

# A Prospective Study of the Referral Pattern on Weekends in a Tertiary Care Hospital

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## ABSTRACT

The period around birth is critical for saving the lives of mother and their infants. The large majority of maternal deaths (60%) and about half of stillbirths occur during this intrapartum period. Maternal mortality in resource-poor countries is attributed to three delays-delay in deciding to seek care, delay in reaching the facility on time, and delay in receiving treatment. The majority of maternal deaths can be prevented by the presence of a skilled birth attendant who delivers high-quality care and can access an appropriate maternal referral system when needed. However, high rates of intrapartum obstetric referrals are common.

**Objective:** To assess the maternal and neonatal outcomes and to study the pregnancy-related maternal conditions that required high dependency unit care on weekends.

**Methods:** It was a prospective observational study that reviewed 40 obstetric cases referred from various centers, from January 2019 to December 2019.

**Results:** It was a prospective observational study that reviewed 40 obstetric cases referred from various centers, from January 2019 to December 2019.

**Conclusion:** Referrals frequently occurred after the onset of labor. Our data imply that improving obstetric referral protocols will improve the birth experience and reduce the burden on tertiary care facilities and on the women themselves.

**Keywords:** Weekend referrals; Obstetrics; Obstetric referrals; Tertiary care hospital

## INTRODUCTION

The period around birth is critical for saving the lives of mother and their infants. The large majority of maternal deaths (60%) and about half of stillbirths occur during this intrapartum period. Roughly 45% of all under-five children's deaths occur during the neonatal period. Of these 75% occur in the first week of life, half of which are on the first day of life due to intrapartum causes [1-3]. The majority of maternal deaths can be prevented by the presence of a skilled birth attendant who delivers high-quality care and can access an appropriate maternal referral system when needed.

Maternal mortality in resource-poor countries is attributed to three delays-delay in deciding to seek care, delay in reaching the facility on time, and delay in receiving treatment. Morbidity following complications of pregnancy and delivery is much less recognized

but unacceptably high all over the world.

Hallmarks of a quality referral system include accurate screening, identification of women at risk, timely referral, and transportation to a facility that can provide needed interventions and care, along with experienced and trained medical staff. Such a referral system is so important that it has been called the keystone of safe motherhood [4,5].

In India, the state government-funded obstetric health system offers three levels of care in rural communities; primary, secondary, and tertiary. The tertiary level facilities provide specialized obstetric care along with allied medical specialty care. Secondary care is provided by district hospitals that have obstetric specialists available for cesarean sections.

The Primary Health Centers (PHC), situated in larger geographical

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rural settings, provide 24-hours day basic obstetric care including birthing facilities for vaginal deliveries and allied basic medical services. Sub-centres (SC) are birthing facilities with trained birth attendants in the villages equipped only for vaginal deliveries. High-risk pregnancies and those with intrapartum complications are eligible for a referral from SCs, PHCs, and secondary care to a suitable higher level of care. High-quality care would ensure accurate and timely identification of at-risk pregnancies and births and prompt referral of the woman and her baby to a higher level of care when at-risk pregnancy or birth is detected.

A disproportionate number of obstetric patients are referred from the first or second-level facilities to tertiary centers on weekends, especially Saturdays. Day-of-the-week linked referral patterns are recognized in Western literature, not necessarily only in obstetrics. However, documentation in contemporary Indian literature is not extensive.

## Aims

To analyze the referral pattern of high-risk obstetric cases from secondary to tertiary care on weekends.

## Objective

- To assess the maternal and neonatal outcomes
- To study the pregnancy-related maternal conditions who required high dependency unit care on weekends

## Materials and Methods

**Source of data:** patients referred to RLJH hospital, Kolar during the period of study, during weekends.

**Study design:** Prospective observational study.

**Study period:** January 2019 to December 2019.

## METHOD AND METHODOLOGY

It was a prospective observational study that reviewed 40 obstetric cases referred from various centers, from January 2019 to December 2019. A thorough history was taken; complete physical and obstetric examination and relevant investigations were done. Management of the patient, clinical course, mode of delivery, both maternal and perinatal outcomes was documented. The time is taken to reach the referral center that is the 2<sup>nd</sup> delay, the gestational age at which 1<sup>st</sup> antenatal visit, the day of referral was documented and the number of antenatal visits also was studied. This study data was collected from case sheets of the patients referred and managed at tertiary care. Demographic data of the patients and the reasons for the referral and whether the referral was antepartum or intrapartum was noted and whether conservative or intervention management was also noted. The maternal outcome was studied in terms of mortality and need for blood transfusions and post-partum complications.

## STATISTICAL METHODS

The Statistical analysis was performed by STATA 11.2 (College Station TX USA).

Chi-square for the goodness of fit was used to measure the association between the age distribution, literacy, number of visits, time taken to reach, referral (Figures 1-6). Referred by, treatment, need a blood

transfusion, and perinatal outcome with the outcome (Good and Bad Outcome) respectively and it's expressed as frequency and percentage.  $p < 0.05$  is considered statistically significant.

## RESULTS

It was a prospective observational study that reviewed 40 pregnant women referred from various centers in 1 year analyzed. Duration and health care center approached by patients was as per Table 1. Details of patients in the study were as per Table 2.

Most common diagnosis at referral was medical disorders complicating pregnancy (44%) among which hypertensive disorders accounted for 23%, followed by severe anemia (16%) (Table 3). Twenty-one percent of the patients were in serious or critical

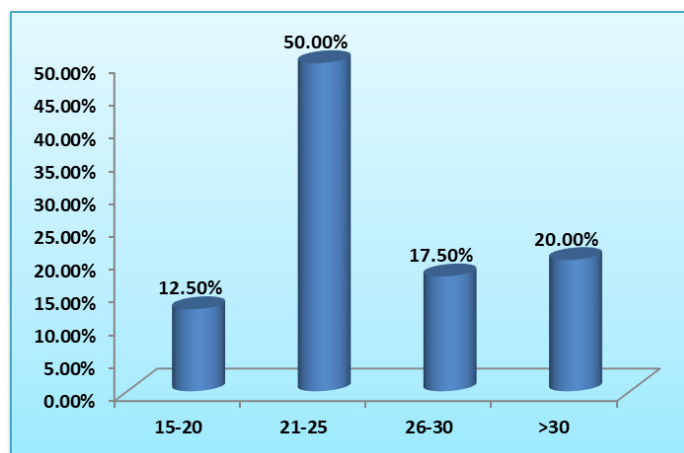


Figure 1: Age distribution.

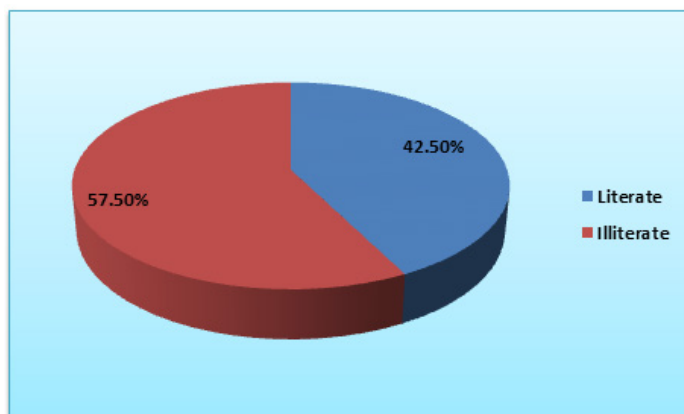


Figure 2: Literacy rate.

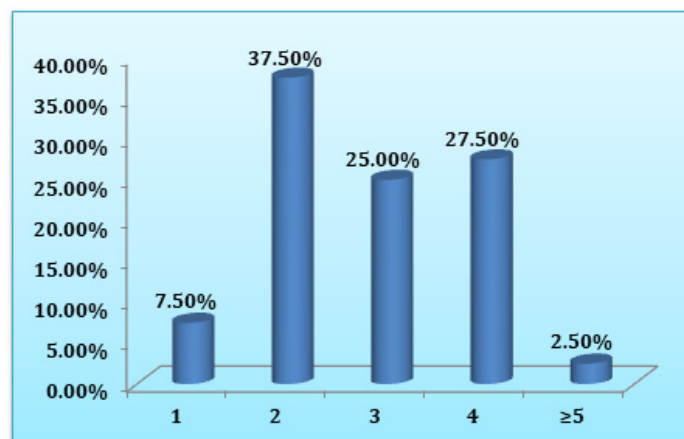


Figure 3: Number of visits.

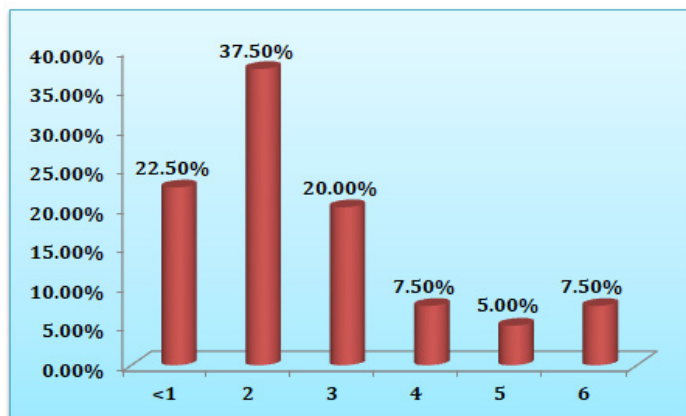


Figure 4: Time taken to reach the center.

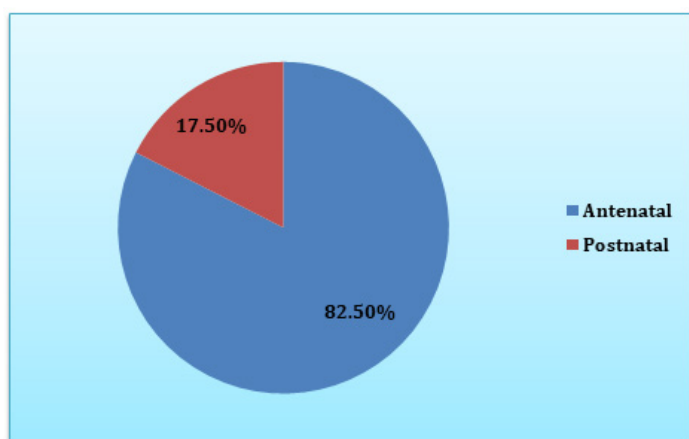


Figure 5: Referral during antenatal/postnatal period.

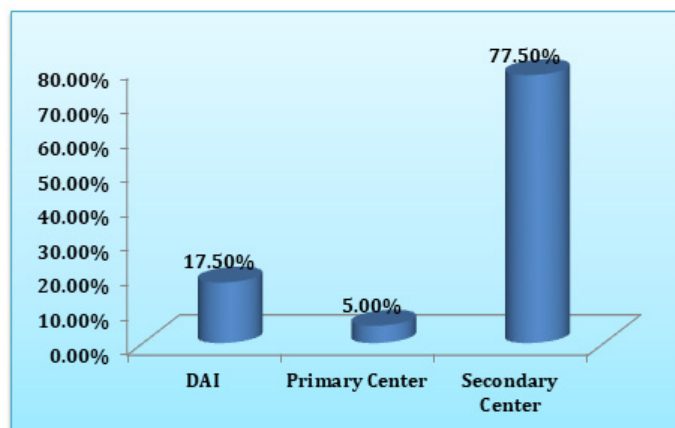


Figure 6: Referred by dai/primary center/secondary center.

Table 1: Duration and health care center approached by patients.

Referral	Antenatal	33	82.50%
<b>During</b>	Postnatal	7	17.50%
<b>Referred by</b>	DAI	7	17.50%
	Primary Center	2	5.00%
	Secondary Center	31	77.50%

condition on arrival, 60% patients required surgical intervention, 19% received intensive care management and there was 1 maternal mortality.

The total number of live births was 20 (50%). Vaginal delivery rate was 15% and patient requiring surgical intervention was 60%,

Table 2: Details of patients in study.

	Years	Number of Cases
<b>Age</b>	15-20	5
	21-25	20
	26-30	7
	>30	8
<b>Literacy</b>	Literate	17
	Illiterate	23
<b>Number of Visits</b>	1	3
	2	15
	3	10
	4	11
	≥ 5	1
	<1	9
<b>Time taken to reach (in hours)</b>	2	15
	3	8
	4	3
	5	2
	6	3
	<b>Treatment</b>	Supportive management
LSCS		20
Abortion		1
Vaginal		6
Exploratory Laparotomy		4

Table 3: diagnosis at referral.

Diagnosis	Number of patients
Pre eclampsia /HTN/eclampsia/HELLP	12
Preterm labor	3
IUGR	2
IUFD	6
Abruption, placenta previa	9
Jaundice	1
Ectopic pregnancy	2
Severe anemia	8
Heart disease	2
Oligohydramnios	2
Hypothyroidism	2
Meconium stained liquor, fetal distress	1
Sepsis, shock	2

as our hospital is a tertiary care center and there was a delay in referring the patient, with patients being referred in critical stages.

Around 40% had a delay ranging from 3hrs to 18 hours to reach the referral center. Among the 40 cases that were referred, 55% of the cases were referred during the weekend, accounting for 22 cases. 6 out of 22 are- preeclampsia/eclampsia related. 6 were hemorrhage related (ectopic, placenta accrete, PPH) in shock. Two had associated cardiac condition, one congenital condition which was exaggerated with pregnancy and other RHD, one patient with placenta accreta required 30 units of blood and components,

ventilator care, inotropic support, emergency hysterectomy, and internal iliac artery ligation. Two patients required massive multiple transfusions. Two women had presented with severe shock due to abruption, APH, ruptured ectopic, and one patient with rupture uterus during the weekend. Among the 6 IUDs, 2 IUDs were during the weekend time, owing to the early resuscitation that was done in the tertiary care/center. However, among the 3 stillbirths, 2 were during the weekend.

Of the maternal (Figure 7), perinatal outcomes (Figure 8), good outcomes were seen during the weekdays (45%) compared to the weekends (55%) in our study, and this needs to be discussed in detail (Table 4 and Figure 9).

This study found that some adverse outcomes were slightly but significantly more common among weekend admission. Though the magnitude was small, the gravity of this outcome demands our attention.

### DISCUSSION

In the present observational study reviewed 40 pregnant women referred from various centers in a 12-month period most common diagnosis at referral was medical disorders complicating pregnancy (44%) among which hypertensive disorders accounted for 23%, followed by severe anemia (16%). Twenty-one percent of the

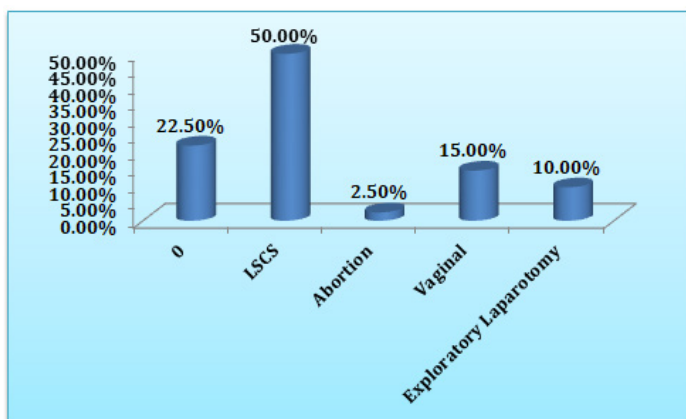


Figure 7: Maternal outcome.

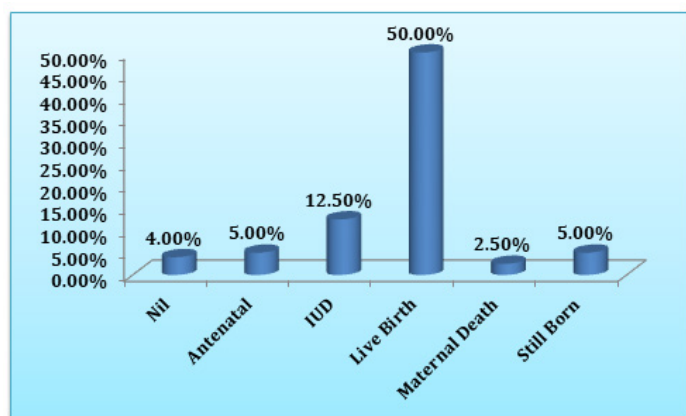


Figure 8: Perinatal outcome.

Table 4: Outcomes (Good outcome and Bad Outcome).

	Number of Cases	Percentage
Good outcome	18	45.00%
Bad Outcome	22	55.00%

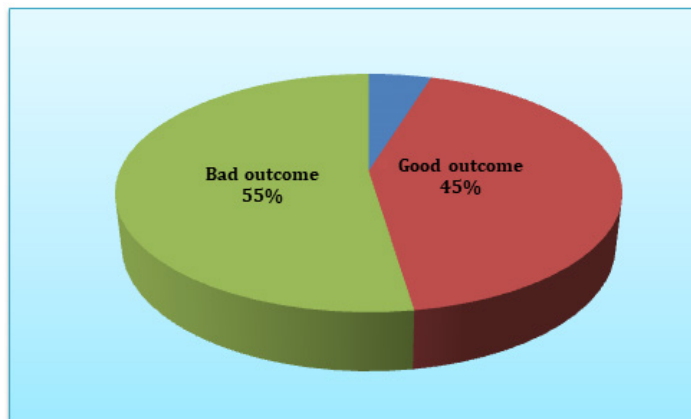


Figure 9: Outcomes (pie chart).

patients were in serious or critical condition on arrival, 60% of patients required surgical intervention, 19% received intensive care management, and one maternal mortality. The total number of live births was 20 (50%). The vaginal delivery rate was 15% and the patient requiring surgical intervention was 60%, owing to our hospital is a tertiary care center with delay in referring the patient.

Around 40% had a delay ranging from 3hrs to 18 hours to reach the referral center.

Among the 40 cases that were referred, 55% of the cases were referred during the weekend, accounting to 22 cases. 6 out of 22 are preeclampsia/eclampsia related. 6 were hemorrhage related (ectopic, placenta accrete, PPH) in shock. 2 had associated cardiac condition, one congenital condition which was exaggerated with pregnancy and other RHD, one patient with placenta accreta required 30 units of blood and components, ventilator care, inotropic support, emergency hysterectomy, and internal iliac artery ligation. 2 patients required massive multiple transfusions. 2 women had presented with severe shock due to abruption, APH, ruptured ectopic, and 1 patient with rupture uterus during the weekend. Among the 6 IUDs, 2 IUD were during the weekend time, owing to the early resuscitation that was done in the tertiary care center. However, among the 3 stillbirths, 2 were during the weekend.

Many studies were conducted related to the study of referral patterns at a tertiary health care center.

Recent research published in the BMJ and elsewhere brings renewed attention to the “weekend effect,” suggesting higher rates of adverse outcomes associated with hospital admissions and procedures performed at weekends than on weekdays [6,7].

Findings are not uniform among studies and fields of medicine, and persistent questions remain about whether significant findings reflect differences in case admitting during weekend versus weekday are likely to influence outcomes among the patients at highest risk. The weekend effect is particularly under-studied in obstetrics, with decidedly mixed results from the small number of studies [8,9].

A study by Palmer and colleagues regarding the association between day of delivery and obstetric outcome highlights the increased risk of being stillborn on weekends with higher rates of puerperal infection, injury to the neonate, and increased emergency neonatal readmission [5].

Maskey S, et al. [10], conducted a prospective observational study that reviewed 112 obstetric cases referred from various centers. A thorough history was taken; complete physical and obstetric

examination and relevant investigations were done. Management of the patient, clinical course, mode of delivery, both maternal and perinatal outcomes was documented. The results were that the most common diagnosis at referral was medical disorders complicating pregnancy (38%) among which cardiac disease accounted for 20%, followed by hypertensive disorder (17%). Unavailability of a perinatal facility was the most frequent reason (24%) for a referral. Twenty-seven percent of the patients were in serious or critical condition on arrival, 52% of patients required surgical intervention, 19% received intensive care management and there were mortalities of 2 women (1.8%). The total number of live births was 70 (62.5%) among which 28 (42%) required neonatal admission and 3 (4% of live birth) had early neonatal death. This study concluded that a wide spectrum of complicated obstetric cases was referred to this hospital. Unavailability of the perinatal facility was the most common reason for referral followed by the unavailability of a physician. The most common diagnosis at the time of referral was medical disorders complicating pregnancy.

Goswami, et al. [11], conducted to know the maternal and fetal outcomes in women referred to a tertiary care center. Data was collected for 154 cases referred to the tertiary health center in 2014, which included the demographic characteristics, reasons for referral, high-risk factors, the intervention was done and the maternal and fetal outcomes. It was found that the majority of the cases were referred from the Dehradun district followed by the Garhwal region. Most of the patients were referred in the antepartum and intrapartum periods. Sixty-seven patients needed surgical intervention. The average hospital stay was 7.37 days. Nineteen patients needed ICU admission with an average stay was 4.26 days. There was no maternal mortality, however out of 115 total births, there were 23 stillbirths and 27 births with 1 minute Apgar score <7.

Charu, et al. [12], conducted a prospective observational study, comprising the first 100 referred obstetric cases. Complete history, basic investigations, and specific investigations as required were carried out for each case. Mode of delivery was documented maternal complications if any, were managed and maternal and perinatal outcome was documented. The results were that 67% of the referrals were from urban areas and 33% from rural areas. The educational status of the urban patients was markedly better than the rural patients. The majority of referrals were for hypertensive disorders (26%) and preterm labour (26%). 60% of the rural population was anaemic. 62% of the total live borns required nursery care. The current study shows that delay in referral and referral to intermediary centers are the main causes for adverse maternal/perinatal outcomes. The peripheral healthcare system needs to be strengthened and the practice of early referral needs to be implemented for the better maternal and perinatal outcome.

Khatoon, et al. [13], conducted a prospective observational study in Obstetrics and gynaecology unit III, Abbasi Shaheed Hospital, Karachi during the period of 1<sup>st</sup> July 2010 to 31<sup>st</sup> Dec 2010. 234 patients referred to our unit in an emergency were included in our study. A detailed proforma, including history and examination, Investigations, source, and reasons for referral, mode of delivery, maternal outcome, perinatal outcome, maternal complications, and their management. The results were a total number of 234 obstetric patients were referred to Gynae Unit III during our study period. 35% of cases were referred from Dai's, 27% from Primary health care units and 41% from Secondary care hospitals. Patients were referred in Antenatal period were 21%, 69% in intrapartum period

while only 10% in postpartum period. Most common reasons for referral are prolonged labor, fetal distress, repeat Cesarean section and meconium stained liquor, respectively [10]. Maternal outcome was 97% and fetal outcome was 87% in total. This study concluded that referral rates to tertiary care centers are rising continuously. Repeat Caesarean Section and meconium stained liquor, are the topmost reasons. Delay in referral is a big contributory factor for adverse maternal and perinatal outcomes. There is an urgent need for the provision of 24 hours emergency Obstetric care system with alert transportation readily available to women in need.

## CONCLUSION

In the end, some women will always deliver at the weekend, during busy days, and at other times of decreased capacity. Weekend delivery is an inevitable part of everyday practice. Solutions will require extra resources, systems thinking, and all our creativity, to determine what explains the apparent protective effect of weekday delivery and how to extend these benefits to women who deliver at the weekend, and their babies.

Corrective measures and steps to be taken to prevent such deaths in the future and to improve quality of care at the hospital by infrastructure strengthening, Human resource availability augmentation, strengthening the protocols and competence of staff, supplies, and equipment, interventions to address the delay in management.

There is indeed no doubt that rural health care infrastructure is falling short of the existing requirement. However, educating the population about the existing health care and delivery system, sensitizing the public towards adverse outcomes. An audit is described as a systematic and critical analysis of quality of care in the broadest sense, which assesses the impact of procedures for diagnosis and treatment on patient outcomes.

We should improve maternal and child health by creating awareness at the primary level. Mothercraft classes regarding complications during pregnancy should be done at all levels of health care. The peripheral health care system has to be strengthened with early referrals for better perinatal and maternal outcomes.

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