



Original Article



Obstetrical Outcomes in Primigravida with Engaged Versus Unengaged Fetal Head during Spontaneous Labor

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ABSTRACT

When the fetal head's widest diameter fits into the pelvic inlet, it is referred to as engaged. When a primigravida's labor begins with the fetal head still not engaged, she was most likely to experience an obstructed labor. This study was conducted at a large tertiary care center with adequate sample size to determine the study outcomes. **Objective:** To compare the obstetrical outcomes in primigravida with engaged versus unengaged fetal head at the onset of spontaneous labor in terms of delivery methods and associated risks. **Methods:** This was a case control study. Study was conducted at Department of Obstetrics and Gynecology National Hospital Defence, Lahore. One hundred thirty patients through non-probability consecutive sampling. Demographic data like name, age was recorded for participants. Data were analyzed using SPSS version 22.0. RR was calculated for two groups. **Results:** Mean age of patients was 22.4 ± 2.6 years. Total 44.7% patients had C-section. When comparison of engaged and unengaged fetal head, 49 patients out of 88 i.e. 55.68% patients had engagement of head in vaginal delivery group and 16 patients out of 42 i.e. 38% patients had engagement of fetal head in C-section group. Relative risk among two group was 1.2564 and z score was 1.847 and p value was 0.0648. **Conclusion:** Relative risk of primigravida getting C-section was high with unengaged fetal head compared to primigravida who has engaged fetal head.

INTRODUCTION

The start of regular contractions in the uterus, gradual cervical dilatation, effacement, and descent of the presenting portion are all signs of labor. Primigravidae have considerably different normal labor than multigravidae due to the uterus's physiological inefficiency and the possibility of irregular or hypotonic contractions, which can delay the onset of labor 37% of primigravidae are diagnosed with dystocia, or difficult labor [1-3]. When the fetal head's widest diameter fits inside the pelvic inlet, it is

considered to be engaged. When a primigravida's labor begins with the fetal head still not engaged, she is most likely to experience an obstructed labor [4, 5]. In some situations, labor lasts longer and may call for further intervention. For a long time, unengagement of the head has been linked to cephalopelvic disproportion. It corresponds to an increased chance of challenging delivery [6]. Anomalies like as dystocia, dysfunctional labor, inability to descend, and failure to progress are



typically the cause of abnormal labor. It's debatable when aberrant labor progress warrants a caesarean delivery. It is evident that there is still some leeway for clinical judgement when determining what is deemed normal and enough abnormal to require surgical intervention [7]. Primigravidas who have not engaged their heads are more likely to experience obstructed labor and all of the associated morbidity and mortality. For delivery, they ought to be referred to a health facility with professional staff and amenities. In Pakistan, Home birth is very common so it increases the chances of obstructed labor. Majority of the studies so far have studied management of primigravida with unengaged head at term with very few looking at comparing the outcomes in primigravida with unengaged vs engaged fetal head at term [8]. Cephalopelvic disproportion is a subjective clinical assessment based on physical examination and course of labour. In a prospective study of nulliparous women in active labour, a persistently floating head at 7 cm dilation was predictive of eventual cesarean delivery in 100 percent of cases [9]. Antepartum, the clinician is generally unable to predict maternal pelvis-fetal size/position discordance leading to arrest of labour requiring cesarean delivery. Clinical and radiologic assessments of the maternal pelvis and fetal size (ie, pelvimetry) are inexact and poorly predict the course and outcome of labour [10]. Normal delivery happens in 46%, assisted vaginal in 14% and caesarian section in 40% of primigravida with caesarian section rates ranging from 21.73% to 90% depending on engagement. Fetal station at full cervical dilation tends to be higher in multiparous women than in nulliparous women, and descent tends to be faster [11]. However, in select scenarios where the probability of a vaginal delivery appears to be low and a woman has been pushing effectively without descent, it is reasonable to make a diagnosis of arrest of descent and proceed with cesarean prior to these upper limits. Factors such as the fetal station, estimated fetal weight, obstetric history, fetal status, maternal pelvis, and adequacy of maternal pushing should all be considered [12]. The time to dilate 1 cm in latent phase (defined as dilation <6 cm) is significantly longer in women undergoing induction than in those in spontaneous labour and can take many hours [13, 14]. The active phase (time to dilate from 6 to 10 cm) is similar in both induced and spontaneous labors and is more rapid. In the preterm induction study above, the median (95th percentile) time for dilation from 6 to 10 cm was approximately 0.3 hours (2 hours) for both nulliparous and multiparas [15].

This study was therefore meant to determine the obstetrical result for a primigravida who's delivery began autonomously and whose fetal head was involved or not using a sizable sample size at a tertiary care center.

METHODS

This was case control study, conducted at Department of Obstetrics and Gynecology National Hospital, Lahore. The study was conducted over six months, from January 27, 2020, to July 26, 2020, with a 95% power of the test. The expected frequency of C-sections was 19% for cases with fetal head engagement and 39% for cases with unengaged fetal heads [5]. Sample size was estimated to be 130 in exposed/case group and 65 in unexposed or control group. Non-probability consecutive sampling was used [3]. Inclusion criteria was all primigravida between the ages of 18 and 28 who had spontaneous labor onset, a cephalic presentation, and a singleton pregnancy while exclusion criteria were patients not willing to participate in the study. Excluded cases included numerous pregnancies, fetal growth retardation, cephalopelvic imbalance, and placenta Previa. This was determined from history, medical record and examination. Diagnosed medical conditions like diabetes mellitus (BSL >200 mg/dl) and hypertension (BP >160/90) as per medical record were excluded. The present study was carried out prospectively at Gynecology department with 130 study participants (65 in exposed group and 65 in unexposed group) selected based on criteria. Recorded were demographic details such as name, age, and address. Informed consent was obtained after patients were reassured about the expertise and confidentiality. Every piece of information was input into pre-made proforma. Every patient's labor progress was documented. According to the operational definition, a caesarean section was performed if labor did not proceed or the fetal head did not descend following observation. Patients were managed as per protocol for any complications. Statistical analysis was done using Statistical Package for Social Sciences (SPSS) version 22.0. Quantitative data i.e., age, cesarean section rate was presented as means and standard deviations. Data were stratified for age, gestational age and birth weight to control for effect modifier. Post stratification chi square test was employed with p value <0.05 considered statistically significant.

RESULTS

This study involved a total of 130 patients, 65 of whom were in the exposed group and 65 of whom were not. 40% of the patients in this study were between the ages of 24 and 28, whereas 60% of the patients were between the ages of 18 and 23. The patients' average age was 22.4 ± 2.6 years. In terms of caesarean section rates, 55.3% of patients had a normal delivery, while 44.7% of patients had a C-section. Comparing engaged and unengaged foetal heads, it was found that 16 out of 42 patients, or 38% of the total, had engaged fetal heads in the C-section group, while 49 out of 88 patients, or 55.68% of the total, had engaged fetal heads

in the vaginal delivery group. Given that the p-value was 0.0648, there was no discernible difference between the engagement and unengagement groups in the normal delivery and C-section groups. There was no significant difference between age groups, patient occupations, educational levels, or engagement versus unengagement of the fetal head (p-value < 0.05) when stratified this data for engagement and unengagement between normal delivery and C-section for various age groups, occupations, and educational levels. In this study, 60% patients were between the ages of 18-23 years whereas 40% patients were between the ages of 24-28 years. Mean age of patients was 22.4 ± 2.6 years (Table 1).

Table 1: Age of Study Participants

Age (Years)	Number of Patients N (%)
18-23	78 (60.0%)
24-28	52 (40.0%)
Total	130 (100%)

Regarding rate of caesarian section, 44.7% patients had C-section whereas 55.3% patients had normal delivery (Table 2).

Table 2: Rate of C-Section among Study Participants

Cesarean Section	Number of Patients N (%)
Yes	42 (44.7%)
No	88 (55.3%)
Total	130 (100%)

When engaged and unengaged fetal head were compared, 49 patients out of 65 i.e. 55.68% patients had engagement of head in vaginal delivery group and 16 patients out of 65 i.e. 38% patients had engagement of fetal head in C-section group (Table 3).

Table 3: Comparison of Engaged and Unengaged Group

Engagement of Fetal Head	Outcome		
	Vaginal Delivery (N)	Cesarean Section (N)	Total (N)
Yes	49	16	65
No	39	26	65
Total	88	42	130

Stratified data for engagement and unengagement between normal delivery and C-section for different age groups, 18-23 years, vaginal delivery for engaged was 26, for C-section was 13 while the vaginal delivery for unengaged was 27 and for C-section was 12 (Table 4).

Table 4: Stratification of study Patients by Age (n=130)

Age	Groups	Outcome			p-Value
		Vaginal Delivery (N)	Cesarean Section (N)	Chi-Square	
18-23 Years	Engaged	26	13	0.058	0.80
	Unengaged	27	12		

18-23 Years	Engaged	18	8	0.087	0.767
	Unengaged	17	9		
Total		130	88	-	-

The data for stratification of patients by gestational age was for up to 38 weeks' vaginal delivery for engaged was 17, for C-section was 9 while for unengaged was 18 and 8 respectively. The stratification of patients by gestational age was for more than 38 weeks' vaginal delivery for engaged was 26, for C-section was 13 while for unengaged was 27 and 12 respectively (Table 5).

Table 5: Stratification of study Patients by Gestational Age (n=130)

Gestational Age	Groups	Outcome		Chi-Square	p-Value
		Vaginal Delivery (N)	Cesarean Section (N)		
Upto 38 Weeks	Engaged	17	9	0.087	0.767
	Unengaged	18	8		
>38 Weeks	Engaged	26	13	0.058	0.80
	Unengaged	27	12		
Total		130	88	-	-

The stratification of patients by birth weight was for upto 2.75kg, the vaginal delivery for engaged was 24, for C-section was 10 while for unengaged was 22 and 11 respectively. The stratification of patients by birth weight was for more than 2.75kg, the vaginal delivery for engaged was 22, for C-section is 9 while for unengaged was 20 and 12 respectively (Table 6).

Table 6: Stratification of Patients by Birth Weight (n=130)

Birth Weight	Groups	Outcome		Chi-Square	p-Value
		Vaginal Delivery (N)	Cesarean Section (N)		
Upto 2.75 Kg	Engaged	24	10	0.001	0.965
	Unengaged	22	11		
> 2.75Kg	Engaged	22	9	0.508	0.475
	Unengaged	20	12		
Total		130	88	-	-

DISCUSSION

When the fetal head's widest diameter fits into the pelvic inlet, it was referred to as engaged. When a primigravida's labor begins with the fetal head still not engaged, she was most likely to experience an obstructed labor. With a big enough sample size, this study was carried out in a tertiary care center to check the study results. Regarding rate of Cesarean section, 44.7% patients had C-section whereas 55.3% patients had normal delivery. Rate of C-section in various studies has been comparable to present study. According to World Health Organization report between 2007 and 2008, rate of C-section in China was 46%. In one study conducted at Iran, prevalence of C-section was 48% [16]. In another study, rate of C-section was slightly higher i.e. 54.90% [17]. Other similar studies showed variable rates

of caesarian section in different countries. One study conducted at Ethiopia showed that prevalence of C-section was 27.6% [18]. Another study from Brazil showed that prevalence of C-section was 55.5% [19]. Similarly, a study conducted at Cyprus showed prevalence of C-section as high as 52.2% [20]. One study conducted at Rawanda showed very high rate of C-section i.e. 62.4% [21]. When engaged and unengaged fetal head were compared, 49 patients out of 88 i.e. 55.68% patients had engagement of head in vaginal delivery group and 16 patients out of 42 i.e. 38% patients had engagement of fetal head in C-section group. Relative risk among two group was 1.2564 and z score was 1.847. There was no significant difference between engagement and unengagement in normal delivery and C-section groups as p value was 0.0648. These results were comparable to the results of other studies. In one study conducted by Sirisha VS *et al.*, it was seen that unengaged head was found in 31% of primigravida. It was also found that out of which 82.9% were delivered through vagina and 17.1% had abdominal delivery (p value <0.0001) [22]. A study conducted in Pakistan reported that 19% of patients with engaged fetal heads and 39% with unengaged fetal heads underwent cesarean delivery. In the same study, vaginal delivery occurred in 65% of the engaged group and 42% of the non-engaged group [1-3]. Similarly, a study by Shrivastava and colleagues found that vaginal delivery occurred in 46% of cases, assisted vaginal delivery in 14%, and cesarean section in 40% of primigravida, with cesarean rates varying between 21.73% and 90%, depending on the engagement of the fetal head. When stratified this data for engagement and unengagement between normal delivery and C-section for different age groups, occupation and education level, there was no significant difference between different. The study's goals were explained to the participants, and written informed consent was obtained. There were no competing ideas declared by the authors. The study's findings were given simply and honestly, with no exaggeration, manipulation, or improper deletion of information.

CONCLUSIONS

Compared to primigravida with an engaged fetal head, those with an unengaged fetal head had a higher relative risk of undergoing a C-section. The study concluded that engagement of the fetal head, though important, may not independently predict delivery outcomes. Further research is warranted to explore additional factors influencing delivery modes.

Authors Contribution

Conceptualization: ZL,
Methodology: ZL, QM, SS, NS
Formal analysis: PA
Writing, review and editing: NM, SM

All authors have read and agreed to the published version of the manuscript

Conflicts of Interest

All the authors declare no conflict of interest.

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REFERENCES

- [1] Shrivastava A. Obstetrical Outcome in Primigravida with Unengaged Fetal Head at Spontaneous Onset of Labor at Term Gestation. *International Journal of Science and Research*. 2017 May; 6(8): 3-4.
- [2] Bhadra DM and Sonawane PK. Comparative study between unengaged and engaged fetal head in primigravida at term or in labour. *International Journal of Reproduction, Contraception, Obstetrics and Gynecology*. 2018 Nov; 7(11): 4569-75. doi: 10.18203/2320-1770.ijrcog20184509.
- [3] Malik S, Asif U, Asif M. Primigravida: obstetrical outcome; with engaged versus unengaged fetal head with spontaneous onset of labour at term. *The Professional Medical Journal*. 2016 Feb; 23(02): 171-5. doi: 10.29309/TPMJ/2016.23.02.1063.
- [4] Haroon M, Baqai S, Choudry A, Gul M, Ahmed M. Outcome of Primigravida with Unengaged Fetal Head at Term or Onset of Labour. *Pakistan Armed Forces Medical Journal*. 2022 Dec; 72(6): 1854-57. doi: 10.51253/pafmj.v72i6.4541.
- [5] Hussain S, Qurban S, Tahseen H, Javed K, Khurshid HN. Maternal Outcome of Primigravida Patient with Term Pregnancy with Engaged Versus Unengaged Foetal Head at Onset of Labour. *Pakistan Journal of Medical & Health Sciences*. 2022 Apr; 16(03): 787-. doi: 10.53350/pjmhs22163787.
- [6] Asma S, Muntaha ST, Haq F, Hayat S, Kanwal M. The Comparison of Outcome In Engaged Versus Unengaged Fetal Heads in Primigravida. *Journal of Rawalpindi Medical College*. 2023 Dec; 27(4). doi: 10.37939/jrmc.v27i4.2383.
- [7] Hautakangas T. Measuring uterine contractile activity in labour: impact of dystocia, obesity and previous caesarean section on labour outcome [Doctoral Dissertation]. 2022.
- [8] Dewan A, Pati B, Nautiyal R, Chaudhary D. Labour outcome in primigravida with unengaged head: a

- observational study. *International Journal of Reproduction, Contraception, Obstetrics and Gynecology*. 2022 Apr; 11(4): 1097-102. doi: 10.18203/2320-1770.ijrcog20220732.
- [9] Agarwal P and Shetty S. Clinical study of primigravida with unengaged head in labour at term. *International Journal of Women's Health and Reproduction Sciences*. 2021 Apr; 9: 100-104. doi: 10.15296/ijwhr.2021.18.
- [10] Subiksha RA. Clinical study of outcome of unengaged head in primigravidae at term gestation and in labour, at Rajarajeswari Medical College and Hospital [Doctoral Dissertation]. Bangalore: Rajiv Gandhi University of Health Sciences; 2022.
- [11] Salim NA, Satti I, Mahmoud AO. Unengaged head in primigravidae, mode of delivery and outcome (a case-control study) in Dongola-Sudan (2019). *Journal of Family Medicine and Primary Care*. 2021 Mar; 10(3): 1254-7. doi: 10.4103/jfmpc.jfmpc_2134_20.
- [12] El-Desouky ES, Farag ES, Mohamed A. Fetal outcome and vaginal delivery rates among primigravidae with unengaged head at onset of labor. *Al-Azhar Medical Journal*. 2021 Jul; 50(3): 1707-22. doi: 10.21608/amj.2021.178262.
- [13] Dashrathi R and Kathaley M. Outcome of High Foetal Station in Primigravida with Vertex Presentation at Term-A Clinical Study in a Tertiary Care Center. *MVP Journal of Medical Sciences*. 2020: 161-9. doi: 10.18311/mvpjms/2020/v7i2/24639.
- [14] Wan X, Zhai J, Lu X, Wang X, Lilenga HS, Luo M *et al*. Effects of maternal posture and cognitive-behavioral interventions on labor outcomes in primigravidas with abnormal fetal head position: a randomized controlled clinical trial. *The Journal of Maternal-Fetal & Neonatal Medicine*. 2024 Jan; 37(1): 2422448. doi: 10.1080/14767058.2024.2422448.
- [15] Becker DA, Szychowski JM, Kuper SG, Jauk VC, Wang MJ, Harper LM. Labor curve analysis of medically indicated early preterm induction of labor. *Obstetrics & Gynecology*. 2019 Oct; 134(4): 759-64. doi: 10.1097/AOG.0000000000003467.
- [16] Rafiei M, Ghare MS, Akbari M, Kiani F, Sayehmiri F, Sayehmiri K *et al*. Prevalence, causes, and complications of cesarean delivery in Iran: A systematic review and meta-analysis. *International Journal of Reproductive Biomedicine*. 2018 Apr; 16(4): 221. doi: 10.29252/ijrm.16.4.221.
- [17] Liu Y, Li G, Chen Y, Wang X, Ruan Y, Zou L *et al*. A descriptive analysis of the indications for caesarean section in mainland China. *BioMed Central Pregnancy and Childbirth*. 2014 Dec; 14: 1-9. doi: 10.1186/s12884-014-0410-2.
- [18] Iqbal S, Sumaira S. Outcome of primigravidae with unengaged versus engaged fetal head at term or onset of labour. *Biomedica*. 2009 Jul; 25(1): 159-62.
- [19] Hussain S, Qurban S, Tahseen H, Javed K, Khurshid HN. Maternal Outcome of Primigravida Patient with Term Pregnancy with Engaged Versus Unengaged Foetal Head at Onset of Labour. *Pakistan Journal of Medical & Health Sciences*. 2022 Apr; 16(03): 787. doi: 10.53350/pjmhs22163787.
- [20] Unnisa S, Poornima MS. Unengaged head at term in primigravida: does it affect the chance of having a normal delivery?. *International Journal of Reproduction, Contraception, Obstetrics and Gynecology*. 2019 Apr; 8(4): 1616-20. doi: 10.18203/2320-1770.ijrcog20191228.
- [21] Mahendra G. Clinical study of unengaged head in primigravida at term in labour [Master's Dissertation]. Karnataka, India: Rajiv Gandhi University of Health Sciences; 2011.
- [22] Sirisha VS. Obstetric outcome in primigravida with unengaged versus engaged fetal head at term [Master's Dissertation]. Karnataka, India: Rajiv Gandhi University of Health Sciences; 2020. doi: 10.18203/2320-1770.ijrcog20205777.