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Study of the Weekend Referral Pattern of Obstetric Cases in Tertiary Care Hospital: A Prospective Observational Study

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ABSTRACT

Introduction: Referral of high-risk obstetric cases to a tertiary centre from a health centre can save the lives of both the mother and their infants. Referral should be prompt and should avoid all the three delays for which pattern of referral during weekdays and during weekend need from the periphery health centre need to be studied.
Objectives: To analyze the referral pattern of high-risk obstetric cases from secondary to tertiary care on weekends.
Methods: A prospective observational study was conducted from July 2022 to September 2023 in the Department of Obstetrics and Gynaecology, Bangalore Medical College and Research Institute among 400 obstetric cases referred from various health centres at periphery. Demographic data was collected and analysed.
Results: Out of 400 participants, 69.3% were referred during the weekdays and 30.7% in weekend. 21% of the patients were referred due to HDP followed by fetal distress (9%). 6.8% of the patients were referred due to non-availability of doctors. Weekend referral was not associated with gestational age, parity, antenatal period, mode of management, LSCS, admission in OBG ICU, admission in NICU, maternal mortality, PNM and Blood transfusion. The mean delay in hours for referral to tertiary institute was significantly more in weekdays when compared with weekend referral.
Conclusion: Out of all seven days in a week, weekend referral accounted for one third of all cases and non-availability of doctors was one of the main reasons which could be corrected with certain policies.

Keywords: Weekend referral, weekday referral, obstetrics, tertiary hospital

INTRODUCTION

An estimated 303,000 women die during pregnancy, childbirth and the puerperium each year. The vast majority (99%) of these deaths occur in low- and middle-income countries and specifically in sub-Saharan Africa and South Asia[1]. Ending preventable maternal deaths continues to be one of the most important goals internationally. SDG targets less than 70 maternal deaths per 100,000 live births by the year 2030 [2]. Thaddeus and Maine identified three delays

leading to maternal death[2]. These are 1) delay in deciding to seek care, 2) delay in reaching a healthcare facility 3) delay in receiving care at the healthcare facility. Type 1 delays are influenced by the factors involved in decision-making; sociocultural factors; financial and opportunity costs. Factors such as distance to the nearest healthcare facility, travel time, availability and cost of transportation; road conditions contribute to type 2 delays. Type 3 delays include factors affecting the speed with which effective care is provided once a woman reaches a healthcare facility; shortages of supplies, equipment, and trained personnel; competence of available personnel and quality of care.

The three delays model helps to determine where improvements can be made to save the lives of women and babies. WHO estimates that around 88-98% of maternal deaths can be averted with timely access to existing emergency obstetric care using effective and efficient referral system.[3] Hallmarks of a quality referral system include accurate screening, timely referral and transportation to a facility that can provide needed interventions along with well trained medical staff.

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 which have obstetric specialists available for caesarean sections. The primary health centers (PHC), situated in larger geographical rural settings, provide 24-h a day basic obstetric care including birthing facilities for vaginal deliveries and allied basic medical services. Subcenters (SC) are birthing facilities with a trained birth attendant in the villages equipped only for vaginal deliveries. High risk pregnancies and those with intrapartum complications are eligible for 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.[4]

This referral system when implemented sincerely is able to identify high risk pregnancy for early referral and better management. But if the referral system is used to reduce workload at the primary and secondary level of care, there will be overload of work at the tertiary level hospital thereby compromising the quality of care. It was reported in a study that maximum of the referral occurs on weekends, especially Saturdays. These referrals on Saturday were predominated by non-medical reasons (non-availability of doctors and NICU) and almost half the cases managed on Saturdays were referred.[5] Thus, this study was conducted to analyze the referral pattern of high-risk obstetric cases from secondary to tertiary care on weekends. Further to assess the maternal and neonatal outcomes of referred cases and to study the pregnancy-related maternal conditions which required intensive care unit on weekends

MATERIALS & METHODS

A prospective observational study was conducted from July 2022 to September 2023 in the Obstetrics and Gynaecology Department Vani Vilas hospital, Bangalore Medical College and Research Institute among 400 obstetric cases referred from various health centres at the periphery. A thorough clinical history with physical examination was done with routine investigation and relevant blood investigation and ultrasound scan. Management of the patient, clinical course, mode of delivery, both maternal and perinatal outcomes were documented. The time taken to reach the referral center that is the 2nd delay, the gestational age at which 1st antenatal visit, the day of referral was documented and the number of antenatal visits also was studied. A structured proforma was used to collect data from the

patients and relevant data were also collected from case sheets of the patients referred and managed at the 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 postpartum complications.

The collected data were entered and analyzed in SPSS (IBM) version 21. Summarization of data was carried out by using descriptive statistics such as mean, standard deviation and percentages. Either $\chi 2$ test or Fisher's exact test were used for categorical variables, and independent t test was used to test association between hours of delay and referral days. P-value < 0.05 was taken as statistically significant. Ethical approval was obtained from the ethical committee of the institute (IEC No. 001946) before the commencement of the study.

RESULT

Maximum of the referred patients were in the age group of 26 to 30 years (44%) followed by more than 30 years (22.5%) and 21 to 25 years (20%). Maximum of the referral was done in the gestational age of ≥ 37 weeks (54.7%) followed by 34 to <37 weeks (18.9%). Maximum of the patients were referred during the weekdays (69.3%) in comparison to weekend (30.7%). Very few patients were referred during their post-natal period (5%). Maximum of the patients were managed by intervention as shown in table1.

Table 1: Characteristics of the study population (N=400)

Characteristics		**No. of participants, n**	**Percentages (%)**
Age in years	18 – 20 years	54	13.5
	21 – 25 years	80	20.0
	26 – 30 years	176	44.0
	> 30 years	90	22.5
Gestational age	< 28 weeks	45	11.8
	28 to < 34 weeks	55	14.6
	34 to < 37 weeks	72	18.9
	≥ 37 weeks	208	54.7
Parity	Primigravida	203	50.8
	Multigravida	197	49.2
Referral days	Weekdays	277	69.3
	Weekend	123	30.7
Referral during	Antenatal	380	95.0
	Postnatal	20	5.0
Management	Conservative	88	22.0
	Intervention	312	78.0

Fig 1 showed a two hour delay (29.5%) was commonly seen during referral to the tertiary institute followed by 24.5% having a 4 hour delay and another 22.8% having a 3 hour delay to reach the tertiary institute. In this study most of the patients were referred due to HDP (21%) followed by fetal distress (9%). 6.8% of the patients were referred due to non-availability of doctors. Anemia (7%) and PROM (6.5%) were also commonly seen as a reason for referral as demonstrated in table 2.

Fig 1: Time taken to reach the tertiary centre (N=400)

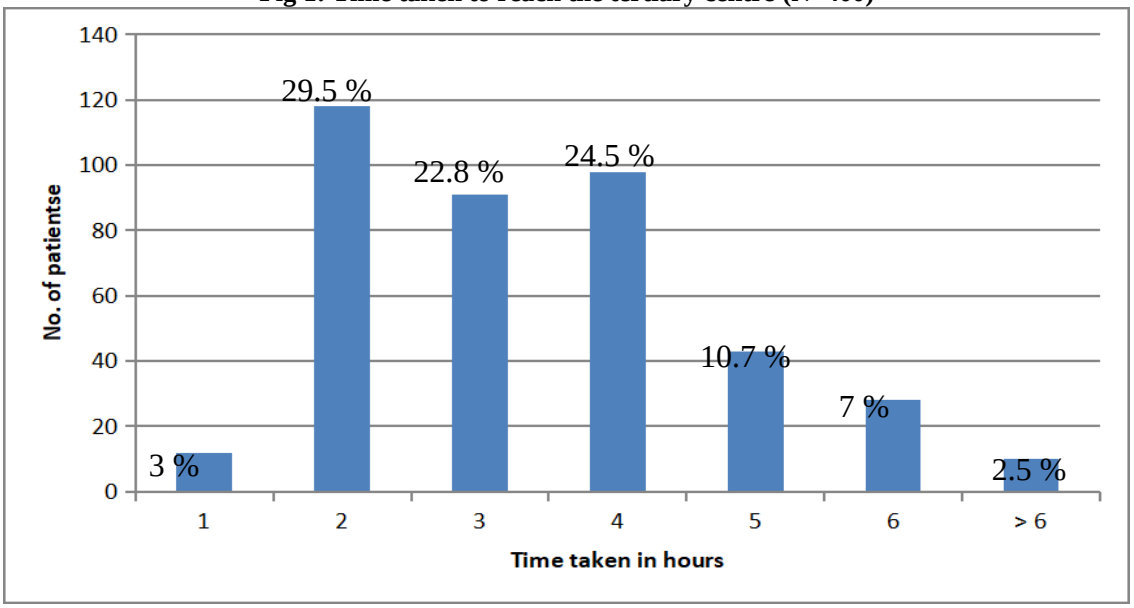

Table 2: Diagnosis at referral (N=400)

Sl.no.	Diagnosis	No. of participants, n	Percentages (%)
1.	HDP	84	21.0
2.	ANEMIA	28	7.0
3.	PRETERM	19	4.8
4.	PROM	26	6.5
5.	FETAL DISTRESS	36	9.0
6.	POST DATED	21	5.3
7.	PREV LSCS	21	5.3
8.	OLIGO	19	4.8
9.	FGR	17	4.3
10.	APH	13	3.3
11.	MISC	9	2.3
12.	ABORTIONS	13	3.3
13.	NICU CARE	9	2.3
14.	GDM	7	1.8
15.	NON AVAILABILITY OF DOCTORS	27	6.8
16.	NOT AFFORDABLE	3	0.8
17.	FEVER	6	1.5
18.	THROMBOCYTOPENIA	4	1.0
19.	ECTOPIC	7	1.8
20.	IUFD	6	1.5
21.	CPD	3	0.8
22.	BREECH	6	1.5
23.	NON PROGRESSION	11	2.8
24.	HEART DISEASE	1	0.3
25.	PPH	4	1.0

Table 3: Association between referral days with other variables

Characteristics		Referral during, n (%)		P value
		Weekdays	Weekend	
Gestational age in weeks	< 28 weeks	35 (13.2)	10 (8.5)	0.538
	28 to 33 weeks	37 (14.1)	18 (15.4)	
	34 – 36 weeks	47 (17.9)	25 (21.4)	
	≥ 37 weeks	144 (54.8)	64 (54.7)	
Parity	Primigravida	138 (49.8)	65 (52.8)	0.576
	Multigravida	139 (50.2)	58 (47.2)	

Natal period	Antenatal	263 (94.9)	117 (95.1)	0.941
	Postnatal	14 (5.1)	6 (4.9)	
Management	Conservative	60 (21.7)	28 (22.8)	0.896
	Intervention	217 (78.3)	95 (77.2)	
LSCS	Yes	91 (41.9)	30 (30.0)	0.089
	No	186 (58.1)	93 (70.0)	
OBG ICU	Yes	16 (5.8)	9 (7.3)	0.563
	No	260 (94.2)	114 (92.7)	
NICU	Yes	88 (40.7)	40 (40.8)	0.990
	No	128 (59.3)	58 (59.2)	
Maternal Mortality	Yes	3 (1.1)	2 (1.6)	0.489
	No	273 (98.9)	121 (98.4)	
PNM	Yes	29 (13.4)	9 (9.2)	0.286
	No	187 (86.6)	89 (90.8)	
Blood transfusion	Yes	42 (15.2)	19 (15.4)	0.942
	No	235 (84.8)	104 (84.6)	

Table 3 showed referral during weekend or weekdays were not associated with Gestational age in weeks, Parity, Antenatal period, mode of management, LSCS, admission in OBG ICU, admission in NICU, Maternal Mortality, PNM and Blood transfusion. As shown in table 4, mean delay in hours for referral to tertiary institute was significantly more in weekdays when compared with weekend referral.

Table 4: Association between mean hours of delay and period of referral (N=400)

Sl.no.	Period of referral	Mean hours of delay	Standard deviation	P value
1.	Weekdays	3.56	1.593	0.002
2.	Weekend	3.14	1.074	

DISCUSSION

In the current observational study 400 patients referred from various peripheral health centres to the tertiary centre were reviewed. Hypertensive disorder of pregnancy was the commonest cause for referral in this study followed by fetal distress and anemia which was similar to a study finding conducted by Gomathy E et al[6]. Similarly, another study by Charu, et al.[7], also reported majority of the referrals to be hypertensive disorders (26%) and preterm labour (26%).

In the current study, out of 400 referral patients, 123 (30.7%) of the patients were referred during the weekend period in the present study and antenatal referral consisted of 95% of all referred cases. 32.5% of the cases had delay of 3 hours to 12 hours in reaching the referral institute. The weekdays referral had more mean hours of duration for delay in referral than those referred during the weekend. In this study the association between weekend referral with maternal and perinatal morbidity were compared with weekday referral cases and found no difference in the outcome. In contrast a study by Palmer WL et al[8] highlights an association between day of delivery and aspects of performance; in particular, babies born at the weekend had an increased risk of being stillborn or dying in hospital within the first seven days. Moreover, the results also suggest increases in the rates of other complications for both women admitted and babies born at weekends, with higher rates of puerperal infection, injury to neonate, and three day neonatal emergency readmissions.

Freemantle N et al[9] reported in their study with higher rates of adverse outcomes associated with hospital admissions and procedures performed at weekends than on weekdays. Another study also reported decreased admission rates from office hours to weekend hours but there was an observed increase in mortality. Further they also demonstrated increased proportion of patients referred from other health centres

gets admitted to an ICU with severe illness during the weekend [10].

Gould and colleagues[11] analysed administrative data from 1.6 million live births between 1995 and 1997 in the United States and found raised levels of neonatal mortality at weekends. Specifically, they observed a neonatal mortality rate of 2.8 per 1000 weekday births compared with 3.1 for weekend births. However, after adjustment for birth weight, the differences were no longer significant. This rejection of the hypothesis of greater complications at weekends has been reiterated elsewhere, including by research in Canada and the United States[12,13]. However, other studies have identified evidence of a weekend effect[14]. Another study in Scotland found an adjusted odds ratio for weekend neonatal death of 1.3, compared with weekday in-hours, which was similar for all out of hours deliveries[15]. Findings are not uniform among studies 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. But the current study was able to identify delay in referral from periphery health centres to the tertiary health institute. This delay may contribute to 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

Out of all seven days in a week, weekend referral accounted for one third of all cases and non-availability of doctors was one of the main reasons which could be corrected with certain policies. Therefore, human resource availability, capacity building, strengthening the protocols and competence of staff, supplies, and equipment, interventions to address the delay in management is advised. 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.

Declaration by Authors

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