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A Prospective Study on the Relationship Between Cervical Dilatation at Initial Presentation in Labor and Subsequent Outcome

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Background: Cervical dilatation at the initial presentation in labor is an important factor in predicting labor progression, maternal and neonatal outcomes. This relationship helps clinicians to assess the likelihood of a timely delivery, the need for medical interventions, and possible complications. **Objectives:** The aim of the study was to evaluate the relationship between cervical dilatation at initial presentation in labor and subsequent outcome. **Methods:** This prospective study was carried out in the Department of Obstetrics & Gynaecology, Dhaka Medical College & Hospital, Dhaka, Bangladesh, during July 2006 to June 2007. A total of 100 patients were selected at random basis admitted with labor pain. Statistical analyses of the results were be obtained by using window-based Microsoft Excel and Statistical Packages for Social Sciences (SPSS-24). **Results:** The age distribution of the patients was (1%) 11 to 15 years, (25%) 16 to 20 years, (40%) 21 to 25 years, (22%) 26 to 30 years and (9%) 31 to 35 years. And (3%) were older than 36 years. The majority of the population ranges in age from 21 to 25 years. In our study, Group I: Cervical dilatation (os) <4 cm and Group II: Cervical dilatation (os) > 4 cm. Dilatation of Cervix on admission where 54(54%) were Group – I <4 cm, 46(46%) ware Group – II ≥ 4cm. Most of the populations belong to Group – I <4 cm group. According to Parity distribution of the patients, 38 (79.2%) group I and 10 (20.8%) group II patients were nulliparous, whereas 16 (30.8%) group I and 36 (69.2%) group II

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patients were multiparous. **Conclusion:** Cervical dilatation at the initial presentation in labor is a crucial factor in determining labor management and predicting outcomes. Advanced dilatation is generally associated with quicker labor progression, fewer interventions, and better maternal and neonatal outcomes, while minimal dilation may require more vigilant monitoring and management to ensure safe delivery.

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INTRODUCTION

Labor is a sequence of uterine contractions that results in effacement & dilatation of the cervix and voluntary bearing-down efforts leading to the expulsion pervagina of the product of conception. [1] During the course of several days to several weeks before the onset of true labor, the cervix begins to soften, efface and dilate. In many cases, when labor starts, the cervix is already dilated 1-3 cm in diameter. [1] Dilatation of the cervix is an important indicator of diagnosis as well as progress of labor. Cervimetry has become accepted as the first measure of progress of labor because it is simple to comprehend, easy to measure, reproducible and subject to little observer error. [2] Nature of cervical dilatation indicates the outcome of labor. A previous study reports that cervical dystocia is one of the most important indications of caesarean section. [3]

It is difficult for a pregnant woman to timing of presentation to the hospital specially a nulliparous one when she is in labor. A previous study has shown that women who present to hospital at 0-3 cm spend less time in labor before presentation and are more likely to have obstetric intervention than those presenting in more advanced labor. [4] The risk of caesarean section rate decreased with increasing cervical dilatation at presentation (both for parous & nulliparous). The caesarean section rate of nulliparous women presenting at 0-3 cm was 10.3%, compared with 4.2% for those presenting at 4cm – 10cm and the mean duration of labor before presentation was 2.0 hours versus 4.5 hours, respectively. For parous women the caesarean section rates were 5.7% and 1.3% respectively. [4] Latent phase women had more caesarean deliveries & latent phase women had more active phase arrest, oxytocin use, scalp pH performed, intrauterine pressure catheter placed, Fetal scalp eectrocardiogram monitoring and amnionitis. [5]

A comparative study was carried out between women who arrived in labor ward in second stage of labor & those who arrived in early active phase. Study groups had considerably shorter labors and all achieved spontaneous vaginal deliveries; a significant proportion (10.6%) of the comparison group had interventional deliveries. [6] Another cross-sectional analytic survey of 92 patients permitted to attempt vaginal delivery after previous lower segment caesarean section reports that when the cervix was less than 3 cm dilated at initial examination in labor, 27% patients delivered vaginally, compared to 69% of patients who were delivered vaginally when the cervix was greater than 3 cm dilated. [7] So, the initial cervical dilatation rate proves to be useful in early identification of those patients whose deliveries are complicated either by assisted vaginal delivery or caesarean section. [8]

METHODOLOGY

This prospective study was carried out in the Department of Obstetrics & Gynecology, Dhaka Medical College & Hospital, Dhaka, Bangladesh, during July 2006 to June 2007. A total of 100 patients were selected at random basis admitted with

labor pain. After admission, full history, past obstetric history and menstrual history were taken which included marital age, age of last child, first day of her last menstrual period and accordingly her gestational age. During general examination – anaemia, jaundice, oedema, dehydration, temperature, pulse, blood pressure was noted. After taking consent and matching eligibility criteria, data were collected from patients on variables of interest using the predesigned structured questionnaire by interview, observation. Statistical analyses of the results were be obtained by using window-based Microsoft Excel and Statistical Packages for Social Sciences (SPSS-24).

RESULTS

Table-1: Age distribution of the study population (n=100).

Age Group	n=100	%
11-15	1	1
16-20	25	25
21-25	40	40
26-30	22	22
31-35	9	9
>36	3	3
Total	100	100

Table 1 shows that age distribution of the patients where 1(1%) were 11 to 15 years, 25(25%) were 16 to 20 years, 40(40%) were 21 to 25 years, 22(22%) were 26 to 30 years and 9(9%) were 31 to 35 years. 3(3%) were >36 years. Most of the populations belong to 21-25 years age group. The mean age and median were found 46.67 ±7.75 years and 47.0 with range from 18 to 70 years.

Table-2: Distribution of the study population according to Socioeconomic Status (n=100).

Age Group	n=100	%
Lower	59	59
Middle	39	39
Higher	2	2
Total	100	100

Table 2 shows that socioeconomic status of the population where, 59(59%) were lower, 39(39%) ware middle and 2(2%) ware higher. Most of the populations belong to lower socioeconomic class.

Table-3: Distribution of the study population according to Dilatation of Cervix on admission (n=100)

Age Group	n=100	%
Group – I (<4 cm)	54	54
Group – II (≥ 4cm)	46	46
Total	100	100

Table 3 shows that Dilatation of Cervix on admission where 54(54%) were Group – I (<4 cm), 46(46%) were Group – II (≥ 4cm). Most of the populations belong to Group – I (<4 cm) group.

Table-4: Distribution of the study population according to Parity distribution of the patients (n=100)

Parity	Group I		Group II	
	No.	%	No.	%
Primi	38	79.2	10	20.8
Parous	16	30.8	36	69.2
Total	54	100	46	90

Amont the 100 patients, 38 (79.2%) group I and 10 (20.8%) group II patients were nulliparous, whereas 16 (30.8%) group I and 36 (69.2%) group II patients were multiparous. Thus, it indicates that majority of primi patients present with less cervical dilatation than the parous patients.

Table-5: Distribution of the study population according to Gestational age of the Patients (n=100)

Gestational Age	Group I		Group II	
	No.	%	No.	%
37 – 38 weeks	17	37.0	12	22.2
38^{+} - 40 weeks	22	47.8	27	50.0
40^{+} - 42 weeks	7	15.2	15	27.8
Total	46	100	54	100

Table 5 shows gestational age distribution of the patients in the study population. Majority 47.8% patients of group I and 50.0% patients of group II attended with labor pain at 38^{+} - 40 weeks of gestation.

Table 6: Distribution of the study population according to Duration of labor before hospitalization (n=100)

Duration (hours)	Group I		Group II	
	No.	%	No.	%
2 - 6	7	13.0	8	17.4
7 - 10	15	27.8	24	52.2
11 - 16	32	59.2	14	30.4
Total	54	100	46	100

Table 6 shows duration of labor before presenting at the hospital ranged from 2-16 hours. Majority of the group I patients (59.2%) attended the hospital at 11-16 hrs. of labor, whereas majority (52.2%) group II patients attended at 7-10 hrs. of labor.

Table 7: Duration of labor in patients with different cervical dilatation at presentation (n=100)

Duration (hours)	Group I		Group II	
	No. (54)	%	No. (46)	%
6-11	8	14.8	9	19.6
12-18	22	40.8	30	65.2
>18	24	44.4	7	15.2
Total	54	100	46	100

Table 7 shows that (44.4%) patients of group I had their duration of labor >18 hrs., whereas (15.2%) patients of group II had this duration of their labor. Duration of labor was 12-18 hrs., in (65.2%) & 6-11 hrs. in (19.6%) patients of group II.

Table 8: Distribution of the study population according to patients required augmentation of labor. (n=36)

Cervical Dilatation	Required augmentation	
	No.	(%)
Group I (<4cm)	29	80.6
Group II (≥4cm)	7	19.4
Total	36	100

Table 8 shows the study population according to patients required augmentation of labor. Here, 29(80.6%) patients of group I and 7(19.4%) patients of group II needed augmentation.

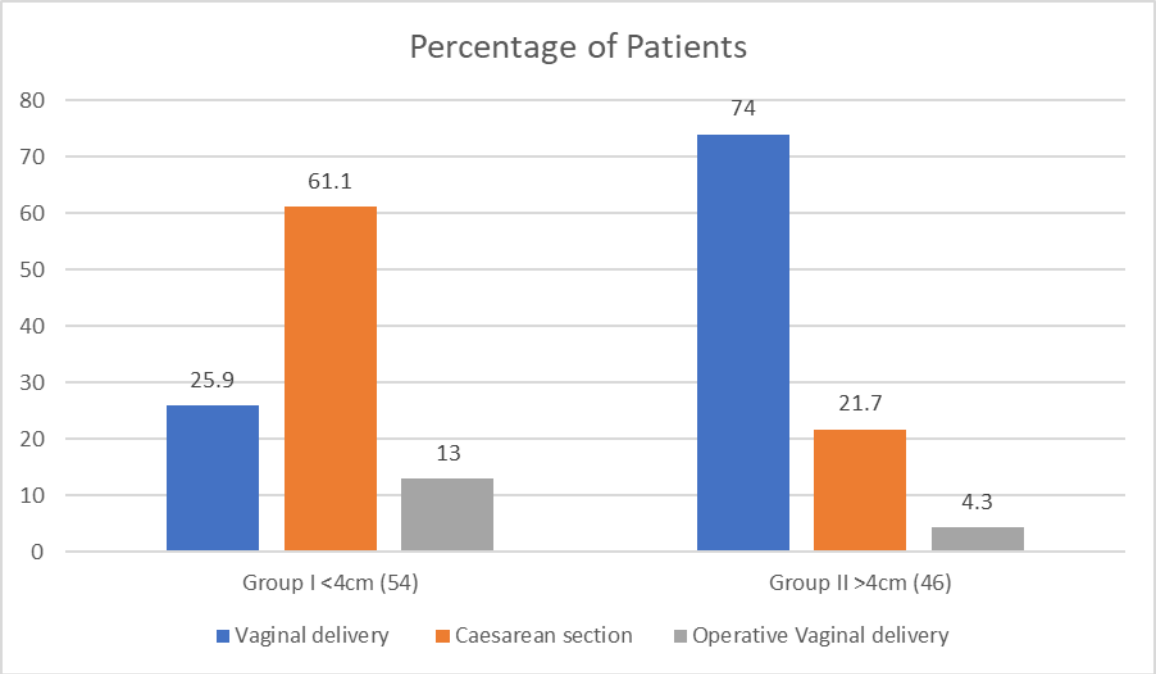

Figure 1: Relationship between cervical dilatation and mode of delivery (n=100).

Figure-1: Shows the relationship between cervical dilatation & mode of delivery. 61.1% patients of group I and 21.7% patients of group II needed caesarean section. On the other hand, normal vaginal delivery was the mode of delivery in 74.0% women of group II and 25.9% patients of group I presenters.

Table 9: Indications of caesarean section on (N=40)

Indication	n	%
Dystocia (Failure to progress cephalopelvic disproportion, mal position)	13	32.5
Fetal Distress	11	27.5
Obstructed Labor	6	15
Previous caesarean section with scar tenderness	6	15
Bad obstetrical history	4	10

Table 9 shows that, caesarean section was done in 40 patients. Dystocia (32.5%) was the most common indication of caesarean section. Foetal distress comprised (27.5%) of the indications.

Table 10: Apgar score at 5 minutes in relation to cervical dilatation at presentation.

Cervical Dilatation	Apgar Score at 5 minutes	
	<7 No. (%)	8-10 No. (%)
Group I (<4cm) n =53	30 (62.5%)	23 (46.0%)
Group II (≥4cm) n =45	18 (37.5%)	27 (54.0%)

Table 10 show that, apgar score at 5 minute was <7 in 48 newborns, of these less apgar scored babies 62.5% were from group I presenters. Apgar score was 8-10 in 50 newborns, of these majority were from group II presenters.

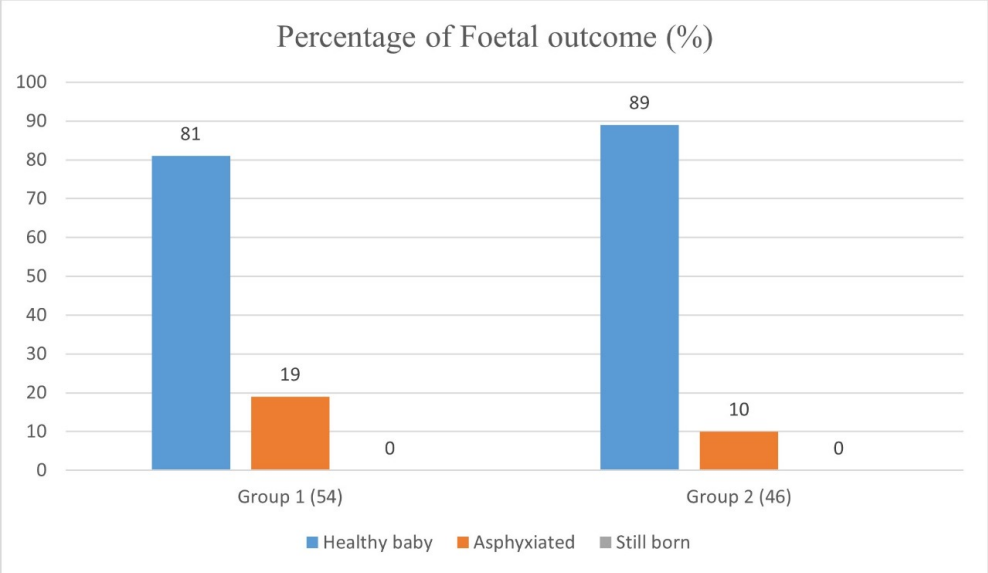

Figure 2: Demonstrated relationship between cervical dilatation at initial presentation & fetal outcome.

Outcome is shown in this figure in term of healthy, asphyxiated & stillborn babies. Total number of asphyxiated babies were 15 and 2 babies were stillborn. 18.5% of newborns in group 1 were asphyxiated. On the other hand, only 10.9% babies developed asphyxia from group II. There was 1 stillbirth in both group of patients.

DISCUSSION

In this study, 100 patients admitted with labor pain were observed according to cervical dilatation at first presentation on admission. The study demonstrated that women who present to hospital with less cervical dilatation have a higher chance of prolonged labor, augmentation with oxytocin, caesarean section, neonatal asphyxia & 5 min Apgar score < 7.

Most (40%) of the patients were in 21-25 years age group & the mean age was about 24.23 years. This incidence is more or less consistent with the findings of Khairun Nahar who found 20-30 years was the most common age group. [9] Total 54 (54%) patients presented with < 4 cm cervical dilatation and categorize as group I. Then total 46 (46%) patients presented with ≥ 4 cm dilatation. cervical dilatation and categorize as group II. In group I 79.2% patients were primi and 30.8% were multigravida. In group II 20.8% were primi and 69.2% were multigravida. Majority 47.8% group I and 50.0% group II attended at 38+-40 weeks of gestation which was determined by their previous antenatal records. Duration of labor before attending the hospital was between 2-16 hours in the study population. 59.2% patients of group I presented at 11-16 hours of labor, whereas 52.2% patients of group II presented at 7-10 hours of labor. This duration was recorded from patient's statement.

Total duration of 1st & 2nd stages of labor were also observed in this study, Major portion 44.4% patients of group I had their labor prolonged for > 18 hours. In comparison to this, 65.2% and 19.6% women of group II had their duration of labor for 12-18 hours & 6-11 hours respectively. Thus, the duration of labor was more prolonged in early presenter group (group I). The present study included the latent phase in the 1st stage of labor. Thus, the duration of this phase also influenced the incidence of prolonged labor in group I. Malone et al. reported that less advanced cervical dilation on admission appear to be most important predictor of prolonged labor. His finding is also supported by this study. [10]

Holmes et al. demonstrated that the women who presented at early cervical dilatation had a longer labor, a higher rate of caesarean section & oxytocin augmentation than the late presenter group. [11] Here also in this study there was significant increase in the use of oxytocin for augmentation of labor in patients of group I. 80.6% patients of this group needed augmentation. 61.1% patients of group I needed caesarean section whereas 21.7% of group II patients needed caesarean section. Normal vaginal delivery was the mode of delivery in 74.0% women of group II and 25.9% women of group I. Thus, it indicates that rate of caesarean section is higher in group I (early presenters) than in group II (late presenters).

Leitch demonstrated that failure to progress remains the major indication underlying the decision of perform caesarean section followed by foetal indication. [12] This study also reflects the same. Here major indication of caesarean section was dystocia which included failure to progress followed by foetal distress. Polo et al. observed that dystocia is currently the most common indication of primary caesarean section. [13] But this is not consistent with the findings of Rownak Jahan who found foetal distress as the main indication for caesarean section. [14]

18.5% babies of group I were asphyxiated at birth whereas 10.9% babies of

group II were asphyxiated. Maghoma in his study found that prolonged labor required more oxytocic drugs, more caesarean section & poor foetal outcome. [15] He showed poor foetal outcome in term of meconium staining of liquor, 5 minutes Apgar score < 7. The present study also demonstrated the same. Significant number (62.5%) of babies with Apgar score < 7 were from (early presenter) group I, the group in which the labor was prolonged in significant number of patients. Oswyn demonstrated that one of the significant risk factors for perinatal asphyxia is prolonged 1st & 2nd stage of labor. [16] His findings are also reflected in this study.

Limitations of the study

The present study was conducted in a very short period due to time constraints and the small sample size was also a limitation of the present study.

CONCLUSION

The findings have shown that women who present to the hospital during labor at < 4 cm cervical dilatation are more likely to have prolonged labor and subsequently there is increased incidence of caesarean section, fetal distress & neonatal asphyxia than those who present in more advanced cervical dilatation. Therefore, these patients need close observations throughout the course of labor by extensive monitoring.

RECOMMENDATION

This study can serve as a pilot to much larger research involving multiple centers that can provide a nationwide picture, validate regression models proposed in this study for future use and emphasize points to ensure better management and adherence.

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REFERENCE

1. Bailit JL, Dierker L, Blanchard MH, Mercer BM. Outcomes of women presenting in active versus latent phase of spontaneous labor. Obstet Gynaecol 2005 Jan; 105(1): 77-9.
2. Holmes P, Oppenheimer LW, Wen SW. The relationship between cervical dilatation at initial presentation in labor and subsequent intervention BrJ Obstet Gynaecol 2001 Nov; 108(11): 1120-4.
3. Nkyekyer K. Arrival in the labor ward in second stage of labor – any prognostic significance? East Afr Med J. 1998 May; 75(5): 282-7.
4. Melmed H, Evans M. Predictive value of cervical dilatation rate. BrJ Obstet Gynaecol 1976 May.
5. Demianczuk NN, Hunter DJ, Taylor DW. Trial of labor ofter previous cesarean section: prognostic indicators of outcome. Am J Obstet Gynecol 1982 Mar 15; 142 (6 pt I): 640-2.
6. Archie Carol L, Biswas Manoj K. The course & conduct of normal labor & delivery. Current obstetric & Gynaecologic diagnosis and treatment. 9th ed. McGraw-Hill Companies; 2003. 213 – 221.
7. Calder A.A. Normal labor. Dewhurst's textbook of Obstetrics and Gynaecology for postgraduates. 6th ed. Blackwell Science Ltd; 1999. 242 - 251.
8. Johanson R. Malposition, malpresentation and cepnalopelvic disproportion. Dewhurst's textbook of Obstetrics and Gynaecology for postgraduate's 6th ed. Blackwell Science Ltd; 1999. 277 – 289.
9. Nahar Khairun. Indication of caesarean section, a study of 100 cases in DMCH. Bangladesh College of Physicians & Surgeons Dissertation 1997;94.
10. Fergal D Malone, M. Grey, David Chelmow, J. Strong. Prolonged labor:

Lesson from active management of labor. Am J Obstet & Gynaecol 1996; 88:211-215.
11. Paul Holmes, Lawrence W, Shiwe Wen. The relationship between cervical dilatation and subsequent outcome. Br J Obstet & Gynaecol 2001; 108:1120-1124.
12. Leitch CR, Walker JJ. The rise in caesarean section rate: the same indication but a lower threshold. Br J Obstet Gynaecol 1998; 105:621-626.
13. Polo Ana, Lisbeth, Herrera, Martin. Complication of labor & delivery. Current obstetric & Gynaecologic diagnosis and treatment. 9th ed. McGraw-Hill Companies; 2003. 466 – 476.
14. Jahan Rownak. Clinical profile & outcome of labor in primi in a series of 100 cases in IPGMR. BCPS Dissertation 1996; 110.
15. Maghoma J, Buchmann EJ. Maternal & fetal risk factor associated with prolonged latent phase of labor. Br J Obstet Gynaecol 2002;22(1):16-19.
16. Oswyn G, Vince JD, Friesen H. Perinatal asphyxia at Port Moresby General hospital: a study of incidence, risk factors & outcome. PNG Med J. 2000;43(1-2):110-120.