

# Intrapartum Fetal and Maternal Complications in Low-Risk Pregnancy: Experience of a Tertiary Hospital in Low-Income Countries

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## Abstract

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**AIM:** To determine the frequencies of intrapartum fetal and maternal complications in women without the identified prenatal risk factor

**METHODS:** We conducted a prospective cross-sectional investigation from January to June 2017 at Khartoum North Maternity Hospital in women categorised pregnancies as low risk (no prenatal risk factors). We evaluated adverse intrapartum fetal and maternal outcomes.

**RESULTS:** Among 600 pregnancies, of these, 12.5% (n = 75) developed fetal or / and maternal complications. The Frequency of primary cesarean delivery, forceps, and ventouse among low-risk pregnancies in this study were 16%, 3%, and 2% respectively. Other adverse pregnancy outcomes were PPH (5%), Blood transfusion (4.5%), admission to ICU (1.8%), while perineal tear, cesarean hysterectomy, and re-laparotomy have equal weight (0.3%). Among all births, the most common adverse fetal outcomes were birth asphyxia (3.8%), low birth weight (2%), admission to the neonatal intensive care unit (1.8%), and fresh stillborn babies (1.3%).

**CONCLUSION:** Of all low-risk pregnancies, 12.5% were reported to have serious obstetrics and neonatal complications. This information is essential for evaluating resources in delivery centres and hospitals and to provide equipment and further training of medical personnel to provide optimal quality care and patient safety.

## Introduction

Pregnancy is considered as a High-risk pregnancy if it is associated with any risk factors about the pregnancy to the mother or the baby. On the other hand, low-risk pregnancy is associated with no identified risk factor for either the mother or in the baby. There is a wide debate in recent years about the benefits and risks of birth in different obstetrics settings [1], [2]. Low-risk mothers are allowed to choose the place of birth freely. In England, births outside an obstetric care unit are relatively uncommon. During 2007, reports have shown that 8% of women in England had delivered the obstetric unit [3]. In one study examining 10,458,616 pregnancies, showed that 29% of low risk had complications that

required nonroutine obstetric or neonatal care [4]. The former study reported that the most common complications in the low-risk group were cesarean delivery, meconium staining, and vacuum delivery, 15%, 5%, and 4% respectively [4].

Prior studies on obstetrical risk level and medical outcomes often focused on actual or planned birth location. Furthermore, prior studies assessing the obstetrical risk of the actual or planned birth location showed that home and centres births compared to the obstetrical resource, have decreased in maternal complications such as operative vaginal delivery, cesarean delivery, episiotomy, and epidural use [5], [6]. In another study of 2831 women comparing private and national health system, the obstetric provider reported a rate of cesarean delivery

6.7% and 7.6%, respectively [7]. In the study by de Jonge A [8] and his colleagues identified that for Low-risk women labouring in primary care with planned home birth showed lower rates of manual removal of placenta and postpartum bleeding compared to planned hospital birth [8].

In Sudan, during the antenatal care low-risk mothers are offered to choose the place of birth, and the delivery is usually attended by a midwife or a traditional birth attendant. Before 1920, the home was the main place of birth 0; however, after 1940; the hospital is considered the safest place of delivery [9]. In Sudan, documentation and data on home delivery are scant and insufficient to be analysed. There is a lack of data on pregnancy outcome among low-risk women in low-income countries, and almost all available data were from developed countries. The present study aimed to assess Intrapartum fetal and maternal complications in low-risk pregnancy in a low-income country.

## Material and Methods

This is a perspective cross-sectional study conducted at Khartoum North Maternity Hospital (KNMH) in the period from January to June 2017. KNMH is a referral maternity hospital for women who live in the northern part of the capital as well as for women who live near the hospital. The study was approved by the ethics committee of the Sudanese specialisation board.

### Study sample

The study sample was collected from women who were admitted in labour at Khartoum North Maternity Hospital in the period from January to June 2017. All women admitted the labour and delivery suite and who were willing to participate and fulfilled the inclusion criteria were included in the study.

### Sample size

A sample of 600 low-risk women was selected to calculate the proportion of women with low risk for obstetrical complications within 3 percentage points of the true proportion, assuming the true proportion was 80% and that 10% of women would not respond.

### Inclusion criteria

The primary outcome was maternal and neonatal mortality and morbidities. Women were classified as low-risk pregnancies if they were not known to have any of the medical or obstetric risk

factors as defined by An Update on Research Issues in the Assessment of Birth Settings: Workshop Summary [10]. The Update on Research Issues in the Assessment of Birth Settings used these inclusion criteria: “singleton, uncomplicated obstetric history (no stillbirth, neonatal death, consecutive miscarriages, fetal death, preterm birth < 32 weeks, isoimmunization, gestational diabetes), no current pregnancy complications (e.g., fetal anomaly), no precluding medical conditions (no cardiac disease, hypertension, diabetes, epilepsy, severe asthma, substance use, significant psychiatric disorder, BMI > 35 or < 17), and no prior Cesarean”. Both primigravida and grandmultiparous women have been excluded from the study as they have special obstetrics complications, and the study was limited to parity 1 to parity 4.

Socio-demographic characteristics were gathered through structured questionnaires. Maternal characteristics, including maternal age, residence, education, and occupation, were gathered from each participant.

Adverse complications included were medical conditions that arise during pregnancy such as diabetes, hypertension disorders of pregnancy and complications during labour and delivery, including mode of delivery (ventose, forceps or cesarean delivery). Other complications reported such as a tear, transfusion, PPH, hysterectomy.

Fetal complications that were reported included admission to neonatal intensive care unit, birthweight < 2500 g, 5-minute Apgar score 0-3, and early fetal loss.

### Statistics analysis

SPSS, version 20.0 was used to record and analyse the data. Descriptive analyses used were the mean, standard deviation, and frequency distribution.

## Results

There were 600 deliveries with live, singleton, cephalic, with term fetuses (9.1% delivered at 37 completed weeks of gestation, 17.6% delivered at 38 weeks, 31.03% delivered at 39 weeks, 31.7% delivered at 40 weeks, and 10.57% delivered at 41 weeks) enrolled in the present study. Of these, 12.5% (n = 75) developed fetomaternal complications. The maternal socio-demographic characteristics are shown in Table 1. The mean maternal age and gestational ages were 28.08 ± 5.681 years and 39.0543 ± .89642 weeks, respectively. The majority of patients 108 (48.4%) were within the age group of 20-25 years. The majority of the studied population were

living in the urban area (67.2%), completed their secondary school (41.5%) and housewives (79.8%).

**Table 1: Basic demographic and obstetrics characteristics**

Variable	Frequency (%)	Parity			
		Para 1 (n = 223)	Para2 (n = 117)	Para3 (n = 196)	Para4 (n = 64)
<b>Age</b>					
< 19	18 (3)	18 (8.1)	0 (0.0)	0 (0.0)	0 (0.0)
20- 25	108 (18)	108 (48.4)	0 (0.0)	0 (0.0)	0 (0.0)
26-30	241 (40.2)	97 (43.5)	117 (100.0)	27 (13.8)	0 (0.0)
31-35	184 (30.7)	0 (0.0)	0 (0.0)	169 (86.2)	15 (23.4)
36-40	49 (8.2)	0 (0.0)	0 (0.0)	0 (0.0)	49 (76.6)
<b>Residence</b>					
Urban	403 (67.2)	223 (55.3)	117 (100)	63 (32.1)	0 (0.0)
Rural	197 (32.8)	0 (0)	0 (0.0)	133 (67.9)	64 (32.5)
<b>Education</b>					
Illiterate	48 (8)	48 (100)	0 (0)	0 (0)	0 (0)
Primary	198 (33)	175 (88.4)	23 (11.6)	0 (0)	0 (0)
Secondary	249 (41.5)	0 (0)	94 (37.8)	155 (62.2)	0 (0)
University and above	105 (17.5)	0 (0)	0 (0)	41 (39)	64 (61)
<b>Occupation</b>					
House wife	479 (79.8)	223 (46.6)	117 (24.4)	139 (29.0)	0 (0)
Worker	73 (12.2)	0 (0.0)	0 (0.0)	57 (78.1)	16 (21.9)

Data presents as number (%).

Table 2 shows the frequencies of intrapartum maternal complications. The Frequency of primary cesarean delivery, forceps, and ventouse among low-risk pregnancies in this study were 16%, 3%, and 2% respectively. The higher rate of interventional delivery was seen among mothers who had 4 previous deliveries while no complications were seen among women with lower parities. Other adverse pregnancy outcomes were PPH (5%), Blood transfusion (4.5%), admission to ICU (1.8%), while perineal tear, cesarean hysterectomy, and re-laparotomy have equal weight (0.3%).

**Table 2: Intrapartum maternal complications**

Variables	Overall complications (%)	Complications % within parity			
		Para 1	Para 2	Para 3	Para 4
Cs	96 (16)	0 (0)	0 (0)	62 (64.6)	35 (35.4)
Forceps delivery	18 (3)	0 (0)	0 (0)	0 (0)	18 (100)
Ventouse delivery	12 (2)	0 (0)	0 (0)	0 (0)	12 (100)
Perineal tear	2 (0.33)	2 (100)	0 (0)	0 (0)	0 (0)
Hysterectomy	2 (0.33)	2 (100)	0 (0)	0 (0)	0 (0)
Relaparotomy	2 (0.33)	2 (100)	0 (0)	0 (0)	0 (0)
Postpartum hemorrhage	30 (5)	30 (100)	0 (0)	0 (0)	0 (0)
Blood transfusion	27 (4.5)	27 (100)	0 (0)	0 (0)	0 (0)
Intensive care unit	11 (1.8)	11 (100)	0 (0)	0 (0)	0 (0)

Data presents as number (%).

Among all births, the most common adverse fetal outcomes were birth asphyxia (3.8%), low birth weight (2%), admission to the neonatal intensive care unit (1.8%), and fresh stillborn babies (1.3%) Table 3.

**Table 3: Intrapartum neonatal complications**

Fetal complications	Overall complications (%)	Complications % within parity			
		Para 1	Para 2	Para 3	Para 4
1-minute apgar score) < 7	23 (3.8)	0 (0)	0 (0)	0 (0)	23 (35.9)
5-minute apgar score) < 7	13 (2.2)	0 (0)	0 (0)	0 (0)	13 (20.3)
Fresh stillborn	8 (1.3)	0 (0)	0 (0)	0 (0)	8 (12.5)
Neonatal intensive care unit	11 (1.8)	0 (0)	0 (0)	0 (0)	11 (??)
Birth weight < 2500 g	12 (2)	12 (100)	0 (0)	0 (0)	0 (0)

Data presents as number (%).

## Discussion

Low-risk pregnancy is the one in which no identifiable risk factor is discovered through antenatal care. Our antenatal, intranatal and postnatal care is much more focused on the high-risk pregnancies. However, the majority of women progress through pregnancy in an uncomplicated manner. Antenatal care continues to screen women with risk factors like age, medical disorders, and bad obstetric history, and then provide more concentrated care to those high-risk women in whom any risk factor is identified. 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 community-led care by midwives. Much resources, as well as medical efforts, are being utilised for preventing complications among the high-risk group, and these are fruitful as well in reducing the fetomaternal morbidity. However, on the other side, complications continue to prevail in low-risk women.

We noticed a high frequency of primary cesarean section, forceps and ventouse delivery (16%, 3%, and 2% respectively) among low-risk pregnancies (Table 2). This is by the results of Haerskjold who raised concerns over a high rate (8.7%) for the emergency cesarean section in a cohort of 2,748 low-risk pregnancies [11]. The authors analysed that failed progress was the foremost indication for a cesarean section; next was the fetal distress. The study only included women in their first pregnancy. On the other hand, we included women with P1-P4. We found a high rate of cesarean section in P3 and P4 women 64.6% and 35.4% respectively. Our study findings revealed that the need of intervention was highest amongst the P3 and P4 groups, which is mostly the group considered to be low risk as firstly these women had previously experienced pregnancy and labour events and secondly, they are mostly in an age group which is considered to be a low risk (Table 1). Strangely, our study did not find a high rate of intervention in Primigravidas although we think that first pregnancy should be a high-risk pregnancy, and no one can predict how the labour events are going to progress. This aspect needs to be studied further in future. We think that both first times intending mothers and caregivers are more concerned about the first pregnancy as compared to the P3 or P4 therefore, give more attention and time and keep the threshold for intervention very high. Roman et al., conducted a study including all metropolitan units from France and they observed that the rate of elective CS was 2.9% and CS in labour was 4.3% in 5393 women, fitting into the criteria of low-risk pregnancies. Maternal age above 30 and BMI above 25 kg/m<sup>2</sup>, as well as maternity units with a delivery rate below 100/year, were associated with high CS rate in labour [12].

In our study group, 3% of women had forceps delivery, and 2% underwent ventouse delivery. All of these were having parity of 4. In a study conducted by Selvi et al., in 40 patients where 250 were low-risk women, it was observed that in 37 % low-risk women obstetrician was called as compared to 29% of the high-risk group. The need for intervention was 21% vs 12 % respectively for low and high-risk groups. They concluded that even if the pregnancy is a low risk from the beginning, the need for intervention may be there at any time during labour, and it's unpredictable [13]. In another study from Netherland, 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 cesarean sections, and instrumental delivery as compare to those who are delivered in primary care 8% vs 9% [14]. Published literature favours as well as refute the use of epidural analgesia as one of the major factors increasing the rate of interventional delivery amongst low-risk women [15], [16].

As regards maternal complications, other adverse outcomes were PPH (5%), Blood transfusion (4.5%), admission to ICU (1.8%), while perineal tear, cesarean hysterectomy, and re-laparotomy have equal weight (0.3%). All of these complications were noticed in primigravidas.

Danilack Valery A et al. analysed US Natality data, including 10 million births from 2011-2013. The authors found 38% pregnancies as low risk and 62% as high risk. Out of all birth, 29% low-risk pregnancies ended up in complications that needed extra care. They reported a 15% incidence of CS, 5.5% meconium staining and 4% vacuum delivery. The risk of complication was 27.8% vs 57.35 between low risk and high-risk groups. Therefore, although it was lower, as compared to the high-risk group still, a significant number of unforeseen complications happened in the low-risk group. Forcep0.8vs 0.5 vacuum (3.7 vs 2.3%) delivery, meconium staining (5.5 vs 4.8) and chorioamnionitis (1.4 vs 1.2%) was found to be higher in low-risk women as compared to high-risk women [17].

The observed fetal complications in our study were birth asphyxia (3.8%), low birth weight (2%), admission to the neonatal intensive care unit (1.8%), and fresh stillborn babies (1.3%). All were observed in women with parity of 4 except low birth weight, which was seen amongst primigravidas more as compared to women of higher parity. The low-risk women are often delivered at home care setting, and meta-analysis reveals that home births vs hospital birth have fewer chances of maternal intervention, but it triples the neonatal mortality rate [18]. Home birth also increases the risk of low 5-minute Apgar score and neurological damage [19]. However, some studies report no increased risk of perinatal mortality and morbidity in women delivered at midwifery units rather than obstetric units [20].

We conclude that although low-risk women in

whom antenatal care fails to detect any risk to the mother or fetus posed by pregnancy still have a high risk for unforeseen feto-maternal morbidity. Regarding our previous experience of success in reducing the materno-fetal morbidity and mortality in high-risk women by improved obstetric care, it's now needed to concentrate on low-risk pregnancies and develop appropriate plans to reduce the maternal and fetal morbidity in this group as well.

**Limitations:** We did not analyse the indications for modes of delivery and needs for intervention. This needs to be studied in details in our low-risk population.

**Strength:** It is a prospective study, and included a reasonable of cases. Our study found the need of intervention highest amongst the P3 and P4 which is mostly the group considered to be low risk as the women had previously experienced pregnancy and labour events and mostly except few are in an age group considered to be low risk.

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