



INTRAPARTUM FOETAL AND MATERNAL COMPLICATIONS IN LOW-RISK PREGNANCY: EXPERIENCE AT A TERTIARY CARE HOSPITAL

Obstetrics & Gynaecology

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ABSTRACT

Objective: To study the peripartum maternal and foetal complications in low-risk mothers. (sentinel events) **Design:** Prospective observational study **Setting:** GMCH, Aurangabad, Maharashtra. **Participants:** 1700 low risk women willing to participate in the study are chosen as per the inclusion criteria of low risk pregnancy, 200 women had an unexpected adverse event. Main outcome measures: Perinatal maternal and foetal morbidity and interventions **Results:** The most common age group in which sentinel events were observed was 20-25 years, unbooked, lower middle class, and had normal BMI range. 34.67% women delivered at 40-41 weeks of gestation, 67% women delivered vaginally, 29.5 % required LSCS, 2.5% required instrumental delivery. The most common intervention needed was LSCS in 31.12% cases. The most common complication was PROM in 17.05%, blood transfusion in 16.48%, PPH in 13.52% women. The most common indication for LSCS was foetal distress (48.27%) and failure to progress (10.53%). 95.5% of the babies were live births and 4.5% were still births. 27.74% required NICU admission. 44.7% babies had a birth weight range of 2.5-3 Kg. The most common morbidity observed in neonates was HIE (35.58%) and RDS (17.57%). **Conclusion:** Despite a perceived low risk of harm in primary care, a continuous awareness of a possible presentation of high risk complications especially during pregnancy, should be part of daily practice. Increased awareness of safety risks, being alert and ready to deal with emergency situations is the key to improve the quality of care in maternity services.

KEYWORDS

labour complications; Low-risk pregnancy; Pregnancy outcome

INTRODUCTION:

Pregnancy is considered as high risk if it is associated with any risk factors to the mother or baby. A low risk pregnancy is one which is not associated with any identifiable risk factor for mother or baby. [1]. It is clear that high risk pregnancies have better outcomes when managed intensively in major referral centres and timely transferred. [2] Most of the interventions have proved so efficacious in high risk pregnancy that they have been considered useful for any labour, high or low risk. In practice this has yet to be realized and unexpected labour and delivery complications remain a concern.

Our antenatal, intranatal and postnatal care is much more focused on the high risk pregnancies. The number of antenatal visits for high-risk women is more compared to low-risk women. High-risk women are provided with the obstetric care at the consultant level, while the low-risk women are shifted to junior doctors and staff nurses. Much resources, as well as medical efforts, are being utilized for preventing complications among the high-risk group. However, on the other side, complications continue to prevail in low-risk women. [3] Low risk pregnancies are often underestimated and can land up with unexpected complications with resultant maternal and foetal morbidity [4] Some studies show that 29% of low risk had complications required non routine obstetric or neonatal care. The most common complications in the low-risk group were caesarean section (15%), meconium staining (5%), and vacuum delivery. This nontrivial risk for unexpected or adverse outcomes in a low-risk patient can unexpectedly require advanced levels of care.

Previously, most of the studies were focused on searching the relationship between high risk pregnancy and outcome. Since last 5 years, researchers started to pay attention to 'low risk pregnancy' [5] There is a lack of data on pregnancy outcome, morbidity among low-risk women in low income countries. Our study aims to assess intrapartum foetal and maternal complications in low-risk pregnancy and to study the foeto-maternal outcome in low-risk pregnancies.

MATERIALS AND METHODS:

This prospective observational study was conducted at Government Medical College, Aurangabad from October 2020- October 2022. Patients were categorized as low risk or high risk pregnancy- at least 1 prenatal risk factor, according to 19 demographic, medical and pregnancy characteristics.) The individuals with unexpected intrapartum and postpartum outcomes from the low risk were the study

population. The study was approved by the ethics committee of our hospital. All women admitted to the labour room fulfilling the inclusion criteria and giving consent were included in the study. A sample of 1700 low risk women were selected. 200 women developed obstetrical complications. Age, residence, BMI, booked status, socioeconomic status, parity, education, period of gestation, mode of delivery, sentinel events in the antepartum, intrapartum and postpartum were noted. Indications of LSCS, ICU, Ventilatory support and causes of maternal deaths were noted.

Neonatal outcomes were noted in terms of liveborn/stillborn, APGAR score, birth weight, NICU admissions and neonatal complications and neonatal death.

Inclusion Criteria:

- I. Singleton Pregnancy
- II. Uncomplicated Obstetric History
 - a. No Still Birth
 - b. No Neonatal Death
 - c. Consecutive Miscarriages
 - d. Foetal Death
 - e. Recurrent preterm births
 - f. Isoimmunization
- III. Gestational Age ≥ 37 wks but < 42 weeks
- IV. Babies Weighing Between 2000-3500g.
- V. No Current Pregnancy Complications such as
 - a. Anaemia
 - b. Hypertensive disorders of pregnancy
 - c. Need of blood transfusion
 - d. Placenta previa any other placental abnormalities
 - e. Gestational Diabetes mellitus
- VI. No precluding medical conditions
 - a. no cardiac disease
 - b. Hypertension
 - c. Diabetes Mellitus
 - d. Epilepsy
 - e. Asthma
 - f. Substance abuse
 - g. Significant psychiatric ailment
- VII. BMI 18.6- 29.9
- VIII. No prior caesarean
- IX. Maternal age 20-35yrs
- X. Women willing to participate in the study.

Exclusion Criteria

1. Primigravida and grand multipara.
2. Previous or elective caesarean section.
3. Chronic renal disease or other chronic debilitating disease.
4. Essential hypertension, Diabetes Mellites or Gestational Diabetes Mellites.
5. Maternal heart disease.
6. Polyhydramnios or intrauterine growth retardation confirmed by USG.
7. Current preeclampsia or eclampsia.
8. Vaginal bleeding after 20 weeks gestation.
9. Multiple gestational.
10. Non vertex presentation.
11. Rh isoimmunization.
12. Infant deaths caused by congenital anomalies.
13. Patients not willing to participate in the study.

ADVERSE medical outcomes and additional medical resources beyond routine care included: eclampsia, chorioamnionitis, meconium staining, vacuum delivery, caesarean section, maternal transfusions unplanned hysterectomy, other unplanned operations (e.g., cervicovaginal exploration) admission to ICU; foetal adverse outcomes like 5 min APGAR.

The frequencies of unexpected outcomes in low-risk pregnancies are calculated. SPSS, version 20.0 was used to record and analyse the data. Descriptive analyses used were the mean, standard deviation, and frequency distribution.

RESULTS:

In the present study 1700 women were studied. 200 cases with sentinel events either in the mother or the neonate were seen, and 1500 cases were low risk mothers who developed no complications and had an uneventful intrapartum and post-partum phase.

In the study period a total of 38,032 deliveries took place in the hospital out of which about 18.1 % of them were high risk mothers and 81.9% were low risk mothers. Around 13.9%(4,335) of the low risk mothers had either maternal or foetal complications/ sentinel events. 86.1% of the low risk women were free of any complications. 26,852 (86.1%) mothers delivered uneventfully and had a positive pregnancy outcome. The low-risk mothers who had maternal or foetal complications were 11.3% Of all deliveries.

Table I: Showing demographic features of low-risk women with sentinel events.

Demographic feature	Range	No N=200	Parity			
			P1	P2	P3	P4
Age	20-25 y	112(61.6)	54	43	13	3
	26-30y	66(27.6)	32	25	8	1
	31-35y	22(10.8)	10	8	2	1
BMI	18.5-24.9	146 (73)	70	55	17	4
	25-29.9	54 (27)	26	21	6	1
Socio-Economic class	Lower class	13(6.5)	6	5	2	0
	Upper lower class	83(41.5)	40	32	10	1
	Lower middle class	91(45.5)	44	35	9	3
	Upper middle class	11(5.5)	5	3	2	1
	Upper class	2(1)	1	1	0	0

112(56%) belonged to the age group 20-25 years, 91(45.5%) in the lower middle class, and majority had a normal BMI, (1 previous delivery) P1 were 96 (48%).

Table II :Showing distribution of women with sentinel events according to period of gestation

Sr. no	Period of gestation at onset of sentinel event	N=200 Sentinel events	% Percentage
1.	37-39	43	28.67
2.	39.1-40	46	30.67
3.	40.1-41	52	34.67
4.	PNC	9	6
		200	100
Mean period of gestation		39.17 ±1.03	

52 (34.67%) of the low-risk women with sentinel events were post term, 40.1-41 week.

Table III: Showing mode of delivery.

Sr. No	Mode Of Delivery	N= 200	100%
1.	Spontaneous Vaginal Delivery	134	67
2.	LSCS	59	29.5
3.	Instrumental Delivery	7	3.5
	Total	200	100

Women with sentinel events 134 (67%) of them delivered vaginally. 59 women (29.5%) underwent LSCS. 7 women (3.5%) needed Instrumental delivery.

Table IV: Showing Indications for LSCS

Sr.No	Indication Of LSCS	N=58	%
1	Foetal Distress	28	48.27
2	Failure to progress	6	10.3
3	Failure of induction	4	6.89
4	Malposition- DTA, Face, compound presentation	6	10.3
5	Second stage arrest	2	3.44
6	Unforeseen CPD	2	3.44
7	Abruptio placentae	4	6.89
8	Cord prolapse	2	3.44

The most common indication for LSCS among the low-risk women with sentinel events was foetal distress, 28 (48.27%). DTA was seen in 3 cases, face presentation in 2 cases and compound presentation in 1 case.

Table V: Showing sentinel events in antepartum, intrapartum, and postpartum period in mother.

Sr. No	SENTINEL EVENTS IN MOTHER	(N=170)	Percent (%)
ANTEPARTUM EVENTS			
1.	Abruptio placenta	11	6.47
2.	Acute fatty liver	1	0.58
3.	Blood transfusion	28	16.48
4.	Cord prolapse	2	1.17
5.	DIC	3	1.76
6.	Deep transverse arrest	3	1.76
7.	EROM	29	17.05
8.	Meconium	19	11.17
9.	Prolonged labour	2	1.17
INTRAPARTUM EVENTS			
10	PPH	23	13.52
10a	Atonic PPH	12	4.67
10b	Traumatic PPH	9	5.29
10c	Mixed PPH	2	1.17
11	2nd Or 3rd Degree PERINEAL-TEAR	10	5.88
12	Lacerations	7	4.11
13	LSCS	53	31.12
14	Forceps	2	1.17
15	Vacuum	5	2.94
16	Obstetric hysterectomy	3	1.33
17	Manual removal of placenta	2	1.17
18	Shoulder dystocia	1	0.58
POST PARTUM EVENTS			
19	Peripartum cardiomyopathy	1	0.58
20	Prolonged hospital stay	9	5.29
21	Acute kidney injury	2	1.17
22	Episiotomy wound gape	2	1.17
23	Convulsion in non HDP	4	2.35
24	ARDS	1	0.58
25	Sepsis	14	8.23
26	ICU admission	6	3.52
27	Obstetric hysterectomy	3	1.33
28	Pulmonary embolism	1	0.67
29	Ventilatory support	4	2.67
30	Death	2	0.67

The most common adverse event was LSCS seen in 53 women (31.12%). The next most common event was PROM (premature rupture of membranes in 29 (17.05%). 28 women (16.48%) required blood transfusion, some requiring massive transfusion. There were 23 (13.52%) cases of post-partum haemorrhage seen. There were 2 maternal mortalities in the study population who developed complications,

1. Irreversible haemorrhagic shock with mixed PPH (atonic +DIC)

- with abruptio placentae in PNC day 1.
2. Endotoxic shock due to peritonitis with septicaemia with septicaemic shock with sepsis with bilateral pneumonitis in PNC day 8

Table VI: showing APGAR score of babies.

Sr no	APGAR Score	N=200	NICU Admission	Baby weight at birth		
				2-2.5 kg	2.6- 3 kg	>3 kg
1	0 (still birth)	9 (4.5)	-	4	3	2
2	1-3	7(3.67)	7(13.20)	2	3	2
3	4-6	33(17.27)	33(63.22)	8	15	10
4	7-10	151(79.05)	13(24.52)	34	67	50
	Total	200	53(100)	48(24)	88(44)	64(32)

There were 9 stillborn babies. 191 were liveborn. 53 babies needed NICU admission, Mean birth weight -2.848±4.56..

Table VII: showing Neonatal sentinel events.

Sr no	Neonatal complication	N=53	%
1	Hypothermia	2	3.7
2	HIE	19	35.58
3	Jaundice	7	13.2
4	Sepsis	4	7.54
5	ARDS	17	32.07
6	Hypoglycaemia	6	11.32
7	Birth injury	2	3.78
8	IVH	2	3.78
9	Shock	4	7.54
10	Death	4	7.54

19 (35.58%) babies had perinatal asphyxia and 17 (32.07%) babies had ARDS. There were 4 neonatal deaths.

DISCUSSION:

This study shows maternal morbidity and neonatal mortality risk for low-risk term women in labour. Our study shows that 13.9% of those identified as low risk developed complications and required some intervention and non-routine obstetric or neonatal care. There are certain unforeseen events in low risk women . Out of 200 women 170 women and 53 neonates developed sentinel events in our study, Table 1 shows the sociodemographic factors in the low-risk women with adverse pregnancy outcome. The mean maternal age was 28.08 ± 5.68 years. Most patients 112(56%) were within the age group of 20-25 years. Para 1 were 96 (48%), and 76 (38%) were para 2. Overgaard et al reported that adverse maternal and foetal outcomes among P1 and P2 accounted for 74.4.% [6]

Table II Our study shows that majority of the low risk women delivered between the gestational age of 40-41 weeks . The incidence of sentinel events was least in the puerperium. Zwart JJ et al agrees to our findings [7].

Table III , IV: Women with sentinel events 134 (67%) of them delivered vaginally. 59 women (29.5%) underwent LSCS. 7 women (3.5%) needed Instrumental delivery. The indications for instrumental delivery were: foetal distress(4 cases),maternal exhaustion (2 cases)and prolonged second stage (1 case). The higher rate of interventional delivery was seen among mothers who were primipara .Same findings were seen in the study done by Danilack et al who had 64% vaginal delivery, 32.6% LSCS rate, 3.4 % instrumental delivery rate [8] Alsammani et al study shows the rate of vaginal delivery 79%, LSCS rate of 16%, and forceps delivery rate of 5% [9]. Overgaard et al and Evers CC share the same findings.[10] In another study from Netherlands, it was observed that women at low risk who deliver in secondary level care are more liable to get obstetric intervention in the form of caesarean sections, and instrumental delivery as compared to those who are delivered in primary care [11].

The present study shows that the most common indications for LSCS were Foetal distress (48.27%), failure to progress (10.3%), and failure of induction of labour. Hoque et al., study shows that majority of the LSCS were indicated by foetal distress (22.34%) and failure to progress (17.83%) and CPD (10.83%) [12]. A significant number of unforeseen complications happened in the low-risk group as seen by Ravelli ACJ, et al [13].

Table V: As regards maternal complications, the adverse outcomes were PPH (13.52 %), Blood transfusion (16.48%), PROM (17.05%),

while perineal tear, caesarean hysterectomy, and ICU admission were also seen. Blood transfusion was given in cases of PPH, Sepsis and abruptio placenta. 6 women needed ICU admission and 4 needed ventilatory support for septic shock, pulmonary embolism, and obstetric hysterectomy. There were 2 maternal deaths in our study. Rare complications such as peripartum Cardiomyopathy, ARDS, Pulmonary embolism, Acute kidney injury (sudden hypoperfusion in case of massive bleeding), acute fatty liver of pregnancy, shoulder dystocia were also seen. Evers CC et al also had similar findings [14]. They reported that out of all births, 29% low-risk pregnancies ended up in complications that needed extra care. Low-risk births that will not require increased obstetrical or newborn intervention are difficult to identify. Our study states that history of a low-risk pregnancy does not ensure a low-risk delivery .

Table VI, VII, : Our study reveals notable risks of complications requiring increased clinical resources among low-risk pregnancies. The observed foetal complications in our study were birth asphyxia (3.17%), low birth weight (24%), admission to the NICU (27.74 %), and fresh stillborn babies (4.5%). Our study findings match with the study of Eskes M et al [15] .They concluded that although low-risk women can still have unforeseen fetomaternal morbidity.

35.58% neonates presented with HIE and 32.08% had ARDS. 7 neonates needed ventilatory support. 3 neonatal deaths took within 5 days of admission. Hyperbilirubinemia, sepsis, birth trauma (brachial plexus injury) and IVH were other neonatal morbidities in our study. Grunebaum A et al reported that it's now needed to concentrate on low-risk pregnancies and develop appropriate plans to reduce the maternal and foetal morbidity in this group as well. [16,17]. De Jonge A revealed that the most common primary obstetric causes of neonatal death were PROM, intrapartum asphyxia, and antepartum haemorrhage [18].

In our study, the commonest adverse outcome seen is low birth weight (LBW). Ashraf et al. reported that neonate from low-risk pregnant women who have inadequate antenatal care tends to get LBW (p = 0.05) and higher NICU admission (p = 0.02) [19] This was also supported by a big data study where it was reported that LBW is the commonest adverse neonatal outcome in low-risk pregnancy (Adams et al).[20]. There was multifactorial maternal cause identified to associated with LBW such as low socioeconomic status, a young maternal age, underweight mother, anaemia, placental pathology and primigravida as well [Khan et al., 2016]

CONCLUSION:

Although perceived as low risk during pregnancy, a continuous awareness of having adverse event should be present. Transitions between low-risk and high-risk can be swift, and sentinel events can occur without warning. The prevention of emergencies in this environment rests on the vigilance of the individual practitioner at the frontline. It is, therefore, important that the individual practitioner should develop and maintain the cognitive skills to anticipate, recognize, and intercept the sentinel events.

REFERENCES:

1. Michael Boah 1, Abraham B Mahama 2, Emmanuel A Ayamga They receive antenatal care in health facilities, yet do not deliver there: predictors of health facility delivery by women in rural Ghana 2018 May 3;18(1):125. doi: 10.1186/s12884-018-1749-6.BMC CVZ. Verlooskundig vademecum 2003. [Obstetrical manual 2003] available online at https://www.nhg.org/sites/default/files/content/nhg_or/uploads/standaard/download/verlooskundig_vademecum_2003.pdf
2. Perinatal Audit Netherlands. Perinatale audit van a terme sterfte in 2013 & 2014. Utrecht: Stichting Perined. Available online at <https://www.perined.nl/producten/publicaties/perinatale-audit-jaarrapportages>
3. Cheyney M, Bovbjerg M, Everson C, Gordon W, Hannibal D, Vedam S. Outcomes of care for 16,924 planned home births in the United States: the Midwives Alliance of North America Statistics Project, 2004 to 2009. J Midwifery Womens Health. 2014; 59(1): 17-27.
4. Bolten N, de Jonge A, Zwagerman E, Zwagerman P, Klomp T, Zwart JJ, Geerts CC. Effect of planned place of birth on obstetric interventions and maternal outcomes among low-risk women: a cohort study in the Netherlands. BMC Pregnancy Childbirth. 2016 Oct 28;16(1):329. doi: 10.1186/s12884-016-1130-6. PMID: 27793112; PMCID: PMC5084314.
5. Overgaard C, Møller AM, Fenger-Gron M, Knudsen LB, Sandall J. Freestanding midwifery unit versus obstetric unit: a matched cohort study of outcomes in low-risk women. BMJ Open. 2011 Jan 1;1(2):e000262. doi: 10.1136/bmjopen-2011-000262. PMID: 22021892; PMCID: PMC3191606
6. Zwart JJ, Richters JM, Ory F, De Vries JI, Bloemenkamp KW, Van Roosmalen J. Severe maternal morbidity during pregnancy, delivery and puerperium in the Netherlands: a nationwide population-based study of 371,000 pregnancies. BJOG. 2008; 115: 842-850. 10.1111/j.1471-0528.2008.01713.x
7. Danilack VA, Nunes AP, Phipps MG. Unexpected complications of low-risk pregnancies in the United States. Am J Obstet Gynecol. 2015 Jun;212(6):809.e1-6. doi: 10.1016/j.ajog.2015.03.038. PMID: 26042957; PMCID: PMC4728153
8. Alsammani MA, Nasralla K, Khieri SA, Saadia Z, Shaaleldin MA, Ali AO. Intrapartum Fetal and Maternal Complications in Low-Risk Pregnancy: Experience of a Tertiary

- Hospital in Low-Income Countries. Open Access Maced J Med Sci. 2019 Jun 30;7(12):1979-1983.
10. Evers ACC, Brouwers HAA, Hukkelhoven C, et al. Perinatal mortality and severe morbidity in low and high risk term pregnancies in the Netherlands: prospective cohort study. *BMJ*. 2010; 341: e5639
 11. Wiegerinck M, van der Goes BY, Ravelli A, et al. Intrapartum and neonatal mortality in primary midwife-led and secondary obstetrician-led care in the Amsterdam region of the Netherlands: A retrospective cohort study. *Midwifery*. 2015; 31(12): 1168- 1176.
 12. Hoque M. Incidence of Obstetric and Foetal Complications during Labor and Delivery at a Community Health Centre, Midwives Obstetric Unit of Durban, South Africa. *ISRN Obstet Gynecol*. 2011;2011:259308. doi: 10.5402/2011/259308. Epub 2011 Jul 31. PMID: 21822497; PMCID: PMC3147131
 13. Wiegerinck MMJ, van der Goes BY, Ravelli ACJ, et al. Intrapartum and neonatal mortality among low-risk women in midwife-led versus obstetrician-led care in the Amsterdam region of the Netherlands: a propensity score matched study. *BMJ Open*. 2018; 8(1):e018845.
 14. Evers ACC, Bruinse HW, Kwee A, et al. Reply: Intrapartum and neonatal mortality in primary midwife-led and secondary obstetrician-led care in the Amsterdam region of the Netherlands: a retrospective cohort study. *Midwifery*. 2016; 34:264-265.
 15. Eskes M, Waelput AJM, Erwich JJHM, et al. Term perinatal mortality audit in the Netherlands 2010–2012: a population-based cohort study. *BMJ Open*. 2014; 4(10):e005652.
 16. Grunebaum A, McCullough LB, Sapra KJ, et al. Early and total neonatal mortality in relation to birth setting in the United States, 2006–2009. *Am J Obstet Gynecol*. 2014; 211(4): 390:e1-7
 17. Grunebaum A, McCullough LB, Brent RL, Arabin B, Levene MI, Chervenak FA. Justified skepticism about Apgar scoring in out-of-hospital birth settings. *J Perinat Med*. 2015; 43(4): 455-460.
 18. De Jonge A, Peters L, Geerts CC, et al. Mode of birth and medical interventions among women at low risk of complications: a cross-national comparison of birth settings in England and the Netherlands. *PLoS ONE*. 2017; 12(7):e0180846.
 19. Ashraf-Ganjoei, T., Mirzaei, F., & Anari-Dokht, F. (2011). Relationship between prenatal care and the outcome of pregnancy in low-risk pregnancies. *Open Journal of Obstetrics and Gynecology*, 1(3), 109–112
 20. Adams N, Tudehope D, Gibbons KS, Flenady V. Perinatal mortality disparities between public care and private obstetrician-led care: a propensity score analysis. *BJOG*. 2018; 125(2): 149- 158
 21. Khan, A., Nasrullah, F. D., & Jaleel, R. (2016). Frequency and risk factors of low birth weight in term pregnancy. *Pakistan Journal of Medical Sciences*, 32(1), 138–142.