-coitus intervention group compared to the control group. In the latent phase intervention group compared to the control group, the need for induction of labor with oxytocin, amniotomy, analgesic, and episiotomy decreased, and the 1<sup>st</sup>-minute Apgar score was found to be higher. At the same time, there is a significant relationship between the frequency of coitus and cervical dilatation, and the cervical dilatation rate increased as the frequency of relations increased. Our study findings show that a decrease in unnecessary medical interventions may occur with coitus in the latent phase in term pregnancies, and the rate of normal spontaneous births with a low intervention rate may increase. Sexual intercourse in term pregnant women can be considered as a natural way to speed up labor, reduce medical interventions, and prevent surmaternity.

► **Table 4** Relations status of pregnant women in the sexual relations group sent home in the latent phase (n:56).

		Intervention group	
		n	%
Coitus time	Within 1–2 hours	9	16.1
	Within 2–4 hours	13	23.2
	Within 5–6 hours	11	19.6
	Within 7–8 hours and above	23	41.1
Frequency of intercourse	1	31	55.4
	2	14	25.0
	3	11	19.6
Dilation after sexual intercourse	4–5 cm	26	46.4
	5–6 cm	18	32.1
	7–8 cm	12	21.4

► **Table 3** Distribution of obstetrical characteristics of the pregnant women by the time they came to the delivery room (n: 112).

	Groups						p
	Intervention			Control			
	Median	Q1	Q3	Median	Q1	Q3	
Week of pregnancy	39.00	39.00	40.00	39.00	38.00	40.00	0.279
Cervical dilation at the first application	2.00	1.00	2.00	2.00	1.50	3.00	0.016*
Cervical ripening at first admission	30.00	20.00	40.00	30.00	30.00	40.00	0.166
	n	%		n	%		
Reason for hospitalization (start of labor)	56.00	100.00		56.00	100.00		–
Rupture of amniotic membrane (none)	56.00	100.00		56.00	100.00		–

Mann–Whitney U test; a:0.05; \* The difference is statistically significant.

► **Table 5** Distribution of birth and newborn characteristics of women in the post-sexual groups (n: 112).

Features of Birth and Newborn		Groups				p
		Intervention		Control		
		n	%	n	%	
Type of birth	Spontaneous vaginal birth	47	83.9	35	62.5	0.016*
	Intervention (vacuum, forceps)	3	5.4	13	23.2	
	Vaginal delivery with episiotomy	6	10.7	8	14.3	
First phase duration	1–2 hours	11	19.6	1	1.8	0.001*
	3–4 hours	26	46.4	6	10.7	
	5–6 hours	12	21.4	10	17.9	
	7–8 hours	3	5.4	20	35.7	
	9 hours and above	4	7.1	19	33.9	
Second phase duration	1–2 hours	56	100.0	56	100.0	–
Third phase duration	Within 5 to 30 minutes	56	100.0	56	100.0	–
Amniotomy	Performed	17	30.4	33	58.9	0.002*
	Not performed	39	69.6	23	41.1	
Oxytocin induction	Applied	13	23.2	41	73.2	0.001*
	Not applied	43	76.8	15	26.8	
Administration of analgesics	Applied	11	19.6	34	60.7	0.001*
	Not applied	45	80.4	22	39.3	
Episiotomy	Performed	13	23.2	27	48.2	0.006*
	Not performed	43	76.8	29	51.8	
Newborn gender	Female	32	57.1	30	53.6	0.704
	Male	24	42.9	26	46.4	
Newborn weight		3232.5	(3030.0–3545.0)	3135.0	(2860.0–3467.5)	0.163
Apgar score, 1st minute		9.0	(9.0–9.0)	8.0	(8.0–9.0)	0.001*
Apgar score, 5th minute		10.0	(10.0–10.0)	10.0	(9.0–10.0)	0.128

Chi-square test; Exact test,  $\alpha:0.05$ ; \* distributional difference statistically significant.

► **Table 6** Cervical dilation rate and mode of delivery by frequency of relations of women in the intervention group (n: 56).

		1 time		2 times		3 times		p
		n	%	n	%	n	%	
Cervical dilation after sexual intercourse	4–5 cm	20	64.5	3	21.4	3	27.3	0.025*
	5–6 cm	5	16.1	8	57.1	5	45.5	
	7–8 cm	6	19.4	3	21.4	3	27.3	
Type of birth	Spontaneous vaginal delivery	25	80.6	11	78.6	11	100.0	0.242
	Intervention (vacuum, forceps)	3	9.7	0	0.0	0	0.0	
	Vaginal delivery with episiotomy	3	9.7	3	21.4	0	0.0	

Exact test;  $\alpha:0.05$ ; \* distributional difference statistically significant.

## Conflict of Interest

The authors declare that they have no conflict of interest.

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