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Comparing the partograph form results among women admitted in latent and active phase of labor: a cross sectional study

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Abstract

The use of partograph increases the quality and regularity of maternal and fetal examinations during labor and makes the rapid detection of potential problems in bothmother and fetus. Since this form is not used in most hospitals across the country, the present study was conducted with the purpose of comparingpartograph results of women admittedin their latent and active phases of labor. This descriptive-comparative study was conducted on 500 mothers admitted to TaleghaniHospital of Tabriz for delivery. The partics were divided into two groups, the latent phasegroup (250 women) and the active phase group (250 women). Data were collected through observation of the labor, interviewing mothers and the patients' records. Results showed that 6.8% of fetuses in the latent phase group and 5.8% in the active phase group suffered from FHRdisorders. There were significant differences between the two groups in terms of the use of oxytocin to stimulate 0f labor and amniotomy, and the administration of Ampicillin, hyoscine, pethidine and promethazine. The mean duration of the active phase was also significantly different between the latent phase group (3.9±2.5 hours) and the active phase group (2.7±1.9 hours). Admission of women during their latent phase of labor is associated withincreased duration of labor, complications and interventions performed on the mother and the fetus. It is therefore recommended that the doctor or midwife in charge of admitting women in labor refuse to admit them during their latent phase of labor, unless there is sufficient reason for hospitalization.

Keywords: Active phase, Labor, Latent phase

Introduction

Partograph is asimple, integrated, inexpensive chart that is considered to be the best tool for monitoring the course of labor as well as maternal and fetal health, but is also deemed highly valuable for improving mother-infant care. This chart is among midwife's life-saving skills and is used in many countries. Partograph is an early warning system that helps the decision-making for the timely admission of the mother to the hospital, accelerating the delivery and terminatingthe pregnancy [1]; it also increases the quality and regularity of maternal and fetal examinations performed during labor and quickly detectspotential problems in either the mother or the fetus [2]. Partograph monitors the course of labor and consists of 3 main parts, i.e. fetal health status, progress of labor and maternal health status [2,3]. Swedish researchers consider the

constant use of partographsfor monitoring labor and the particular attentiongiven to the role of midwivesa major reason for the low rates of maternal-infantmortalities in Sweden [3].

A highly crucial obstetric diagnosis is the correct detection of the onset of labor and monitoring its course [4]. The main obstacle against understanding natural labor is recognizing its moment of onset. In the United States, the decision made to admit women to the labor unit is often based on theircervical dilation (3-4cm or more) alongside painful contractions [5]. It is difficult to decide when to admit and hospitalize a woman whose labor has already begun; women tend to recognize the onset of labor; however, most of them are concerned about making a wrong detection of the process [6,7]. There is often a great inclination to hospitalize mothers in their latent phase of labor with the aim of reducing their levels of pain and fear [8]. Admission of parturient women in their latent phase of labor can lead to certain problems such as the increased risk for cesarean section [9]. Given the extensive range of time it involves and the prolonged hospital stay ensuing, admission of parturient women in their latent phase of labor may also have unpleasant effects on the patient and her relatives andmight increase the financial burden on the patients, lead to high bed occupancy rates and impose huge costs on the national healthcare system. Additionally, in such circumstances, the physician isunder the impact of various pressures and might be more willing to opt for a cesarean section [10]. Toavoid unnecessary interventions to the process of labor and to reduce costs, many experts and medical centers delay admission of the parturient unless the latent phase of labor is concurrent with momentous complications such as rupture of the amniotic sac, fetal distress or vaginal bleeding [11].

Bailitet al. compared child labor outcomes of 6121 women admitted to Metro Medical Center of Ohio, US, in theiractive phase of labor, with 2697 women admitted in their latent phase. The majority of women admitted in the latent phase were nulliparous. The rate of cesarean section was significantly higher in the latent phase group compared to the active phase group (14.2% against 6.7%). In addition, the parity checks in this study revealed the higher likelihood of terminating the active phase, using oxytocin, fetal scalp PH testing, intrauterine pressure catheter monitoring and internal fetal heart monitoring and amnionitisfor women admitted in their latent phase of labor [8].

Ajori et al. Studied the maternal and infant complications of a prolonged latent phase and showed that, of the 224 patients admitted in their latent phase, 77.2% had normal latent phases while 22.8% had prolonged latent phases. There were no significant differences between the normal latent phase group and the prolonged latent phase group in terms of the Apgar score, admission of the newborn intoneonatal intensive care units, use of antibiotics and assisted delivery. However, there were significant differences between the two groups in terms of complications such as meconium discharge, excessive postpartum bleeding, cesarean rates and fever during and after delivery [12].

In a study, 473 nulliparous women, 77.9% had natural deliveries while 20.1% had assisted or cesarean deliveries. They concluded that nulliparous women admitted in their latent phase were at a greater risk for unnatural delivery due to complications such as prolonged latent phase, fetal distress, meconium discharge and abnormalitiesof the first and second stages of labor [11].

Greulich and Tarrant believe that prolonged and complicated latent phases comprise a complex subject that is still unknown with the level of scientific knowledge we have today. They also believe that this subject has been less studied because detecting its occurrence is asubjectivematter [13]. Although in a number of hospitals, there are no restrictions against the admission of parturient women in their latent phase of labor, and thoughclinical experiments and certain studies have shown that hospitalization during the latent phase of labor is associated with complications and

problems, current studies still do not determine a definitive policy for the management of the latent phase [14]. One of the tools available for monitoring the course of labor is the partograph form. Since this valuable form is not used in most hospitals across the country, and also due to insufficient studies addressing this subject, the present study was conducted with the purpose of comparingpartograph results of women admitted to TaleghaniHospital of Tabriz in their latent and active phases of labor.

Method

This cross-sectional study was conducted in 2012 on 500 pregnant women admitted to the hospital of Tabriz for vaginal delivery.

To calculate sample size, the estimation of two means formula was used. The newborn's Apgar score was also defined as the main variable among other neonatal factors. According to results of a pilot study, mean Apgar score was 8.25±0.2 in the first group and 8.78±1.1 in the second group. Taking the maximum type one error to be 0.05, the power to be 80%, and the difference in the mean Apgar score between the two groups to be a single unit, sample size was found to be 250 for each group. As a result, a total of 500 women were selected as study subjects and were then randomly divided into two groups. The first group consisted of women admitted to the hospital in their latent phase of labor (250 women), and the second group of women in their active phase (250 women). The latent phase of labor was determined based on regular uterine contractions at the time of admission and a cervical dilationof less than 4cm, and the active phase was determined based on regular and painful uterine contractions and a cervical dilation in excess of 4cm.

Study inclusion criteria consisted oftermed pregnancy (38-42 weeks of the first day of the last menstruation or the ultrasound from weeks 8-16), admission to the hospital during the latent or active phase of labor, vertex presentation, pelvic dimensions suitable for natural birth (normal pelvic inlet, middle pelvis and pelvic outlet and the proportion of fetal head to the pelvis as determined byspecific pelvic examinations), single pregnancy, lack of complicationsduring pregnancy, and normal non-stress testing at the time of admission to the hospital. Study exclusion criteria consisted of fetal death in previous pregnancies, rupture of membranes at the time of admission, excessive bleeding at the time of admission, Cephalopelvic disproportion, disorder of amniotic fluid volume, abnormal adhesion of the placenta to the uterine wall, placenta previa, major fetal malformation, fetal growth disorders such as intrauterine growth restriction and macrosomia, blood pressure of 140/90 mmHg or above at the time of admission, fever above 37.8°C at the time of admission, history of previous cesarean section, history of uterine surgery, and perineorrhaphy, uterine leiomyomas, history of infertility, and history of maternal medical or obstetric impairments.

Before beginning the study, permission was obtained from the Ethics Committee of Tabriz University of Medical Sciences, and before collecting written consent from the study subjects, they were given explanations about objectives and methods of the study, the voluntary nature of participation, confidentiality of their information and their right to withdraw from participation at any stage of the study.

Data were collected through observation of the course of labor, interviews with mothers and advising the patients' records. Data collection tools included a questionnaire, a partograph form and a labor and delivery assessment checklist. The questionnaire covered, in respective order, the study subjects' personal information, and obstetricrecords, test results at the time of admission, vaginal examination results, and assessment of uterine contractions and vital signs measurements. The partograph form covered, in respective order, the fetal heart rate, duration of both latent and active phases of labor, dilation, fetal position and presentation, frequency of uterine contractions, use of oxytocin, status of membranes and medications taken. The labor and delivery assessment checklist covered,

in respective order, duration of the second and third stages, type of delivery, fundal pressure during labor, complications and actions taken in the fourth stage of delivery, and vital signs measurements at the time of transfer to the ward upon delivery.

Eligible candidates entered the study after submitting their written consents and were then examined. First, the subjects' personal informationwas collected and recorded in the relevant forms. Next, according to results of their vaginal examinations, the subjects were divided into two groups, the latent group and the active group. After admission to the labor and delivery unit, their labor progress and actions performed on them were assessed and recorded on thepartograph form. Duration of the stages of delivery was determined based on hours for the latent and active phases, and based on minutes for the second and third stages. It should be noted that the study subjects were monitored by 6 researchers working in 3 different shifts, who had received all the necessary trainings beforehand.

Data collected were analyzed using SPSS-13. Descriptive statistics were used to examine the data and the Chi-squared test, the correlation test, the t-test and the logistic regression test were used to compare results pertaining to women admitted in their latent phase and active phase of labor. $P<0.05$ was considered statistically significant.

Results

The mean age of women was 25±5.2 years in the first group (women admitted in their latent phase) and 24.4±5.6 years in the second group (those admitted in their active phase). The mean weight of women was 68.6±8.9 kg in the first group and 68.8±9.5 kgin the second group. A total of 168 women (67.2%) in the first group and 127 women (50.8%) in the second group were nulliparous. A total of 24 women (9.4%) in the first group and 18 women (7.2%) in the second group had a history of abortion. A total of 7 women (2.8%) in the first group and 10 women (4%) in the second group had had stillbirths. A total of 79 women (31.6%) in the latent phase group and 120 women (48%) in the active phase group had a history of giving natural births once or more. Results of thet-test did not show any significant differences between the two groups in terms of age ($P<0.14$), number of pregnancies ($P<0.09$), deliveries ($P<0.06$), abortions ($P<0.34$), stillbirths ($P<0.36$), and number of natural deliveries ($P<0.06$) and indicated that the two groups were statistically matched. The mean gestational age according to the 8-16 weeks ultrasound at the time of admission for delivery was 280.8±11.8 days in the first group and 275.6±10.2 days in the second group. The majority (64%) of womenin the latent phase group had been admitted with 3-cm dilation and the majority (67.3%) of those in the active phase group had been admitted with 5 and 6-cm dilations.

According to the partograph form, the number of women who had required stimulation through oxytocin due to their failure toprogress in labor was 187 (74.8%) in the latent phase group and 76 (30.4%) in the active phase group; a significant difference was therefore observed between the two groups ($P<0.001$). Mean oxytocin units usedwere 8±5.7for the first group and 3±4.6for the second group. In 160 women (64%) belonging to the first group and 71 women (28.4%) belonging to the second group, a measure of 10 units of oxytocin were used. Moreover, in the latent phase group, oxytocin-assisted stimulation was applied twice for 10 women (4%) and three times for 4 women (1.6%) while in the active group, neither of the women received oxytocin-assisted stimulation more than once. Amniotomy rate was greater in the latent phase group (55.6%) compared to the active phase group (53.6%), with a significant difference observed between the two groups ($P<0.021$). There was a significant relationshipbetween the two groups in terms of the administration of ampicillin, hyoscine, pethidine and promethazine during labor and delivery;however, no significant relationship was observed between them in terms of the administration of cefazoline and atropine.

The rate of administration of all medications was greater in the first group than in the second group. Fetal heart rate monitoring during labor showed that 17 (6.8%) of women in the latent phase group and 15 (6%) in the active phase group suffered from heart rhythm disorders such as bradychardia and tachycardia; however, results ofthe t-test did not show anysignificant differences between the two groups (P<0.4). Assessment of uterine contractions during labor showed that 47 women (18.8%) in the latent phase group and 7 women (2.8%) in the active phase group were hypotonic while using oxytocin and the relation between the two groups was deemed significant (P<0.001). Partograph results of women admitted to the hospital in their latent and active phases of labor are presented in Table 1.

According to thestudy's practical definition, duration of the latent phase starts from the first examination in the labor and delivery unit until the time a 4-cm dilationis achieved. In the latent phase group, the mean duration of the latent phase was 3.9±3.8 hours (minimum 30 minutes and maximum 25 hours). In this group, the mean duration of the active phase (starting from the 4-cm dilation to the time a full cervical dilation is achieved) was 3.9±2.5 hours (minimum 30 minutes and maximum 13 hours). In the active phase group, i.e. the group that had spent their latent phase at home, the mean duration of the active phase was 2.7±1.9 hours (minimum 10 minutes and maximum 9 hours).

According to the assessment of the partograph forms, 28 women (11.2%) admitted in their latent phase experienced a prolonged latent phase (lasting over 8 hours) and 54 of them (21.6%) also experienced a prolonged active phase with a cervical dilation progress rate of less than 1cm per hour. In the active phase group, only 19 women (7.6%) experienced a prolonged active phase. There was a significant relationship between the two groups in terms of the duration of the active phase (P<0.0001). Duration of the different stages of labor in women admitted in their latent and in their active phases of labor is shown in Table 2.

Table 1 *Results of partograph checklist among women admitted to latent and active phases*

	Latent phase		Active phase		P value
	N	%	N	%	
Labor stimulation with oxytocin	187	25.2	76	30.4	0.001
Amniotomy	139	55.6	109	43.6	0.021
Drug use					
Ampicilin	126	50.4	96	38.4	0.009
Cefasolin	6	2.4	9	3.6	0.4
Hyocin	82	32.8	57	22.8	0.016
Petidin	20	8	7	2.8	0.016
Promrthazin	64	25.6	32	12.8	0.001
Atropin	16	6.4	9	3.6	0.4
FHR					
Normal	233	93.2	234	93.6	0.4
Bradycardia	4	1.6	7	2.8	
Tachycardia	6	2.4	4	1.6	
other	7	2.8	4	1.6	
Contractions					
Normal without oxytocin	107	42.8	214	85.6	0.001
Normal with oxytocin	96	38.4	29	11.6	
Hypotonic with oxytocin	47	18.8	7	2.8	

Examining the labor and delivery assessment checklist showed that 208 women (83.2%) in the first group and 195 women (78%) in second group had vaginal deliveries with

Table 2 *Duration of labor stages among women admitted to latent and active phases*

Duration of Labor stages		Latent phase		Active phase		P-value
		N	%	N	%	
Duration of second stage of Labor(min) Latent ph:27.22±18.43(M±SD) Active ph:26.3±26(M±SD)	1-20	134	53.6	159	64.6	P=0.49 T=-0.685
	21-40	82	32.8	49	19.8	
	41-60	14	5.6	24	9.6	
	61-80	12	4.8	4	1.6	
	81-100	6	2.4	11	4.4	
Duration of third stage of Labor(min) Latent ph:7.8±5.11(M±SD) Active ph:7.1±3.7(M±SD)	1-5	125	50	138	55.2	P=0.22 T=-1.206
	6-10	99	39.6	87	34.8	
	11-15	22	8.8	20	8	
	16-20	3	1.2	5	2	

Table 3 *Results of logistic regression test based on labor phases*

Variables	P-value	CI %95	OR
Compressor on the uterus	0.027	1.07-3.1	1.8
4th stage complications	0.9	0.7-1.4	0.001
Uterus Massage post delivery	0.001	0.12-0.49	0.25
Oxytocin use in Labor	0.001	0.17-0.53	0.3
Amniotomy	0.01	1.3-27.28	6.1
Practices in 4th stage	0.2	0.85-1.7	1.2
Duration of administration in post partum ward	0.015	0.928-0.992	0.95

an episiotomyperformed (P<0.2), and only 2 women in the first group and 1 in the second group had to resort to vacuum-assisted vaginal deliveriesdue to dystocia (P<0.2). As for results of the second stage of delivery, a significant relation existed between the two groups only in terms of the uterinefundal pressure during delivery (P=0.001).

Among the actions performed during the third and fourth stages of delivery, there was a significant relationshipbetween the two groups in terms of uterine massage over the abdomen (P<0.001), and complications of the fourth stage of delivery (P<0.04). However, no significant relationshipwas observed in terms of the manual placenta removal (P<0.1), administration of metrogen (P<0.3), prostaglandin (P<0.7) and blood (P<0.1) in the fourth stage of delivery. Examination of maternal vital signs at the time of transfer to the ward after the delivery showed that no significant relationship existedbetween the two groups in terms of blood pressure and temperature; however, significant relationshipwas observed between them in terms of heart rate (P<0.001) and respiratory rate (P<0.02).

A confounding factor of this study was the parity. The logistic regression test showed that the frequency distribution differences between the two groups was not significant in terms of parity; therefore, uterine pressure during delivery, amniotomy and actions performed during the fourth stage of delivery increase the chances of a successful delivery Table 3.

Discussion

Results of the present study indicate that, when a womanis admitted to the hospital in her latent phase of labor, her prolonged labor and inadequate uterine contractions increase

obstetric interventions and, inevitably, she will have to undergo induced labor and amniotomy, which themselves have certain complications such as higher rates of cesarean section. A study conducted in 2008 by Haidarniaetal.revealed the greater rate of oxytocin use for women admitted to the hospital in their latent phase of labor compared to the women admitted in their active phase due to their reported failure to progress in labor, which is in line with results of the present study [15]. According to the study conducted by Bailitet al., women admitted in their latent phase were more likely to have their active phase interrupted, use oxytocin, perform fetal scalp pH testing, use intrauterine pressure catheter, use internal fetal heart monitoring and amnionitis, which were in line with results of the present study [8]. In their study of 2007, Delarametal.revealed the greater amount of oxytocin used in the latent phase group compared to the active phase group;however, no significant relationship was found between the two. These results were not in line with results of the present study [16].

Sinceparticipants admitted in the active phase of labor had already gone through their latent phase at home, it was not possible for the present study to compare the duration of the latent phase between the two groups; however, there was a statistically significant relation between the two groups in terms of the duration of their active phase of labor. Furthermore, results indicated that admission of women intheir latent phase of labor meansa prolonged latent phase, a prolonged active phase and increased maternal and fetal complications and interventions. In their study of 2009, Vazirietal.practically defined the duration of the latent phase of labor as starting from the first examination until the time a 4-cm dilation is achieved, and found the mean duration of the latent phase to be 9.6±9.3 hours (minimum 50 minutes, and maximum 2.8 days). These results were not in line with results of the present study, in which the mean duration of the latent phase was 3.9±3.8 hours and was significantly lower than in Vaziri's study [11]. A number of studies have criticized the old theory that a prolonged latent phase is a benign state [8]. In their study of 2008, Hoodnetet al.al showed that a prolonged latent phase in excess of 12 hours for nulliparous women and in excess of 6 hours for multiparous women is associated with a prolonged delivery [17].

In their study of 2001, Holms et al. reported that women admitted to the hospital with a dilation of 3cm or lowerexperienced alengthier labor and higher amounts of maternal and fetal interventions performed on them; they were also diagnosed with complicated deliveries more often [18].

Results of the study also revealedadministering medicationsto be greater in mothers admitted in their latent phase of labor.

According to results of the present study, there were no statistically significant relations between the two groups in terms of the duration of their second and third stages of labor.In addition, during the second stage, there were no statistically significant relations between the two groups with regard to the use of vacuum, episiotomy and perineal rupture; however, uterine fundal pressure was significantly greater in the latent phase group during delivery. Results of the study conducted by Haidarniaet al. (2008) showed that 32.6% of women admitted in their latent phase experienced dystocia due to prolonged labor, failure to progress in laborandcephalopelvic disproportion; there was a statistically significant relation between the latent phase group and the active phase group with regard to this complication [15], which is not in line with results of the present study.

Considering that the purpose of modern obstetrics is to make the process of birth for both the mother and the newborn as safe as possible, and since admission in the latent phase increases the duration of labor, hospital stay and obstetric interventions and complications, it is essential to accurately determine the correct timing of admittingpregnant women into labor and delivery units before proceeding with hospitalization and attempting to perform the

delivery and to further the interventions.
Study limitations included the low sample size per each shift, which was largely resolved by sampling during all hospital shifts and by increasing the total number of samplers to 6. Since some women had not sought admission to the hospital immediately after the beginning of their pain and had instead waiteda while, the study's capacity to accurately calculate the duration of the latent phase must have been sabotaged.
According to partograph results, it is recommended that the physician or obstetrician in charge of admitting parturients only admit women whentheir active phaseof labor has already begun, unless she is facing difficulties and complications,so that prolonged hospitalization and subsequent complications are prevented. Furthermore, similar studies with larger sample sizes should be conducted in other labor and delivery units of hospitals across the country in an effort to change the assumption that "a prolonged latent phase is benign" and so that specific protocols can be established in healthcare centers in order to properly manage this phase.

Conclusion

Admission in the latent phase of labor leads to prolonged hospital stays, development of maternal and fetal complications and the performing of further invasive interventions, which can lead to reduced maternal satisfaction with natural birth and might interfere with their choice of another natural delivery in the future. Therefore, if the patient is not a high-risk patient, it is better not to admit them in their latent phase of labor.

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Contributions

Study design: FS
Data collection and analysis: FS, SN
Manuscript preparation: SN, FS

Conflict of interest

"The authors declare that they have no competing interests."

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