Effect of quality of antenatal care on the perinatal outcome: A cross sectional study

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Abstract
Antenatal care is one of the major way by which we can avoid many complications related to pregnancy outcome by very minute and cost effective interventions. Antenatal care is a way of monitoring pregnancy to lead to a successful outcome. A cross sectional study was conducted at tertiary care hospital to know the effect of antenatal care on pregnancy outcome, association of risk factors with poor pregnancy outcome, reasons for poor antenatal care and to increase the awareness about regular antenatal check-up. For this, 100 postnatal women whose baby shifted to NICU were included in this study. Majority (62%) of the study subjects were from urban areas, were educated up to upper primary and belonged to Class 3 socioeconomic status. About 26% of cases had irregular ANC check-up and 74% had check-up more than or equal to 4 during their ANC period. Most common risk factor was anaemia followed by pre-eclampsia and PROM in our study. Among the neonatal risk factors, low birth weight was the most common risk factors. Among all the factors associated with the regularity of the ANC check-up, rural residents had more irregular check-up when compared to the urban areas ($p<0.05$). Educational status of mother and socioeconomic status of the family had significant influence over the regularity of the ANC check-up. All antenatal risk factors except for obstructed labour were significantly higher in the patients who had irregular ANC check-up. Further, low birth weight, preterm birth and infections were also more common in mothers having irregular check-up during the ANC period ($p<0.01$). The present study highlights that regularity of the ANC check-up reduces the perinatal complications. Some factors like socioeconomic status, educational status of mother and residence affect the regularity of the ANC check-up, indirectly affecting the perinatal outcome.

Keywords: Antenatal care, Perinatal outcome, Check-up.

Introduction
Mother and child constitute a single unit during the pregnancy and post pregnancy period.[1] So, the morbidities that affect the mother during this period also affect the foetus and child later. A complete health check-up during this period is of prime importance to reduce morbidity and mortality in the mother and child. According to the World Health Organisation guidelines, at least of 4 antenatal check-up are recommended.[2] In spite of the government's initiatives taken to increase the utilisation of Antenatal (ANC) services, some proportion of women still doesn't take up these advantages.[3] Maternal outcome and poor perinatal outcome are highly associated with non-utilisation of the ANC services. Many studies have been conducted in this regard, but very few studies have been conducted in Central India.[4-22] So, we conducted this study with objective to find the association between the perinatal outcome and regularity of the ANC services and reasons which keep pregnant women away from visiting ANC clinics.

Materials and Methods
A cross sectional study was conducted in a tertiary care hospital in central India in the month of July 2018. The postnatal mothers whose baby was admitted in neonatal intensive care unit immediately after delivery, who gave consent to participate in this study were included. Before the start of the study, all necessary permission was taken from the designated authorities. A total of 100 consecutive study subjects were interviewed using a pretested and predesigned questionnaire. The questionnaire included socio demographic factors like age, socio economic status, educational status etc. and questions related to quality of antenatal care like number of visits during pregnancy, history of complications etc.

A study conducted by Abbas AM et al[4] found out that 25.57% of their study population had irregular ANC check-up. Using this prevalence, with 95% confidence interval and 10% absolute error, we found the minimum sample size to be 73 study subjects. But, for the convenience, we included 100 study subjects. The regularity of the ANC visits was expressed into two categories-regular and irregular. According to WHO guidelines 2016, if the study subject has attended 4 or more ANC visits is considered to be regular and if otherwise it was considered as irregular. The educational status of the mother was divided into categories based on the standard guidelines.[23] The birth weight of the child was classified into low birth weight (less than 2.5kgs) and normal birth weight (more than 2.5kgs) based on the World Health Organisation guidelines.[24] The socio economic status was categorised using the modified BG Prasad classification based on the consumer price index of the study period.[24]

Statistical analysis
The data was collected, compiled and analysed using EPI info (version 7.2). The quantitative variables were expressed in terms of percentages. The quantitative variables were both categorised and expressed in terms of percentages or in terms of mean and standard deviations. Difference between two proportions was analysed using chi square or fisher exact test. All analysis was 2 tailed and the significance level was set at 0.05.

Result

100 subjects were included in the study. The mean age of the study subjects was 25.13 ± 7.86 years. Majority of the study subjects were from urban areas, were educated up to upper primary and belonged to Class 3 socioeconomic status (Table 1).

Table 1: Sociodemographic characteristics of the study subjects

Sociodemographic characteristics	**No**
Age group[#]	
<25	38
25 to 30	47
>30	15
Residence	
Urban	62
Rural	38
Educational status of the mother	
Illiterate	14
Primary	16
Upper primary	40
Secondary	24
Senior secondary	5
Graduate and above	1
Socio economic status [a]	
Class 1	2
Class 2	23
Class 3	45
Class 4	22
Class 5	8
Parity	
Primi	32
Multi	68

#-in years, a- Based on BG Prasad classification

About 26% of cases had irregular ANC check-up and 74% had check-up more than or equal to 4 during their ANC period. About 88% of mothers received TT injections as per schedule, 46% of them received iron, folic acid and calcium tablets and 83% cases were registered cases. About 83% of the mother had gestational age more than 37 weeks at the time of delivery (Table 2).

Table 2: Distribution of study subjects based on the quality of antenatal care

Quality of antenatal care	**No**
Number of visits	
None	0
1	3
2	10
3	13
≥4	74
Number received TT injections (as per schedule)	88
Iron, folic acid and calcium tablets taken	46
Registration status	
Registered case	83
Booked case	17
Not registered	3
Gestational weeks at delivery	
<37	17
>37	83

Most common risk factor was anaemia followed by pre-eclampsia and premature rapture of membranes (PROM) in our study. Among the neonatal risk factors, low birth weight was the most common risk factors. About 65% of the subjects delivered by normal vaginal delivery (Table 3).

Table 3: Distribution of study subjects based on perinatal risk factors (n=100)

Perinatal risk factors	**No**
Antenatal risk factors	
Pregnancy induced hypertension	11
Pre-eclampsia	34
Eclampsia	6
Anaemia	43
Oligohydramnios	13
PROM	17
Obstructed labour	2
Placenta previa	7
Placental abruption	4
Gestational diabetes	6
Neonatal risk factors	
Low birth weight	23
Preterm birth	15
Infections	10
Mode of delivery	
LSCS	35
Normal	65

Among all the factors associated with the regularity of the ANC check-up, rural residents had more irregular check-up when compared to the urban areas ($p<0.05$). Educational status of mother and socioeconomic status of the family had significant influence over the regularity of the ANC check-up. All antenatal risk factors except for obstructed labour were significantly higher in the patients who had irregular ANC check-up. Further, low birth weight, preterm birth and infections were also more common in mothers having irregular check-up during the ANC period ($p<0.01$) (Table 4).

Table 4: Distribution of various factors based on the regularity of the antenatal care

Factors	Irregular (n=26)		Regular (n=74)		P value
	No	%	No	%	
Age					
<25	10	41.67	28	37.83	0.8395
25 to 30	13	54.16	34	45.94	
>30	3	4.17	12	16.23	
Residence					
Urban	11	42.30	51	68.91	0.0081
Rural	15	57.69	23	31.08	
Educational status of the mother					
Illiterate	8	30.76	6	8.10	0.0114
Primary	3	11.54	13	17.56	
Upper primary	10	38.46	30	40.54	
Secondary	2	7.70	22	29.75	
Senior secondary	3	11.54	2	2.70	
Graduate and above	0	0	1	1.35	
Socio economic status					
Class 1	2	7.70	0	0	0.0167
Class 2	8	30.76	15	20.27	
Class 3	13	50.08	32	43.24	
Class 4	1	3.76	21	28.37	
Class 5	2	7.70	6	8.12	
Parity					
Primi	12	46.15	20	27.02	0.0360
Multi	14	53.85	54	72.98	
Gestational weeks at delivery					
<37	10	38.46	7	9.45	<0.001
>37	16	61.54	67	90.55	
Antenatal risk factors					
Pregnancy induced hypertension	9	34.61	2	2.70	<0.001
Pre-eclampsia	21	80.76	9	12.16	<0.001
Eclampsia	8	30.76	3	4.05	<0.001
Anaemia	23	88.46	12	16.21	<0.001
Oligohydramnios	8	30.76	4	5.40	<0.001
PROM	12	46.15	5	6.75	<0.001
Obstructed labour	1	4.17	1	1.32	0.4322
Placenta previa	5	19.23	2	2.70	<0.001
Placental abruption	8	30.76	3	4.05	<0.001
Gestational diabetes	4	15.38	2	2.70	0.0095
Neonatal risk factors					
Low birth weight	15	57.70	8	10.81	<0.001
Preterm birth	10	38.46	5	6.75	<0.001
Infections	7	26.92	3	4.05	<0.001

Discussion

One of the sustainable development goal states that the global maternal mortality ratio has to reduce to 70/ 1,00,000 live births by the year 2030. Further, to end all preventable deaths of new-borns and children under 5 years of age.[25] To achieve this, we have to increase the utilisation of prenatal, antenatal and postnatal services in the developing countries like India. This cross-sectional study was an attempt to study the factors which affect the regular ANC check-up and hence were we are lagging behind in achieving our goal.

The mean age of the study subjects was 25.13 ± 7.86 years. Majority (62%) of the study subjects were from urban areas, were educated up to upper primary and belonged to Class 3 socioeconomic status. About 74% of the study subjects availed regular ANC services during their pregnancy. Studies done by Abbas AM et al[4] inferred the similar results. Some studies conducted by Brown CA et al[9] and Onasoga A et al[20] and Brown CA et al[9] had lower proportion of non-utilisation of the ANC services and the studies done by Sah RB et al,[6] Chingle MP et al,[16] and Azzaz AMS et al[22] had higher utilisation rates when compared to

our study. This difference in the rates of utilisation corresponds to the different geographical locations and the socioeconomic status of the countries included.

The irregularity of ANC check-up was significantly higher in case of lower educational status of the mothers, lower socioeconomic status families and rural areas. Similar results were reported by Abbas AM et al,[4] Raatikainen K et al,[7] Beeckman K et al,[8] Brown CA et al,[9] Tuladhar H et al,[11] Chingle MP et al,[16] Respress ET et al,[18] Eldin HA et al,[19] and Azzaz AMS et al.[22] A study done by Andrade MV et al[14] inferred that the socioeconomic inequality affects the regularity of the ANC check-up.

Further, the risk factors during the ANC period like pregnancy induced hypertension, eclampsia, anaemia, oligohydramnios etc were significantly higher in the those who had irregular ANC check-up. Similar results were postulated by studies done by Abbas AM et al,[4] Polite OT et al,[5] Tuladhar H et al,[11] Eldin HA et al[19] and Azzaz AMS et al[22] A study conducted by Raatikainen K et al[7] did not find any significant difference between the rates of anaemia and pre-eclampsia in their study.

Similarly, the neonatal complications like low birth weight, preterm birth and infections were significantly higher in the mothers who have had irregular ANC check-up. Similar results were inferred by the studies conducted by Azzaz AMS et al[22], Chingle MP et al,[16] Polite OI et al[5] and Abbas AM et al.[4] A study done by Arunda M et al[12] in the Kenyan population inferred that the regularity of ANC check-up was an independent predictor for the neonatal morbidity and mortality. Another study done by Sah RB et al[6] concluded that the neonatal complications were significantly higher in mothers with irregular ANC check-up.

The study had some limitations. One of them was that it was a hospital based cross sectional study in a smaller sample. Larger analytical studies conducted in community will yield better generalizable results. In spite of the limitations, the study added up to the pool of knowledge of the proportion of mothers having regular ANC check-up and their associated perinatal outcome.

Conclusion

The present study highlights that regularity of the ANC check-up reduces the perinatal complications during the pregnancy. Some factors like socioeconomic status, educational status of mother and residence affect the regularity of the ANC check-up, indirectly affecting the perinatal outcome. Interventions like proper health education for ANC offered by the peripheral health workers, strengthening the health systems and ensuring proper referral systems will reduce the irregularity of the ANC check-up. This will further lead to better perinatal outcome.

Lets come together to defeat perinatal morbidity and mortality with healthy mother!!!

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Conflict of interest

None.

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