Original Article

A Clinical Study on Non-Engaged Head in Primigravid Women at Term Pregnancy

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Abstract:

Background: In the process of labor, engagement of fetal head is a vital event. Engagement has been defined as the stage at which the widest part of the fetal head has passed through the pelvic inlet. The aim of this study was to find out the incidence of non-engagement of fetal head in primigravida at term pregnancy, to find out the different causes of non-engagement of head at the various stages of labor and to see the outcome of labor process. **Methods:** This is a crosssectional observational study undertaken in Department of Obstetrics and Gynecology, Rangpur Medical College Hospital, Rangpur, Bangladesh from July 2006 to December 2006 to see the incidence, different causes of non-engagement of head and outcome of labor in primigravidas who had non-engaged head at the onset of labor. Total 83 primigravid women at labor during the study period were included in the study. Patients with any medical or obstetrical complications were excluded from the study. **Results:** Of the 83 patients in the study group head was engaged in 20 (48%) cases and unengaged in 79.65% cases (X^2=28.928, p=<0.001). Caesarean section was needed in 17.65% of head engaged group and 57.57% of head non-engaged group than head non-engaged group (X^2=24.878, p=0.001). Caesarean section was significantly higher in head non-engaged group. Among the head non-engaged group, in 33.33% cases head was in the occipito-posterior position. Vaginal delivery occurred 82.35% of head engaged group and 42.42% of head non-engaged group. **Conclusion:** Compared with the engaged head, there was increased incidence of caesarean delivery in non-engaged head and occipito-posterior position was an important cause of non-engaged head.

Indexing words: Primigravid, Term pregnancy, Engagement

Introduction:

Human labor is surprisingly hazardous. Evolution ought to favour those mothers who deliver without problems and yet, for those without access to good medical care, the lifetime risk of dying from labor may be 10% or more. Delivery of a healthy baby to a healthy mother – is the simple objective of every pregnancy. Desired outcome of a pregnancy is spontaneous vaginal delviery. The fullest possible understanding of the different aspects of labor is the central to that objective.

In the process of labor, engagement of fetal head is a vital event. Engagement has been defined as the stage at which the widest part of the fetal head has passed through the pelvic inlet. It refers to the descent of the biparital plane of the fetal head to a level below that of the pelvic inlet[1]. The distance between the pelvic inlet and ischial spines is about 5cm and the distance between the biparital plane of unmoulded head to the lowest point of the vertex is 3cm[2]. So when the biparital diameter crosses the pelvic inlet the station, the location of the leading edge of the presenting part within the birth canal, is at or just above or just below the ischial spines. It has been said that in majority of primiparous women engagement occur two weeks before the expected date of delivery[3-4]. Friedman and Sachtleben demonstrated that higher station of the head at the onset of labor were associated with more incidence of prolonged and dysfunctional labor[3]. The incidence of a prolonged latent phase, primary dysfuctional labor and secondary arrest of dilatation all decreased with a lower station at the time of admission to labor and delivery[3]. In an average baby, if the lowest part of the head is at the ischeal spines-o-station, then the widest part of the head must pass through the pelvic inlet[5]. If the head fails to engage in primigravida even at 38 weeks, probable causes are deflexed head placing the larger diameter to engage,

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cephalopelvic disproportion due to contracted pelvis, big head or combination of both, poly hydramnios, poor formation of the lower uterine segment, hydrocephalus, placenta previa, pelvic tumors, high pelvic inclination.[2]

Labor progression also related to station of the fetal presenting part at the time of arrest of descent. The higher the station, the slower and more protracted a course of labor[6]. In USA, number of studies showed that – an unengaged vertex is a significant risk factor for caesarian delivery[7,8,9]. But in a comparative study between Nigerian primiparae and caucasians at the Queen Charlotte's Maternity Hospital showed that an unengaged fetal head in early labor should not by itself be an indication for early delivery by caesarean section[10]. O 'Driscoll reported that engagement of the fetal head after 38 weeks of pregnancy were suspected for cephalo-pelvic disproportion, but when trail of labor was given most of the patient delivered without injury to the mother and fetus. So un-engagement does not always mean cephalo-pelvic disproportion[11]. In Bangladesh, a study showed that non-engaged head nulliparous parturient is a significant risk factor for caesarean delivery secondary to arrest disorder due to occipito-posterior- position[12].

In Bangladesh, the incidence of non-engagement of fetal head at term in primigravid women with cephalic presentation is not known. So the main aim of this study were to find out the incidence of non-engagement of fetal head in primigravida at term pregnancy, to find out the different causes of non-engagement of head at the various stages of labor and to see the outcome of labor process.

Methods:

This crossectional observational study was carried out in the Department of Obstetrics and Gynecology, Rangpur Medical College Hospital, Rangpur during the period from July 2006 to December 2006. This study included 83 primigravid women at term pregnancy in labor admitted at Rangpur Medical College Hospital, Rangpur during this study period. After admission diagnosis was made mostly on the basis of history and clinical examination with minimum laboratory aid. Primigravid women with single fetus and cephalic presentation were included in the study.

Parturient with pre-eclampsia, eclampsia, malpresentation, antipartum hemorrhage, intra uterine growth retardation, severe anemia diabetes mellitus, hypertension or any other obstetrical and medical complications were excluded in this study.

Eligible women were informed about the study and informed consent was taken from all the study subjects. Engagement of the fetal head was assessed by the rule of 5th[6], when 2/5th or less became palpable abdominally, it was labeled as engaged. Labor was managed actively and monitored by close and careful observation. Fetal distress was declared when fetal heart rate was <100 or >180 beats per minute and presence of muconium stained liquor after rupture of membranes either spontaneously or artificially. Labor was augmented with artificial rupture of membrane or oxytocin drip whenever necessary, cesarean section was done when it was indicated.

Maternal outcome was measured in terms of vaginal delivery with or without aid, cesarean section, incidence of post-partum hemorrhage, injury to the birth canal.

Fetal outcome was measured in terms of – Apgar score at 5 minutes, incidence of resuscitation, incidence of admission in neonatal unit and perinatal mortality. Birth weights were recorded immediately after delivery.

All information was recorded in the pre-designed questionnaire and analyzed using computer based software, the Statistical Package for Social Science (SPSS) version 20.0.

Results:

Of 83 patients, 66 (79.52%) patients were unengaged head in labor while in the rest 17 (20.48%) head was found engaged (Table I). Incidence of non-engagement of fetal head was highly significant (p<0.001).

Table I: Incidence of engagement of fetal head (n=83)

Status of engagement	Number	Percentage	X^2	p value
Non-engaged	66	79.52	28.928	<0.001
Engaged	17	20.48		

Table II shows the age distribution of the subjects. It was found that maximum number of patients (55.42%) belong to the age group 21-25 years.

Table II: Age distribution of the patient (n=83)

Age group (in years)	Mean ±SD	No. of patients	Percentage (%)	X^2	p value
16-20	-	31	37.35		
21-25	22.47±4.48	46	55.42	29.518	<0.001
26-30	-	6	7.23		

Table III shows the height distribution of the subjects. It was found that maximum number of patients both in engaged and non-engaged group, height was within 146-155cm.

Table III: Height of the patients in engaged and non-engaged group (n=83)

	Height					
	135-145	146-155	156-165	Mean ±SD	X^2	p value
	No.(%)	No.(%)	No.(%)			
Engaged (n=17)	1(5.88)	14(82.85)	2(11.76)	151.53 ±12.69	1.620	0.445
Non-engaged (n=66)	18(27.27)	42(63.65)	6(9.09)			

Of non-engaged group, vaginal delivery occurred in 42.43% and lower segment caesarean section in 57.58% of cases, vaginal delivery of engaged group occurs in 82.35% and lower segment caesarean section in 17.65% of cases.

Table IV: The mode of delivery in both engaged and non-engaged group (n=83)

Mode of delivery	Engaged (n=17)		Non-engaged (n=66)		X^2	p value
	No.	%	No.	%		
Vaginal delivery	14	83.35	28	42.43	4.667	0.031
With aid	1	-	11	-	8.333	0.008
Without aid	13	-	17	-	0.533	0.465
LUCS	3	17.65	38	57.57	24.878	0.001

Among unengaged group major indication of cesarean section was due to fetal distress (Fig. 1).

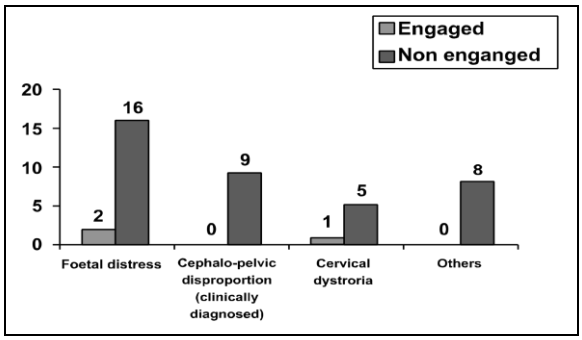


Fig 1: Indication of cesarean section in engaged and non-engaged group

Most common etiological factor was deflexed head, the most important of which was occipitoposterior position. Then next common cephalopelvic disproportion. No etiology was found in 33.33% of cases (Fig. 2). The apparent etiology of non-engagement had statistically highly significant difference (p<0.001).

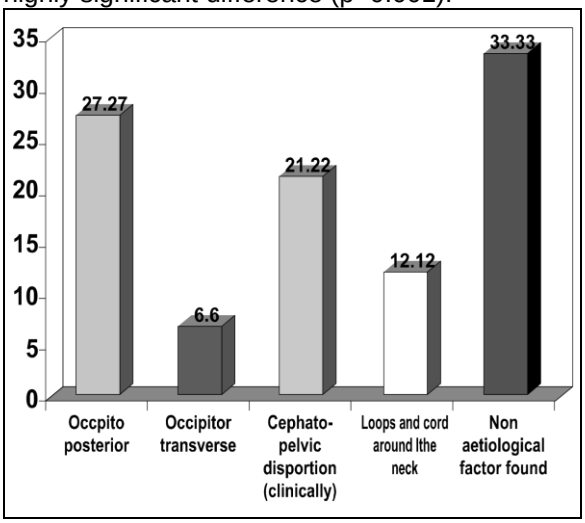


Fig 2: **Apparent etiology of non-engagement**

Among 66 non-engage cases, LUCS was done 38 cases mainly due to deflex head and CPD (clinically diagnosed). Vaginal delivery occurred in 28 cases of which without aid 17 and aid (ventouse) 11 cases. There was no statistically significant variation in mode of delivery regarding apparent etiology (p>0.05) (Table V).

Table V: Outcome of cases according to the apparent etiology of the non-engaged head at onset of labor (n=66).

Apparent Aetiology	No. of Cases	LUCS	Vaginal delivery without aid	Vaginal delivery with aid	X^2	p value
CPD (Clinically diagnosed)	14	12	00	2		
Deflex head						
(i) Occipito posterior position	18	8	6	4	1.333	0.513
(ii) Occipito transverse	4	4	00	00		
Loops of cord around the neck	8	5	2	1	3.250	0.197
Unknown	22	9	9	4	2.273	0.321

Table VI shows that there was a significant relationship between non-engagements and prolong duration of labor.

Table VI: Duration of labor between unengaged and engaged groups who were delivered vaginally.

Patient	Total no. of patient delivery	More than 12 hours		Less than 12 hours		X^2	p value
		No.	%	No.	%		
Engaged	14	6	42.86	8	57.14	2.27	0.120
Non-engaged	28	19	67.86	9	32.14	12.37	0.001

There was no major maternal complication and no maternal death occurred in the present study (Table VII).

Table VII: Maternal outcome (n=83)

Outcome	Engaged	Non-engaged	X^2	P value
PPH	00	00		
Cervical tear	00	02		
Extension of episiotory wound	01	02	3.000	0.223
Vaginal tear	01	00		

In the present study APGAR SCORE of the maximum babies were good except nine. Admission in neonatal unit was needed among two and rest seven babies' APGAR SCORE returned to normal after resuscitation (Table VIII).

Table VIII: Fetal outcome (n=83)

APGAR score at 5 minutes	Engaged	Unegaged
7-10	16	58
4-6	01	08
0-3	00	00

Discussion:

Majority of nulliparous with cephalic presentation the fetal head is engaged 1-2 weeks prior to onset of labor[13]. But our clinical experience contradicts this traditional view. The incidence of non-engagement of fetal head at onset of labor in this series was 79.52%. This is definitely a very high rate. Roshanfekr observed an incidence of non-engagement was (71%)[8]. The rate observed by Murphy et al[9] was 78%. While the rate observed by Khanam and Begum[12] was 58% in Bangladeshi nulliparous women and Ara[14] was 83.48%.

Diegmann et al[15] in USA in their study showed incidence of non-engagement of head was 69%.

Most of the studies of the world, incidence was estimated based on hospital admission rather than on total populations. Therefore, it is not possible to estimate the true incidence.

The difference in incidence is most probably because of the difference in pelvic inclination, racial and ethnic variation. But Briggs[10] in a study of Nigerian primigravida did not find any co-relation between non-engagement and pelvic brim inclination.

In addition, retrospective studies, on pelvic brim inclination between Nigerian primiparae and matched caucasians at the Queen Charlotte's Maternity Hospital showed no statistically significant differences[10].

There was no significant difference in maternal age, height and weight between engaged and non-engaged group of women in this study. This indicates that there were no other factors which could have influenced the rate of engagement in these women.

In present study significant etiological factor like occipito-posterior postion, cephalopelvic disproportion, loops of cord around the neck was found in 66.67% cases and no apparent cause was found in 33.33% cases. In a study of Ambwani[16] showed most common etiological factor was deflexed head, the most important of which was occipito-posterior position. The next common was cephalo-pelvic disproportion.

In Ambwani[16], cases were 30% occipito-posterior position and 20% cephalopelvic disproportion. In the present study 33.33% non-engagement due to occipito-posterior position and cephalo-pelvic disproportion was 21.22% patients with gross degree of disproportion was taken up for caesarean section without a trial of labor but such cases were few. Patients with borderline disproportion were given a trial of labor with continuous intrapartum monitoring. Patient who failed to show progress in labor in spite of good contractions and those who developed fetal distress during labor were subjected to caesarean section. Disproportion was diagnosed clinically either due to contracted pelvis with a normal size baby or a big baby without pelvic contraction.

But the diagnosis of disproportion, except the gross ones, cannot be made unless uterine action is adequate[17].

In this study 42.43% of women with non-engaged fetal head delivered vaginally of them 25.75% delivered without interference by ventouse or forceps and 16.67% delivered aided by ventouse.

Number of studies showed that an unengaged vertex is a significant risk factor for caesarian delivery[7,9] and prolonged duration of labor. In present study rate of caesarian delivery among non-engaged group is 57.57%.

Duration of labor who delivered vaginally, were significantly higher with non-engaged head, Friedman and Sachtleben[3] stated that in primigravidas with floating head latent phase is increased and mean duration of labor was 14.4 hrs. In the present study 67.86% of patient's labor lasted more than 12 hrs. So, there was a significant relationship between non-engagement and prolonged duration of labor. In the present study there was no maternal death and no serious complications except perineal tear and cervical tear. There was no neonatal death. APGAR score of most of the babies was good except nine. Admission in neonatal until were needed among two and rest of the seven babies' APGAR score returned resuscitation.

Conclusion:

In conclusion it can be said that the incidence of active medical and surgical intervention in the cases of primigravidas with floating head at the onset of labor is quite high. A high total duration of labor can also be expected in these cases. If the attitude of watchful expectancy and timely intervention is used in these cases, specially in those cases in which no significant etiological factor is found, a good number of cases can be delivered vaginally.

So, obstetricians should be more optimistic regarding vaginal delivery of primigravidas who present an unengaged head at the onset of labor and aboid hasty decisions towards caesarean delivery

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