ANATOLIAN JOURNAL OF HEALTH RESEARCH

Original Article

2023; 4(3): 112-118
http://dx.doi.org/10.29228/anatoljhr.71307

The effect of the squatting position on the duration of labor and level of pain perception

Çömelme pozisyonunun doğum süresi ve ağrı algılama düzeyine etkisi

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ABSTRACT

***Aim*:** This research was carried out to investigate the effect of using the squatting position in pregnant women on labor duration and pain perception level.
Methods: This intervention research that using post-test and control group was conducted with 82 pregnant women at a gynecology hospital in a province in eastern Anatolia, Türkiye. The data were gathered using a questionnaire form, Partograph, and the Visual Analog Scale. The data were analyzed using percentage distributions, means, Chi-square, and independent samples t-test.
Results*:* Pregnant women in the intervention group had shorter first phase labor durations, and it was also shown that their level of pain perception were lower in this group. The total duration of the first stage of labor was determined as 211.00±108.24 minutes in the intervention group and 295.23±95.47 minutes in the control group. In addition, the pain perception level in the transition period was determined as 8.70±1.30 in the pregnant women in the intervention group and 9.42±0.85 in the pregnant women in the control group.
Conclusion: It was found that the squatting position reduces perception of labor pain while also shortening the first phase of labor.

Keywords*:* labor; pain; pain perception

ÖZ

Amaç: Bu araştırma, gebelerde çömelme pozisyonu kullanmanın doğum eylemi süresi ve ağrı algılama düzeyine etkisini araştırmak amacıyla yapılmıştır.
Yöntem: Son test ve kontrol gruplu müdahale araştırması, Doğu Anadolu'da bir ilde bulunan kadın doğum hastanesindeki 82 gebe ile yürütülmüştür. Veriler anket formu, Partograf ve Görsel Ağrı Skalası kullanılarak toplanmıştır. Verilerin analizinde yüzdelik dağılım, ortalama, ki-kare ve bağımsız gruplarda t testi kullanılmıştır.
Bulgular: Girişim grubundaki gebelerde doğumun ilk evresinin daha kısa, ağrı algılama düzeylerinin daha düşük olduğu belirlenmiştir. Doğum eyleminin ilk evresinin toplam süresi müdahale grubundaki gebelerde 211.00±108.24 dakika, kontrol grubundaki gebelerde 295.23±95.47 olduğu bulunmuştur. Ayrıca geçiş fazındaki ağrı algılama düzeyinin müdahale grubundaki gebelerde 8.70±1.30, kontrol grubundaki gebelerde 9.42±0.85 olduğu belirlenmiştir.
Sonuçlar: Çömelme pozisyonunun doğum ağrısı algılama düzeyini azalttığı ve doğumun ilk evresini kısalttığı bulunmuştur.

Anahtar kelimeler*:* ağrı; ağrı algısı; doğum

Introduction

Duration of labor and perceived level of pain may have at varying degrees in each pregnant women as well as at different labors of the same women. There is no definite duration of labor since it varies from individual to individual and labor to labor. On the other hand, it's a common practice to specify an average time for the phases of labor, which are based on the contraction frequency, duration and severity as well as cervical contraction and dilatation. This time is different for a primipara and multipara (Arıkan, 2014; Taşkın, 2016).

Labor pain, which is known as one of the most terrible pains experienced, is distinguished from other types of pain with its physiological nature (Erdine, 2007). Labor pain occurs due to myometrial contractility, cervical contraction and dilation, stretch on the ligaments that support uterus, hypoxia in the muscles of uterus, and fetal pressure on perineum (Rathfisch & Güngör, 2015). Women usually feel pain in the lower abdomen, back, waist and uterus during labor (Kömürcü & Ergin, 2008; Rathfisch & Güngör, 2015). Since pain disrupts a person's quality of life, this condition should be taken into consideration by midwifes and nurses. Various factors such as pregnant woman's age, physical and mental status, number of births, weight and position of the fetus, culture, anxiety, previous experiences, preparation to childbirth, and social support can be effective on the pain perception. For this reason, it's very difficult to predict pain intensity of pregnant women before delivery (Capogna, 2010; Gönenç & Terzioğlu, 2020; Leung et al., 2013; Manzoni & Carvalho, 2008; Sayıner & Özerdoğan, 2009).

Pregnant women are now expected to actively participate in the delivery process (Lothian, 2009). The objective here is to ensure pregnant women control their bodies during labor for a positive experience. Pregnant women generally focus on the pain during labor, and are in need of coping methods (Yıldırım & Şahin, 2003). There are some pain-relieving practices that pregnant women can use during labor such as relaxation techniques, warm showers, massage, supportive midwifery care, and change of position. Changing position is the most frequently used method by pregnant women to relieve pain. The position of the infant's head, uterine contractions and the relationship between head and pelvis also change due to gravity as pregnant women change positions (Özveren & Uçar, 2009; Simkin & Bolding, 2004).

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Received: 25.07.2023, Accepted: 25.10.2023
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This article was presented as an oral presentation at the 3rd International 4th National Midwifery Congress.

At the start of labor, pregnant woman's position, walk, movement, and change of position helps delivery as well as reducing pain and duration of labor (Coşar, 2015). Care given to pregnant women during labor ensures a delivery safe for both the mother and baby as well as allowing pregnant women to experience more fearless and confident delivery (Hodnett, 2002; Sauls, 2004; Waldenstrom et al., 2004). Although childbirth is a natural process in a woman's life, the pain and progression of labor can result in negative perceptions of this experience. Positive or negative experiences during childbirth can be stored in a woman's memory for a short or long period, and sharing these experiences with others, especially with other women, can contribute to the formation of negative perceptions about childbirth (Takehara et al., 2014). During maternal care, respecting a woman's autonomy, dignity, emotions, thoughts, and preferences is among the fundamental human rights (Ishola et al., 2017). Women taking an active role in the childbirth process (having control and involvement in decisions) is a crucial obstetric care aspect with significant psychosocial implications, influencing positive birth experiences (Mazúchová et al., 2020). It is also the key to quality care. The goal of care provided during labor is to ensure that the process is the safest and healthiest for both the mother and the baby, with minimal intervention. The position of the body during childbirth is crucial for ensuring that the process occurs with minimal damage to both the mother and the baby. Therefore, allowing freedom of movement and enabling the woman to maintain a comfortable position where she can relax her body are essential (WHO, 2018).

There are many studies in the literature related to birthing positions, primarily focusing on positions applied during the second stage of labor, often concerning perineal lacerations and postpartum hemorrhage. This research aims to investigate the impact of the squatting position, applied during the first stage of labor, on the duration of labor and pain perception levels. The study is conducted to contribute to the literature in this area.

Methods

Design and sample

This is a intervention study that was carried out in a maternity hospital in a province in eastern Anatolia, Türkiye. The population of the research consisted of primiparous women who applied to the hospital due to labor pain between 30 September 2015 and 15 May 2016. Ninety pregnant women who volunteered to participate in the study and completed the requirements for inclusion made up the sample.

The criteria for inclusion were: being a primipara, and who are at least primary school graduate, having no communication problems, intending to give birth vaginally, sustaining a full-term pregnancy (38-42 weeks), being in the latent phase (0-3 cm dilatation), having no systemic or neurological diseases, having intact amniotic membranes, have not antenatal training and who haven't done any exercise during pregnancy. The study's exclusion criteria include pregnant women who are multiparous, have high risky pregnancies, have presentation or position abnormalities. According to the literature, parametric tests require a sample of at least 30 people (Özdamar, 2015). The sample size for the study was determined to be 72 pregnant women based on the power analysis, and 90 pregnant women were included in the study. However, eight pregnant women were disqualified from the trial for factors such fetal distress and non-progressive labor. In summary, 82 pregnant women (each study group contained 40 pregnant women) participated in this study. During data collection, the pregnant women in the interventional and control groups were studied on separate days-one pregnant woman a day- in order to avoid mutual influence between the groups. The interventional group consisted of pregnant women who arrived in the delivery room on Monday and Wednesday, whereas the control group consisted of those who arrived on Thursday.

Data collection tools

The information was gathered using a "questionnaire form" to analyze the sociodemographic and obstetric features of the pregnant women, a "Partograph" to gauge the progress of labor, and a "Visual Analog Scale (VAS)" to gauge how much pain they perceived.

Questionnaire form

The elements on this form, which the researchers created, are used to identify the demographic and obstetric features of pregnant women.

Partograph

It's a tool used to interpret and assess the progress of labor. It is based on the principle of recording the events observed during on a labor graph paper by specifying the time. It is used beginning from the active phase. Use of partograph allows detailed monitoring of the labor as well as ensuring early recognition of abnormal conditions (TR. Ministry of Health, 2023)

Visual Analog Scale

The Visual Analog Scale (VAS) was developed and used by Bond and Pilowsky for the first time in 1966 (Bond & Pilowsky, 1966). The sensitivity and selectivity of the scale was studied by Arslan in 1998, and it was revealed that the scale is suitable for use in Turkish. VAS is a 10cm-long ruler indicating no-pain on one end, and the most severe pain on the other end. The patient/individual marks her pain on the ruler. The marked line is used as numerical data in determining the level of pain perception. The ruler can be used either horizontally or vertically (Arslan, 2012).

Steps of the study

Each pregnant woman, who met the inclusion criteria for the study, was informed about the research, and allowed to fill out the personal information form after obtaining her written consent. The mothers in the interventional group were given 20 minutes training about the squatting position that they will use. In the training, the squatting position was shown visually, its advantages were presented briefly, and an application was performed. Pregnant women were told to apply this position during each contraction until labor, and allowed to try any comfortable position (walking, lying on bed, sitting, etc.) during relaxation. In this phase, both groups were monitored for approximately 20 minutes in order to assess the contractions and condition of fetus. At the end of the latent phase, each of the pregnant women were asked to assess their pain on a VAS (Fig 1). In the active phase, the routine practices of the hospital on pregnant women have continued, but pregnant women in the interventional group have used the squatting position during contraction additionally. In the active phase of the labor, vaginal examinations were performed hourly, and recorded in the partograph considering that there will be 1 cm of cervical dilatation per hour in the pregnant women. At the end of the active phase, pregnant women were asked again to assess their pain on a VAS (Fig 1).

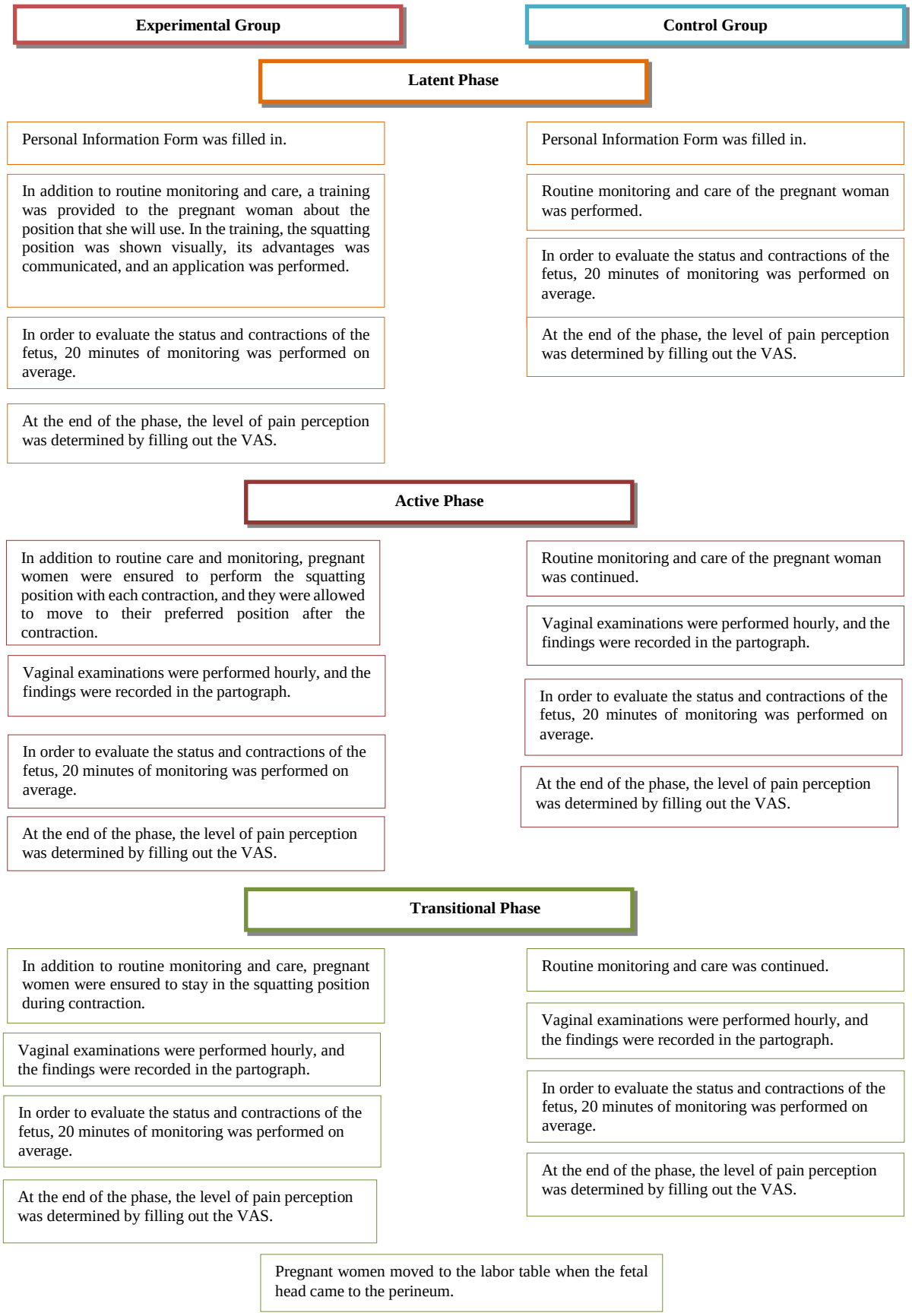

Figure 1. Flowchart of the study

Transition phase; pregnant women have continued to use the squatting position during this period until they moved to obstetrical table. Vaginal examinations were performed hourly to assess the progress of the labor, and recorded in the partograph. When the dilation reached 10 cm, pregnant women were asked again to assess their pain on a VAS for the last time, and then they were allowed to lie on obstetric table to give birth when the head leaned to perineum (Fig 1). The principles of the Declaration of Helsinki were followed at all stages of this research (WMA, 2022).

Statistical analysis

The Statistical Package for Social Sciences (SPSS) 20 was used to analyze the data. The data were analyzed using percentage distributions, means, Chi-square, and independent samples t-test. The data shows a normal distribution.

Ethical approval

Ethical approval for this study was obtained to Ethical Committee of Ataturk University Faculty of Health Sciences (Number: 03, Date: June 11, 2015). The pregnant women who volunteered to participate in the study were educated about the research methodology.

Results

The pregnant women in the intervention and control groups were found to be homogeneous in terms of demographic and obstetric characteristics (Table 1, Table 2).

The times given for the 1st and 2nd phase of labor were in minutes, and were evaluated according to the partograph. It was found that the duration in the active 1st phase of labor was 128.75±62.43 minutes on average in pregnant women in the interventional group, whereas it was 178.33±57.86 minutes on average in pregnant women in the control group.

Table 1. Comparison of demographic characteristics of pregnant women in the intervention and control groups

Demographic Characteristics	Intervention Groups (n=40)		Control Groups (n=42)		Test and p value
	n	%	n	%	
Age (year) mean±SD	23.22±3.46		22.90±3.22		
Age (Group)					
19-26	34	85.0	36	85.7	X^2=0.008
27-35	6	15.0	6	14.3	p=0.927[a]
Education					
Primary school	9	22.5	12	28.6	X^2=0.540
High school	25	62.5	23	54.8	p=0.763[a]
University	6	15.0	7	16.6	
Working condition					
Unemployed	34	85.0	42	100	-
Employed	6	15.0	-	-	-
Education of husband					
Primary school	10	25.0	12	28.6	X^2=0.420
High school	18	45.0	20	47.6	p=0.810[a]
University	12	30.0	10	23.8	
Occupation					
Civil Servant	8	20.0	5	11.9	X^2=1.226
Worker	13	32.5	13	31.0	p=0.542[a]
Self-employment	19	47.5	24	57.1	
Perception of income status					
Worse	6	15	7	16.7	X^2=0.159
Medium	21	52.5	23	54.8	p=0.924[a]
Well	13	32.5	12	28.5	
Family type					
Nuclear family	26	65.0	25	59.5	X^2=0.261
Extended family	14	35.0	17	40.5	p=0.609[a]

[a]p>0.05

It was found that the duration of the transitional phase was 82.25±56.57 minutes on average in pregnant women in the interventional group, and it was found to be 116.90±43.72 minutes on average in pregnant women in the control group.

Table 2. Comparison of obstetric characteristics of pregnant women in the intervention and control groups

Obstetric characteristics	Intervention Group		Control Group		Test and p value
	Min-Max	$\overline{X}$ ± SD	Min-Max	$\overline{X}$ ± SD	
Gestational week	38-41	38.82±0.81	38-41	38.83±0.72	t=-0.049 p= 0.961[a]
Findings of vaginal examination					
Dilation (cm)	1-3	2.10±0.81	1-3	2.21±0.78	t= -0.650 p= 0.518[a]
Effacement (%)	30-70	50.75±13.84	30-70	49.28±13.50	t= 0.485 p= 0.629[a]
Level of the fetal head	-3-0	-1.55±0.90	-3-0	-1.80±0.91	t= 1.290 p= 0.201[a]

[a]p>0.05

It was discovered that the average length of the first phase of labor for pregnant women in the interventional group was 211.00±108.24 minutes, whereas the average length for pregnant women in the control group was 295.23±95.47 minutes. It was found that there was a statistically important difference in the length of the first phase of labor between the intervention and control groups (p<0.001, p<0.01). Considering the duration of 2nd phase of labor, the average duration was found to be 6.77±3.23 minutes in pregnant women in the interventional group, and it was 6.28±1.78 minutes on average in pregnant women in the control group. The difference between the groups was not statistically important in terms of the duration of the 2nd phase of labor (Table 3, p>0.05).

In the latent phase, the mean score in the level of pain perception was 3.20±1.39 in the pregnant women in interventional group, whereas the mean score was 3.59±1.32 in the control group, and the difference between the mean scores was not found statistically important (Table 4, p>0.05). In the active phase, the mean score in the level of pain perception was 6.35±1.64 in the pregnant women in interventional group, whereas the mean score was 7.50±1.50 in the control group, and the difference between the mean scores was found to be statistically important (Table 4, p<0.01). In the transitional phase, the mean score in the level of pain perception was 8.70±1.30 in the pregnant women in interventional group, whereas the mean score was 9.42±0.85 in the control group, and the difference between the mean scores was found to be statistically important (Table 4, p<0.01).

Discussion

The length of the first phase of labor differed statistically important between the intervention and control groups, according to research findings. Accordingly, duration of 1st phase of the pregnant women in the interventional group, who applied the squatting position starting from the active phase of labor, was found to be shorter; however, there was no significant difference between the durations in the 2nd phase.

Considering the durations in the 2nd phase of labor, although the difference was not significant, it was shorter in pregnant women in the control group. It is believed that this may be due to the midwife who had performed the delivery. This is because deliveries are performed by midwives in turn. It is believed that experienced and practical midwives may affect the duration of 2nd phase of the labor. On the other hand, in a systematic review study conducted by Lawrence et al., which compared vertical and horizontal positions reported in 21

Table 3. Comparison of time of 1st and 2nd delivery phases of pregnant women in the intervention and control groups*

Phases of labor	Duration of labor (minutes)				Test and p value
	Intervention Group		Control Group		
	Min-Max	$\overline{X}$ ± SD	Min-Max	$\overline{X}$ ± SD	
1st Phase of labor (stages of dilation)					
Active phase	30-260	128.75±62.43	60-290	178.33±57.86	t= -3.732 **p= 0.000[b]**
Transition phase	15-240	82.25±56.57	45-250	116.90±43.72	t= -3.112 **p= 0.003[c]**
Total duration	45-420	211.00±108.24	120-520	295.23±95.47	t= -3.742 **p= 0.000[b]**
2nd Phase of labor (stages of expulsion)	3-15	6.77±3.23	5-10	6.28±1.78	t= 0.843 p= 0.402[a]

*According to partographs, [a]p>0.05, [b]p<0.001, [c]p<0.01

Table 4. Comparison of pain perception levels of pregnant women in the intervention and control groups

Time of VAS	Level of Pain Perception				Test and p value
	Intervention Group		Control Group		
	Min-Max	$\overline{X}$ ± SD	Min-Max	$\overline{X}$ ± SD	
1stApplication (Latent Phase)	1-6	3.20±1.39	1-6	3.59±1.32	t= -1.313 p= 0.193[a]
2ndApplication (Active Phase)	4-10	6.35±1.64	5-10	7.50±1.50	t= -3.312 **p= 0.001[c]**
3rdApplication (Transition Phase)	6-10	8.70±1.30	7-10	9.42±0.85	t= -3.000 **p= 0.004[c]**

[a]p>0.05, [b]p<0.001, [c]p<0.01

studies, and the duration of the 1st phase of labor has been reported to be significantly shorter in pregnant women who used vertical positions, though there had been no significant difference in the 2nd phase, similar to the finding of this research (Lawrence et al., 2009). In the study conducted by Kibuka et al. (2021), it was stated that in the first stage of labor, pregnant women using an upright position had a shorter duration of the first stage compared to those in a horizontal position. However, there was no significant difference in the duration of the second stage between the two positions (Kibuka et al., 2021). Similarly, in the study by Türkeli et al. (2016), pregnant women who spent the first stage of labor in an upright and supine position were examined, and no significant differences were observed in the duration of labor between the groups. When looking at studies examining maternal positions during childbirth, it is generally observed that vertical and horizontal positions are compared with each other during the second stage of labor.

The study results indicate that in the second stage of labor, the duration of labor is shorter in pregnant women who remain in an upright position using instruments such as birthing stools, balls, or cushions compared to those in a horizontal position (Dani et al., 2015; Gupta et al., 2017; Lin et al., 2018; Jyoti et al., 2022; Moraloğlu et al., 2016; Thies-Lagergren et al., 2013; Valiani et al., 2016). Generally, using upright positions such as sitting, standing, squatting, or kneeling during the first stage of labor relaxes the anterior abdominal wall and facilitates the forward movement of the fundus (Coşar, 2015). This allows the fetus to descend into the pelvis and shortens the duration of the labor process. Therefore, it can be understood that using upright positions both in the first and second stages of labor shortens the duration of the labor process. This conclusion is consistent with the existing literature.

The labor is one of the worst sources of pain known and defined nowadays. The pain in the first phase of labor is developed depending on the uterine contractions and dilatation of the cervix. The pain at the end of the 1st phase and beginning of the 2nd phase is usually caused by stretching of the perineum. The labor pain is a condition that causes excessive fatigue, stress and anxiety for the mother. Mothers perceive the labor as a painful and fear-provoking condition since they focus mainly on the pain during labor. Since the fear causes tension, and tension causes pain, pain relief methods are needed during labor (Lowdermilk et al., 2000; Üstünöz & Güngör, 2005).

In this study, the pain perception levels of pregnant women were found to be significantly lower in the active and transitional phases in the intervention group. Similar to the study conducted by Türkeli et al. (2016), where pregnant women who spent the first stage of labor standing had lower perceived pain levels in the active phase compared to pregnant women in the supine position. In the study by Sönmez and Apay (2023), the impact of different birthing balls used in the first stage of labor on birth outcomes was examined, and it was found that birthing balls reduced pain. Furthermore, in the studies evaluating positions applied in the second stage of labor, pregnant women using the squatting position had significantly lower pain perception levels (Moraloğlu et al., 2016; Valiani et al., 2016; Lin et al., 2018). These studies provide supporting evidence for the research findings.

Limitations

The routine administration of enemas, oxytocin, and fetal monitoring to laboring women in the hospital, as well as the exclusion of primiparous and high-risk pregnant women from the sample, constitutes a limitation of the study.

Conclusion

Pregnant woman's position, walk, movement, and change of position helps delivery as well as reducing pain and duration of labor. The duration of labor and level of pain perception was found to be lower (excluding latent phase) in pregnant women in the interventional group in this research, which was conducted to determine the effect of squatting position on the duration of labor and level of pain perception. It is believed that the difference was not significant between the levels of pain perception of pregnant women in the intervention and control

groups since the application had not started in the latent phase yet. It was shown that the squatting position both reduces the intensity of pain felt as well as the length of the first phase of labor.

Midwives are members of a multidisciplinary team who have centrally placed the goal of providing comprehensive care with the aim of improving the quality of contemporary childbirth services. They share their knowledge and expertise with other professionals and learn from them. It is crucial for midwives to provide women with the personalized, woman-centered care they deserve and collaborate with women. During the action, there is a need for scientifically proven practices in the services provided to women. Increasing women's awareness during the action, actively engaging them in childbirth, enhancing maternal satisfaction, achieving a positive birth experience, and improving maternal and infant health are crucial. In this context, when perinatal outcomes are evaluated, the importance of the use of positions will be better understood.

Conflict of Interest

None.

Acknowledgements

We would like to thank all pregnant women who participated in this research.

Sources of Funding

None.

Ethics Committee Approval

Ethical approval for this study was obtained to Ethical Committee of Ataturk University Faculty of Health Sciences (Number 03, June 11, 2015). The pregnant women who volunteered to participate in the study were educated about the research methodology.

Informed Consent

Before starting the study, information about the study was given and verbal consent was obtained from participating women.

Peer-Review

Externally peer-reviewed.

Author Contributions

Z.D.Ü.T.: Study Conception/Design, Data Collection/Analysis, Drafting of Manuscript

T.P.: Statistical Expertise, Administrative/Technical/Material Support

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