DETERMINANTS OF IMMEDIATE ADVERSE PREGNANCY OUTCOMES: A HOSPITAL-BASED STUDY

Jaya Koirala,[1] Sudha A Raddi,[2] Anita Dadi Dalal[3]

[1]KLE Academy of Higher Education and Research (KAHER), [2]OBG Nursing, KLE Institute of Nursing Sciences, KAHER,
[3]Department of Gynaecology, J. N. Medical College, KLE, Dr.Prabhakar Kore Charitable Hospital, Belagavi, Karnataka, India

ABSTRACT

Adverse pregnancy outcomes are a major public health problem which can lead to serious short and long- term health effect to the mother and the newborn. Hence, the objective of this study is to find out the determinants of immediate adverse pregnancy outcomes in tertiary care hospital in South India. The study comprised of antenatal mothers admitted for delivery in selected tertiary care hospital in Belgaum, Karnataka, India from 10th November, 2021 to 20th January 2022. All registered deliveries in the study period have been included, comprises of 101. Bivariate logistic regression was used to determine the factors associated with outcome variables. A significance level of 5% was used to decide the significance of statistical tests. The mean age in years (± SD) of the mother was 24.6 (± 3.9). The average cost invested for a family health check-up in a year was Rupees 18,099. The average birth weight of the newborn was 2.7 kg, while the minimum weight of the newborn was 1.4 kg, and the maximum weight was 3.8 kg. The average week of gestation for the first-time with respect to antenatal care visit of pregnant women was 9.6 weeks. The average weight of the women was 47.6 kg during first antenatal care visit and 61.5 kg during last antenatal care visit. Adverse outcomes reported were post-partum hemorrhage was 7.9%, low birth weight 26.7%, preterm delivery 28.7%, anemia 53.5%, neonatal physiological and jaundice 15.8%. However, use of mode of transportation during antenatal care visit was found to be significant factor for preterm delivery. Every fourth baby was low birth weight, and every fourth women have preterm delivery and every second woman was anemic. Socioeconomic, demographic and chronic illness was associated with immediate adverse pregnancy outcomes.

KEYWORDS

Antenatal visit, postpartum hemorrhage, low birth weight, preterm delivery, blood transfusion, neonatal jaundice

***Received on**: May 17, 2022*
***Accepted for publication**: July 01, 2022*

CORRESPONDING AUTHOR

Ms. Jaya Koirala
PhD Scholar KAHER,
Institute of Nursing, Belagavi,
Karnataka, India
Email: jayakoirala32@gmail.com
Orcid No: https://orcid.org/0000-0003-0308-3684
DOI: https://doi.org/10.3126/nmcj.v24i3.48599

INTRODUCTION

The adverse pregnancy outcomes include low birth weight (LBW), stillbirth, and preterm birth.[1,2] Worldwide 15 million neonates are born preterm (<37 weeks of gestation) and this trend is increasing. A rate of 5% to 18% of preterm offsprings are born among 184 countries.[3] The most severe adverse outcome of pregnancy is the death of mother or her offspring.[4,5]

Birth or pregnancy-related complications occur every 2 minutes as per UNFPA report 2017.[6] Prematurity and low birth weights are the considerable cause of neonatal morbidity and mortality. This may lead to serious and long-term health effects on the mother and the neonates.[2,7] Socio-demographic and economic factors affect preterm delivery and low biological weight, dependent on maternal health status, maternal health behavior, and provision utilization of health facilities.[8]

Maternal mortality ratio (MMR) in India still remains high as 113 per 1,00,000 live births and Karnataka 92 per 1,00,000 live births.[9] The neonatal mortality rate is not uniform across the country with Kerala and Tamil Nadu having a low neonatal mortality rate (<20 per 1000 live births), Odisha, Madhya Pradesh and Uttar Pradesh with very high neonatal mortality rate (NMR) neonate mortality rate (35 or more per 1000 live births).[10]

Maternal, neonatal and infant mortality are the leading health problem in India, still maternal and neonatal mortality and morbidity, stillbirth has impacted by data gaps, especially regarding coverage and quality care of health institutions. Findings of the study will be useful in identifying the determinants of immediate adverse pregnancy outcomes among the women who are admitted to tertiary care hospital for delivery. This data can be used for health planning, policy-making and implementation. With the high burden of maternal and newborn morbidity and mortality, health care providers and policy makers can think and take required action against complications during pregnancy and labor. Based on the facts and figures, researcher realized that this type of study has rarely been done in India and it is needed to do such study.

MATERIALS AND METHODS

The study was conducted in KLE (Dr. Prabhakar Kore Charitable Hospital, Belagavi, Karnataka) which is one of the tertiary care hospitals located in south India. The hospital has a mainly rural catchment population for tertiary-level care.

A hospital-based cross-sectional study was conducted during 10th November to 20th January 2022. Antenatal mothers admitted for delivery in a tertiary care hospital in Belgaum, Karnataka, India were included (minimum sample size was 101).

Participant and enrolment: The purpose of the study has been already explained to women before the data collection, and written informed consent was taken from every subject. For socio-demographic, socio-economic condition, personal and previous antenatal information, semi-structured interview schedule techniques were used. For the maternal and new-born immediate adverse pregnancy outcome information checklist and patient's case sheet have been used. The total number of samples were 101. Data was collected from 10th November 2021 to 20th January, 2022.

Statistical analysis: The collected data was entered in MS Excel-2016 and exported in SPSS- version 20 for analysis. Data has been checked for consistency and completeness by exploratory data analysis before running the statistical analysis. Univariate and bi-variate were used to see the distribution of the study subjects by outcome variables (Post-Partum Hemorrhage (PPH), low birth weight, Anemia, preterm delivery, neonatal jaundice and Blood Transfusion). Bivariate logistic regressions were used to determine the factors associated with outcome variables. A significant level of 5%, was used to decide the significance of statistical tests.

Ethical considerations: Ethical clearance was obtained from the ethical review committee of KLE Academy of Higher Education and Research (KAHER), to conduct the study. Approval number (Ref. No. KAHER/EC/21-22/015). Further permission obtained from the Medical Director of KLE's Dr. Prabhakar Kore Charitable Hospital, and Medical Research Centre (MRC), department head of gynecology and obstetric ward. Discretion was maintained by making the data collectors aware not to record identifying information found on the persistent case sheet.

Data quality control and management: Data quality was ensured in collection, coding, entry, and analysis. Semi-structured interview schedule and patient case sheet, each case information was checked for its consistency, provision of full information and apposite documents.

RESULTS

The mean age (± SD) of the mother was 24.6 (± 3.9). The minimum scheduled family income in Indian currency was Rs. 9,000 while, maximum scheduled family income was Rs. 2,00,000. The average cost invested for a family health check-up in a year was Rs.18,099. The average size of the family living in a house was 7.3. The average birth weight of the newborn was 2.7 kg, while the minimum weight of the newborn was 1.4 kg, and the maximum weight was 3.8 kg. The average APGAR score of the newborn within one minute was 7.1/10. The average APGAR score of the newborn within 5 minutes was 8.5/10, and the average total hospital stay (day) was 7.9 days (Table 1a).

The average week of gestation for the first-time antenatal care visit of pregnant women was 9.6 weeks. While, the average total number of ANC visit was 7.9 times, whereas maximum total number of antenatal care visits was 15 times. The average gestational age of expecting women was 38 weeks (Table 1b).

The average number for utilization of health facilities was 8 times in a year. The average week of gestation for the first-time antenatal (ANC) visit of pregnant women was 9.6 weeks. The average total number of ANC visit was 7.9 times, whereas maximum total number of antenatal (ANC) visits was 15 times (Table 1b).

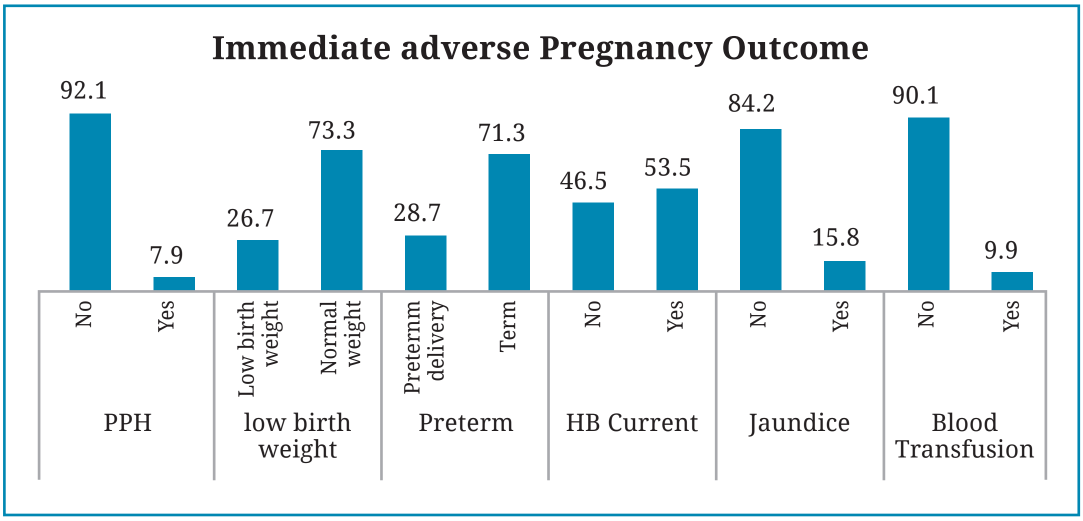

Fig. 1: Immediate adverse pregnancy outcomes' in tertiary care hospital, Karnataka, India. Post-partum hemmorrhage (PPH) 7.9%, low birth weight (LBW) 26.7%,preterm delivery 28.7%, anemia 53.5%, neonatal physiological jaundice 15.8% and blood transfusion (9.9%)

Table 1a: Descriptive statistics by socio-demographic and health variables

	N	**Mean**	**SD**	**Median**	**Min**	**Max**
Age (years)	**101**	**24.6**	**3.9**	**24.0**	**19.0**	**40.0**
Monthly family income (INR)	101	39703.0	33265.8	30000.0	9000.0	200000.0
cost invested for family health check up in a year (INR)	101	18099.0	19241.4	10000.0	2000.0	100000.0
No of family members live in Home	101	7.3	4.1	6.0	2.0	30.0
No of room in house	101	4.0	3.1	4.0	1.0	30.0
Birth weight (kg) -overall	101	2.7	0.6	2.7	1.4	3.8
Singleton birth weight (kg)	97	2.8	0.5	2.7	1.4	3.8
First twins birth weight (kg)	4	1.9	0.2	1.9	1.7	2.0
Weight of the second baby	4	1.9	0.1	1.9	1.8	2.0
APGAR score within 1 min	101	7.1	1.2	7.0	0.0	8.0
APGAR score within 5 min (/10)	101	8.5	1.0	9.0	0.0	9.0
Duration of hospital stay (day)	101	7.9	4.7	7.0	3.0	20.0

Table 1b: Descriptive statistics by health variables

Variables	N	Mean	SD	Median	Min	Max
Family use health facilities (in times) in a year	101	8.1	4.0	8.0	2.0	25.0
Gestational weeks of pregnancy during first ANC visit	101	9.6	4.2	8.0	4.0	24.0
ANC visited in a government health facility during your pregnancy	101	2.9	3.1	2.0	0.0	11.0
ANC visited in a private health facility during your pregnancy	101	5.0	3.7	5.0	1.0	15.0
Total ANC visit during pregnancy	101	7.9	2.7	8.0	2.0	15.0
Travel one way for ANC visit in minutes	101	54.4	43.3	45.0	5.0	240.0
Height of women in feet	101	5.1	0.3	5.2	4.1	5.6
weight of the mother in first visit	101	47.6	8.6	45.0	32.0	80.0
Weight during last visit weight at last visit	101	61.5	9.8	60.0	42.0	93.0
Systolic BP during admission	101	118.8	11.8	120.0	90.0	160.0
Diastolic BP during admission	101	76.8	8.3	80.0	60.0	100.0
Hb checked (in times)	101	3.5	1.1	3.0	2.0	7.0
Current Hb%	101	11.6	1.4	11.7	8.1	14.5
Hb% last time	101	11.4	1.4	11.5	7.7	14.5
mother USG (in times)	101	4.0	1.3	4.0	1.0	8.0
Systolic BP (within 30 minutes of delivery)	101	118.8	10.4	120.0	90.0	160.0
Diastolic BP(within 30 minutes of delivery)	101	77.8	8.0	80.0	60.0	100.0
Fatal heart rate during Admission	101	148.6	12.4	148.0	120.0	182.0
Gestational age at delivery	101	38.0	2.4	38.0	23.0	41.0
Blood loss after vaginal delivery within two hours (in ml)	51	275.5	115.1	250.0	150.0	600.0
Blood loss after C/S delivery within one hour (in ml)	50	402.0	177.3	350.0	200.0	1050.0
Blood loss within 24 hours (in ml)	101	188.1	53.5	200.0	100.0	500.0

Foot Note: *USG- ultra sonography, ANC visit-antenatal care visit, BP-blood pressure, Hb%- hemoglobin level, C/S delivery- caesarean section*

Complication previous pregnancy was 34.5%, while complication current pregnancy was 53.5%. Mode of delivery previous pregnancy was 23.8% caesarean section, whereas 52.5% (C/S) delivery was current pregnancy. Normal delivery in previous pregnancy was 29.7%, while normal delivery in current pregnancy was 45.5%. Whereas, current pregnancy birth outcomes were 26.7% low birth weight and 2% stillbirth (Table 2).

Below 25 years of age pregnant women had post-partum hemorrhage which was 13.7%, mild anemia, 56.9%, preterm delivery 33.3%, neonatal jaundice 7.5%, and 9.8% blood transfusion. Whereas, 30 years age or above 30 years age group pregnant woman 57.1% mild anemia, 14.3% preterm delivery, 14.3%, low birth weight, 21.4% neonatal jaundice and 14.3% blood transfusion (Table 3a).

Women's total ANC visit of ≤3 times had 50% mild anemia and 50% preterm delivery. Women with more than 4th gravida was 50% mild anemic 50%, preterm delivery, 50% low birth weight and 37.5% neonatal physiological jaundice (Table 3b).

The table 4 shows that, less <25 years age group women were high risk for anemia, preterm delivery, and low birth weight than age >25 years age group women. Anemia, Preterm delivery and low birth weight were higher in women ≤4 times' antenatal visit than antenatal visit more than 5 times. Anemia was 2.01 times, preterm delivery was 3.77 times and low birth weight was 4.53 times higher in women who were more than 1st gravida (Table 4).

Anemia was 1.62 times, preterm delivery was 5.27 times and low birth weight was 1.27 times higher in women who were from rural than urban residence. The women who had received iron tablets was at low risk of anemia, preterm delivery and low birth than women who had not received iron tablets. The risk of anemia was 3.58 times and preterm delivery was 1.34 times higher in women who had not attended health

Table 2: Distribution of immediate adverse pregnancy outcome by previous and current pregnancy

Background characteristics		**Previous**		**Current**	
		%	**n**	**%**	**n**
Eclampsia	Primi	43	42.6	*	*
	Yes	0	0.0	2	2.0
	No	58	57.4	99	98.0
Preeclampsia	Primi	43	42.6	*	*
	Yes	2	2.0	6	5.9
	No	56	55.4	95	94.1
Prolonged labour	Primi	43	42.6	*	*
	Yes	2	2.0	4	4.0
	No	56	55.4	97	96.0
PPH	Primi	43	42.6		
	Yes	6	5.9	6	5.9
	No	52	51.5	95	94.1
PROM	Primi	43	42.6	*	*
	Yes	8	7.9	O	O
	No	50	49.5	93	92.1
IUGR	Primi	43	42.6	*	*
	Yes	2	2.0	6	5.9
	No	56	55.4	95	94.1
Hemorrhage	Primi	43	42.6	*	*
	Yes	1	1.0	1	1.0
	No	57	56.4	100	99.0
Breech presentation	Primi	43	42.6	*	*
	Yes	5	5.0	6	5.9
	No	53	52.5	95	94.1
Complication detected during Pregnancy	Primi	43	42.6	*	*
	Yes	35	34.7	53	52.5
	No	23	22.8	48	47.5
Cord round the neck	Primi	43	42.6	*	*
	Yes	18	17.8	6	5.9
	No	40	39.6	95	94.1
Meconium Stain	Primi	43	42.6	*	*
	Yes	8	7.9	11	10.9
	No	50	49.5	90	89.1
Oligohydramnios	Primi	43	42.6	*	*
	Yes	15	14.9	9	8.9
	No	43	42.6	92	91.1
Polyhohydraminos	Primi	43	42.6		
	Yes	5	5.0	4	4.0
	No	53	52.5	97	96.0
Mode of delivery	Primi	42	41.6	*	*
	Emergency C/S	24	23.8	52	52.5
	Normal delivery	30	29.7	46	45.5
	Vacuum delivery	1	1.0	3	3.0
	Forceps delivery	0	0.0	0.0	0.0
	C/S delivery 2 times	4	4.0	0.0	0.0
	C/S delivery more than 2 Times	0.0	0.0	0.0	0.0
	Elective C/S	1	1	1	1.0
Birth outcome	Primi	42	41.6	*	*
	Normal alive	41	40.6	73	72.3
	Congenital abnormal	2	2.0	0	0.0
	Low birth weight	12	11.9	27	26.7
	Stillbirth	2	2.0	1	1.0
	Abortion	15	15.0	O	O

***Note** : Primi women (*), no abortion during current pregnancy- O , IUGR- Intra Uterine Growth Retardation, PROM- Premature Rupture of Membrane, PPH- Postpartum Haemorrhage*

Table 3a: Distribution of outcomes (PPH, preterm delivery, low birth weight, jaundice, blood transfusion and Hb% count mild, moderate, severe and normal

Background characteristics		PPH %	Hb%		Preterm delivery %	Low birth weight	jaundice %	Blood transfusion %
			Mild	Normal				
Age	< 25 Years	13.7	56.9	43.1	33.3	31.4	7.8	9.8
	25-29 Years	2.8	47.2	52.8	27.8	25	25	8.3
	30+ Years	0	57.1	42.9	14.3	14.3	21.4	14.3
Labor started	Spontaneous	4	64	36	28	26	20	6
	Augmented	16.1	45.2	54.8	22.6	19.4	9.7	19.4
	No	5	40	60	40	40	15	5
Travel for ANC	<20	6.7	53.3	46.7	20	20	6.7	6.7
	20-59	5.3	52.6	47.4	34.2	26.3	15.8	15.8
	60-99	12.1	51.5	48.5	30.3	21.2	15.2	3
	100+	6.7	60	40	20	46.7	26.7	13.3
Total ANC Visit	<=3	0	50	50	50	0	0	0
	4-10	8	53.4	46.6	28.4	27.3	14.8	10.2
	11+	11.1	55.6	44.4	22.2	33.3	33.3	11.1
Gravida	1	11.9	50	50	33.3	33.3	19	7.1
	2-3	5.9	56.9	43.1	21.6	17.6	9.8	13.7
	4+	0	50	50	50	50	37.5	0
Monthly family income	<20000	13	60.9	39.1	30.4	26.1	21.7	17.4
	20000-40000	4.8	52.4	47.6	35.7	28.6	9.5	7.1
	40001+	8.3	50	50	19.4	25	19.4	8.3
Residence	Urban	6.3	56.3	43.8	21.9	21.9	21.9	9.4
	Semi urban	15.8	42.1	57.9	26.3	26.3	15.8	10.5
	Rural	6	56	44	34	30	12	10
Education of Woman	Illiterate	0	100	0	100	100	0	0
	Primary	0	100	0	0	0	100	0
	Secondary	7	53.5	46.5	30.2	32.6	16.3	9.3
	PUC	5.1	53.8	46.2	25.6	20.5	12.8	15.4
	Graduation	23.1	46.2	53.8	15.4	15.4	15.4	0
	Post-Graduation	0	50	50	75	50	25	0
Dietary habit	Thrice a day	8.1	53.5	46.5	29.3	27.3	16.2	9.1
	4+ times a day	0	50	50	0	0	0	50
current Hb%	Mild	7.4	100	0	31.5	24.1	22.2	16.7
	Normal	8.5	0	100	25.5	29.8	8.5	2.1

Foot Note: *PPH- Post Partum Hemorrhage, PD (Preterm Delivery), LBW- Low Birth Weight, NPJ-Neonatal physiological Jaundice, BT- Blood Transfusion, PT- Public Transportation, ANC visit – antenatal care visit, DM-Diabetes mellitus, HTN- Hypertension*

education provided by health professional during antenatal visit than mother who had attended health education provided by the health professional (Table 4).

Table 5 shows that, neonatal jaundice in 25-29 years age group women's newborn was 10.48 times higher than in <25 years age group. Blood transfusion was 64% increase risk in above 30 years age group women. While, neonatal physiological jaundice was 7.65 times higher in more than 4th gravida than 2-3 gravida. Neonatal physiological jaundice was higher in women whose family income was Rs <20000 per month than above Rs.20000 per month (Table 5).

Neonatal physiological jaundice was 2.43 times higher in women with PUC education than secondary level education women. Neonatal jaundice was higher in women with the problem of hypertension than women without problem of hypertension. Likewise, neonatal jaundice was higher in women without attend heath education provided by the health professional during antenatal visit than mother who attended antenatal health education (Table 5).

Table 3b: Distribution of outcomes (PPH, Anemia, preterm delivery, low birth weight, jaundice, and blood transfusion and Hb% count Mild Moderate, severe and Normal

Background characteristics		PPH %	Hb (%)		PD (%)	LBW (%)	NJ (%)	BT (%)
			Mild	Normal				
No of TT inj	One	9.8	53.7	46.3	22	29.3	14.6	12.2
Admitted from	Two	6.7	53.3	46.7	33.3	25	16.7	8.3
Received iron tablet	Yes	8.4	53.7	46.3	29.5	26.3	14.7	9.5
	No	0	50	50	16.7	33.3	33.3	16.7
Received vitamins and calcium	Yes	8.5	54.3	45.7	29.8	25.5	14.9	9.6
	No	0	42.9	57.1	14.3	42.9	28.6	14.3
Health education by health professional	Yes	7.1	50	50	28.6	31.4	18.6	11.4
	No	9.7	61.3	38.7	29	16.1	9.7	6.5
Mode of transportation during your ANC visit	Walking	0	66.7	33.3	50	50	16.7	16.7
	Motorbike	7.7	50	50	30.8	23.1	11.5	15.4
	PT	6	52	48	24	30	16	8
	Private car	15.8	57.9	42.1	31.6	15.8	21.1	5.3
HTN	Yes	0	50	50	50	50	50	0
	No	8.2	53.6	46.4	27.8	25.8	14.4	10.3
DM	Yes	0	100	0	0	0	100	0
	No	8	53	47	29	27	15	10
Heart disease	Yes	0	66.7	33.3	0	66.7	33.3	0
	No	8.2	53.1	46.9	29.6	25.5	15.3	10.2
Infectious disease	Yes	0	100	0	0	0	0	0
	No	8	53	47	29	27	16	10
Hypothyroidism	Yes	14.3	57.1	42.9	42.9	28.6	14.3	14.3
	No	7.4	53.2	46.8	27.7	26.6	16	9.6
Kidney disease	Yes	0	50	50	50	50	100	0
	No	8.1	53.5	46.5	28.3	26.3	14.1	10.1
Most of visit during sick?	Private Hospital	12.1	51.5	48.5	27.3	24.2	21.2	6.1
	Government Hospital	4.5	52.3	47.7	29.5	25	9.1	9.1
	Both Hospitals	8.3	58.3	41.7	29.2	33.3	20.8	16.7
	Total	7.9	53.5	46.5	28.7	26.7	15.8	9.9

Neonatal jaundice was 3.72 times higher in women who used public transportation during antenatal care visit than women who walked during antenatal care visit. Neonatal jaundice was 13.23 times higher in women without problem of hypothyroidism than women with problem of hypothyroidism. While, neonatal jaundice was 2.11 times higher in women who had used to visit both health facilities (government and public) than only private health facilities during sick (Table 5).

DISCUSSION

The adverse pregnancy outcomes comprise preterm birth, stillbirth and low birth weight.[1,11] In planned pregnancies, complications are

Table 4: Multiple binary logistic registration output for socio-demographic, obstetric, and medical factors associated with immediate adverse pregnancy conclusions, Karnataka, 2022

Background characteristics (95% C.I.)		**Anemia**	**Preterm Delivery**	**Low birthweight**
		(95% C.I.)	**(95% C.I.)**	
Age	<25	1	1	1
	25-29	0.74 (0.23, 2.38)	0.37 (0.09, 1.5)	0.48 (0.12, 1.9)
	30+	0.69 (0.14, 3.35)	0.26 (0.03, 2.54)	0.19 (0.02, 1.9)
Labor started	Spontaneous	1	1	1
	Augmented	0.23 (0.06, 0.82)	0.62 (0.14, 2.77)	1.02 (0.23, 4.5)
	No	0.28 (0.06, 1.28)	2.52 (0.47, 13.62)	1.67 (0.3, 9.29)
Travel for ANC	<60 Min	1	1	1
	60+ Min	1.53 (0.48, 4.89)	0.89 (0.23, 3.39)	1.58 (0.35, 7.1)
Total ANC visit	<=4	1	1	1
	5+	1.32 (0.26, 6.65)	0.34 (0.05, 2.21)	0.86 (0.11, 6.78)
Gravida	1	1	1	1
	2-3.	2.01 (0.58, 6.9)	0.91 (0.23, 3.61)	0.3 (0.07, 1.31)
	4+	1.89 (0.25, 14.54)	3.77 (0.35, 40.62)	4.53 (0.52, 39.57)
Monthly family income	<20000	1	1	1
	20000-40000	1.96 (0.45, 8.58)	1.25 (0.26, 6.05)	2.18 (0.42,11.18)
	40001+	0.91 (0.18, 4.54)	0.29 (0.05, 1.89)	2.98 (0.47, 19.01)
Residence	Urban	1	1	1
	Semi-urban	1.17 (0.22, 6.32)	1.81 (0.24, 13.56)	0.54 (0.07, 4.37)
	Rural	1.62 (0.4, 6.51)	5.27 (0.88, 31.77)	1.27 (0.25, 6.6)
Women education	Secondary or less	1	1	1
	PUC	0.54 (0.18, 1.66)	0.78 (0.22, 2.83)	0.58 (0.15, 2.22)
	Graduate and above	0.67 (0.13, 3.48)	0.94 (0.15, 6.03)	0.56 (0.08, 4.12)
HTN	Yes	1	1	1
	No	0.98 (0.05, 18.23)	0.18 (0, 7.84)	2.13 (0.07, 61.86)
TT injection	Yes	1	1	1
	No	1.2 (0.36, 4.09)	2.07 (0.53, 8.12)	0.5 (0.13, 2.01)
Received iron tablet	Yes	1	1	1
	No	0.65 (0.07, 6.5)	0.07 (0, 1.39)	0.3 (0.02, 5.66)
Health education received	Yes	1	1	1
	No	3.58 (1.08, 11.8)	1.34 (0.36,5.03)	0.39 (0.09, 1.67)
Mode of transportation during ANC visit	Walking	1	1	1
	Motorbike	0.15 (0.01, 1.81)	0.15 (0.01, 2.26)	0.1 (0.01, 1.63)
	Public transportation	0.18 (0.02, 1.8)	0.06 (0, 0.88)	0.22 (0.02, 3.12)
	Private car	0.76 (0.06, 9.1)	0.3 (0.02, 4.88)	0.06 (0, 1.19)
Heart disease	Yes	1	1	1
	No	0.1 (0, 2.32)		0.06 (0, 2.32)
Hypothyroidism	Yes	1	1	1
	No	0.65 (0.09, 4.71)	0.27 (0.03, 2.39)	0.7 (0.07, 7.01)
Kidney disease	Yes	1	1	1
	No	1.32 (0.03, 54.18)	0.34 (0.01, 21.32)	0.04 (0, 2.23)
Most of visit during sick	Private Hospital	1	1	1
	Government Hospital	0.72 (0.21, 2.52)	0.46 (0.09, 2.2)	1.58 (0.34, 7.43)
	Both Hospitals	1.43 (0.32, 6.42)	0.61 (0.11, 3.54)	2.56 (0.46, 14.25)

Table 5: Multiple binary logistic regression output for socio-demographic, obstetric and medical factors associated with immediate adverse pregnancy outcomes, Karnataka, 2022

Background characteristics OR (95% C.I.)		Neonatal physiological Jaundice	Blood Transfusion
		OR (95% C.I.)	
Age	<25	1	1
	25-29	10.48 (1.09, 98.1)	0.65 (0.08, 5.11)
	30+	6.39 (0.5, 81.96)	1.64 (0.11, 23.81)
Labour started	Spontaneous		
	Augmented	0.25 (0.03, 2.34)	5.8 (0.51, 65.93)
	No	0.43 (0.02, 9.27)	1.41 (0.06, 32.26)
Travel for ANC	<60 Min		
	60+ Min	6.69 (0.67, 67.03)	0.34 (0.05, 2.27)
Total ANC Visit	<=4	1	1
	5+	0.5 (0.02, 12.87)	
Gravida	1	1	1
	2-3.	0.28 (0.03, 2.64)	2.07 (0.21, 20.17)
	4+	7.65 (0.36, 163.47)	
Monthly family income	<20000	1	1
	20000-40000	0.32 (0.02, 4.3)	0.16 (0.01, 2.25)
	40001+	0.57 (0.04, 8.37)	0.63 (0.03, 13.4)
Residence	Urban		
	Semi-urban	0.31 (0.02, 6.5)	0.14 (0.01, 3.45)
	Rural	0.31 (0.03, 3.13)	0.47 (0.03, 6.99)
Women education	Secondary or less	1	1
	PUC	2.43 (0.24, 24.35)	2.68 (0.34, 21.35)
	Graduate and above	0.99 (0.05, 20.02)	
HTN	Yes	1	1
	No	0.9 (0.01, 135.97)	
TT injection	No		
	Yes	0.62 (0.09, 4.46)	0.45 (0.05, 4.03)
Received iron tablet	No	1	1
	Yes	0.89 (0.03, 31.05)	3.72 (0.17, 80.21)
Health education Received	Yes	1	1
	No	0.12 (0.01, 2.03)	0.19 (0.02, 2.25)
Mode of transportation during ANC visit	Walking	1	1
	Motorbike	0.39 (0.01, 20.48)	10.11 (0.2, 524.25)
	Public transportation	3.72 (0.08, 173.54)	3.65 (0.09, 148.13)
	Private car	1.71 (0.04, 72.18)	1.03 (0.02, 61.46)
Heart disease	Yes	1	1
	No	0.59 (0, 89.6)	
Hypothyroidis m	Yes	1	1
	No	13.23 (0.09, 1927.78)	0.86 (0.03, 23.8)
Kidney disease	Yes	1	1
	No		
Most of visit during sick	Private Hospital	1	1
	Government Hospital	0.41 (0.06, 2.89)	1.09 (0.07, 17.93)
	Both Hospitals	2.11 (0.18, 25.24)	1.53 (0.06, 36.79)

few and outcomes are generally auspicious for maternal and newborns in developed countries.[4,12] However, in low-income countries, chances of adverse pregnancy outcomes are more frequent. Therefore, this study was aimed to measure the determinants of immediate adverse pregnancy outcomes in Karnataka, India. Postpartum hemorrhage was 7.9%, low birth weight 26.7%, preterm delivery 28.7%, anemia 53.5%, neonatal physiological jaundice 15.8% and blood transfusion 9.9%. Whereas, 12% premature birth, 8% low birth weight and 3% have major congenital abnormalities.[13,14]

This study also revealed that, preterm delivery (28.7%) was higher than a previous study which was done in Gondar University Hospital, Northwest Ethiopia (17.1%).[15] Similarly, this finding was higher than reports from South West Ethiopia (22.5%), and nearly similar in West Bengal (28.8%). Preterm delivery was similar to Ethiopian Demographic Health Survey (EDHS) 2011, which was (28%).[16-18]

In this study augmented labor and blood transfusion was found to be significant factor for anemia and preterm delivery was significantly associated with using the mode of transportation during ANC visit. Other studies found that, adverse pregnancy outcomes were significantly associated with previous obstetric history and adverse birth outcomes.[19-21]

Socioeconomic factors, maternal education, residence and family monthly income were associated with preterm delivery. Other studies indicates that, socioeconomic factors, maternal education, residence, monthly household income had a significant association with preterm delivery.[22-25] This study shows that, illness during pregnancy was associated with poor pregnancy outcomes. However, previous study had illness during pregnancy which was significantly associated with poor pregnancy outcomes. This finding was consistent with a similar study done in Kenya.[24] Furthermore, this study disclose that, anemic mothers had a higher chance to deliver low birth weight neonates, consistent with a study.[25] In this study, gravida, residence, number of antenatal visits, utilization of health facilities, TT vaccination, dietary pattern, distance of health facilities, previous pregnancy complications, current medical illness, previous obstetric/abortion history, and anemia are determines factors of current pregnancy outcomes. Whereas a similar study 'Determinants of adverse pregnancy outcomes' was done in Jimma University's specialized hospital.[1]

In conclusion, determinants of immediate adverse pregnancy outcomes were; 7.9% post-partum hemorrhage, 26.7% low birth weight 28.7%, preterm delivery 53.5% anemia, 15.8% neonatal physiological jaundice and 9.9% blood transfusion. Whereas, determinants factors which affected immediate adverse pregnancy outcomes were; socioeconomic, demographic, previous obstetric history, and chronic illness, which were associated with anemia, preterm delivery, low birth weight, neonatal jaundice, postpartum hemorrhage, and blood transfusion. Augmented labor and blood transfusion were found significant factor for anemia, whereas use of mode of transportation during antenatal visit was found to be significant factor for preterm delivery.

ACKNOWLEDGEMENTS

The authors would like to thank KLE Academy of Higher Education and Research KAHER for securing ethical clearance for this study. Additional thanks goes to KLES Dr. Prabhakar Kore Hospital and Medical Research Centre (MRC), Obstetrics and Gynaecology Ward head for allowing the data collection procedures. My sincere gratitude goes to Dr. Jang Bahjadur Prasad, Asst. Prof. Dr. Prakash Adhikari, Asst. Prof. Dr. Divya Koirala and my friend Arenlila Jamir for their irreplaceable support throughout the whole work with their valuable advices.

Conflict of interest: None
Source of research fund: None

REFERENCES

1. Yeshialem E, Abera M, Tesfay A. Determinants of adverse pregnancy outcomes among mothers who gave birth from jan 1-dec 31/2015 in jimma university specialized hospital, case control study, 2016. *Ethiopian J Reprod Health* 2019; 11: 1-10.
2. Tsegaye B, Kassa A. Prevalence of adverse birth outcome and associated factors among women who delivered in Hawassa town governmental health institutions, south Ethiopia, in 2017. *Reprod Health* 2018; 15. DOI: https://doi.org/10.1186/s12978-018-0631-3

3. World Health Organization. Preterm Birth Retrieved 2022-01-19. Available on https://www.who.int/news-room/fact-sheets/detail/preterm-birth.
4. Rosen field A, Maine D. Maternal mortality - a neglected tragedy where is the M in MCH? *Lancet* 1985; 2: 83–5.
5. AbouZhar C, Wardlaw T. Maternal mortality at the end decade: what signs of progress? *Bull WHO* 2001; 79: 561–73.
6. Maternal Health. United Nations Population Fund. Retrieved 2022-01-19. Available on https://www.unfpa.org/maternal-health.
7. Lolaso T, Oljira L, Dessie Y, Gebremedhin M, Wakgari N. Adverse birth outcome and associated factors among newborns delivered in public health institutions, Southern Ethiopia. *East African J Health Biomed Sci* 2019; 3: 35-44.
8. Sadiq AA, Poggensee G, Nguku P, Sabitu K, Abubakar A, Puone T. Factors associated with adverse pregnancy outcomes and perceptions of risk factors among reproductive age women in Soba LGA, Kaduna State 2013. *Pan African Med J* 2016; 25.
9. Geronimus A, Bound J. Black/white differences in women's reproductive-related health status: evidence from vital health statistics. *Demography* 1990; 27: 457-66.
10. Ministry of Health and Family Welfare Maternal Mortality Rate (MMR). Retrieved 20220119. Available on https://www.pib.gov.in/PressReleasePage.aspx?PRID=169744
11. Registrar General of India. Sample registration system (SRS) statistical report 2013. New Delhi: 2013.
12. AbouZhar C and Wardlaw T. Maternal mortality at the end decade: what signs of progress? *Bull WHO* 2001; 79: 561–73.
13. World Health Organization. The incidence of low birth weight: an update. *Weekly Epidemiol Record Relevé épidémiologique hebdomadaire* 1984; 59: 205-11.
14. Blencowe H, Cousens S, Chou D *et al*. Chapter 2: 15 million preterm births: priorities for action based on national, regional and global estimates. Born too soon: *Global Action Rep Preterm Birth* 2013; 10 (Suppl 1): S2.
15. Zeleke BM, Zelalem M, Mohammed N. Incidence and correlates of low birth weight at a referral hospital in Northwest Ethiopia. *Pan African Med J* 2012; 12: 4.
16. Dasgupta A, Basu R. Determinants of low birth weight in a block of Hooghly, West Bengal: a multivariate analysis. *Int'l J Biol Med Res* 2011; 2: 838-42.
17. Tema T. Prevalence and determinants of low birth weight in Jimma Zone, Southwest Ethiopia. *East African Med J* 2006; 83: 366-71.
18. Demographic N. Health survey 2011. Addis Ababa, Ethiopia. 2012 Mar.
19. Abaraya M, Seid SS, Ibro SA. Determinants of preterm birth at Jimma University Medical Center, Southwest Ethiopia. *Pediatr Health Med Therapeutics* 2018; 9: 101.
20. Adane AA, Ayele TA, Ararsa LG, Bitew BD, Zeleke BM. Adverse birth outcomes among deliveries at Gondar University Hospital, Northwest Ethiopia. *BMC Preg Childbirth* 2014; 14: 1-8.
21. Xu B, Järvelin MR, Lü H, Xu X, Rimpelä A. Maternal determinants of birth weight: a population-based sample from Qingdao, China. *Soc Biol* 1995; 42: 175-84.
22. Bener A, Abdulrazzaq YM, Dawodu A. Sociodemographic risk factors associated with low birthweight in United Arab Emirates. *J Biosoc Sci* 1996; 28: 339-46.
23. Magadi M, Madise N, Diamond IA. Factors associated with unfavorable birth outcomes in Kenya. *J Biosoc Science* 2001; 33: 199-225.
24. Cheptum JJ, Oyore JP, Okello Agina BM. Poor pregnancy outcomes in public health facilities in Kenya. *Afr J Midwifery Women's Health* 2012; 6: 183-8.
25. Muftah S. Maternal under-nutrition and anaemia factors associated with low birth-weight babies in Yemen. *Int'l J Community Med Public Health* 2016; 3: 2749-56.