

Assessment of the effect of Antenatal checkups and IFA supplementation on pregnancy outcome

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Abstract

Background: The antenatal care is systematic supervision (examination and advice) of a woman during pregnancy.

Objectives: To assess the effect of ante-natal check-ups and iron and folic Acid supplementation on pregnancy outcome.

Material and methods: A cross sectional study was conducted among the pregnant women admitted for delivery between the January 2008 to June 2008 in Maharani Laxmi Bai Medical College & Hospital, District Jhansi. Data collected in a pre-structured questionnaire were analyzed by using Chi square test.

Results: Frequency of low birth weight babies was 42(27.27 %), 26(24.07 %), and 7(4.38 %) in mothers who underwent nil, 1-3 and ≥ 3 ante natal checkups respectively. Relationship between iron and folic acid intake and pregnancy outcome in the form of LBW and normal birth weight babies was highly significant statistically ($p < 0.001$).

Conclusions: Ante-natal check-ups and IFA supplementation were found to be major determinants of birth weight and pregnancy outcome in the form of still birth and low birth weight.

Key Words: Ante natal care, iron and folic acid, maternal factors, pregnancy outcome, low birth weight, still births

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Introduction: Child health is closely related to maternal health. A healthy mother brings forth a healthy baby. Various social and environmental factors may influence human reproduction. The Antenatal Care is systematic supervision (examination and advice) of a woman during pregnancy. The supervision should be of a regular and periodic nature in accordance with the principles laid down or more frequently according to the need of individual. The care should start from the beginning of pregnancy and end at delivery.

Adequacy of prenatal care use and the association of use to a series of maternal risk factors and pregnancy outcomes, such as low birth weight, preterm delivery and macrosomia in both Mexican Americans and Non Hispanic Whites in Arizona were studied by Bakazar et al (1992).¹ Antenatal care plays a significant role in the birth weight of the newborn as evident by LBW proportion of 46.4% in the no care group, 40.9% in inadequate care and 30.9% in adequate antenatal care group (Gawande et al, 1994).²

Iron deficiency is the most commonly recognized nutritional deficiency in both the developed and the developing world. It is estimated that < 50 per cent of women do not have adequate iron stores for pregnancy. Requirements for absorbed iron increase during pregnancy from 0.8 mg/day in the first trimester to 7.5 mg/day in the third trimester. Average requirement during the entire gestation is approximately 4.4 mg/day. An adequate iron balance during pregnancy implies body iron reserves of >500 mg at conception. The physiologic iron requirements in the second half of gestation cannot be fulfilled solely through dietary iron.³ Iron deficiency anaemia has been shown to be associated with low birth weight and preterm delivery.^{4,5}

Low birth weight and anemia remain intractable problems in many developing countries despite considerable efforts to address them. Intervening with prenatal iron-folate (IFA) supplements may be the best approach given the substantial demands for iron by maternal and fetal tissues.

Material and Methods: This hospital based cross sectional study was carried out in the department of Social and Preventive Medicine, Obstetrics & Gynecology and Microbiology in M.L.B. Medical College Jhansi between Jan. 2008 to June 2008. Criteria for choosing the hospital of M.L.B. Medical College Jhansi as a study area was that it covers most of the patients from different parts of the Jhansi district. Women admitted for delivery in the maternity ward of the department of Obstetrics & Gynecology and their newborn babies were taken as a study unit. The study was approved by the institutional ethics committee.

Before collection of data an informed consent was obtained from all the mothers who were admitted for delivery in the department of Obstetrics & Gynecology. The low birth weight (LBW) amongst the live births of the pregnant women was considered as basis for

computation of the sample size. For this purpose, observations were initially made on first 100 study subjects as a pilot study (n=100). Amongst these pregnant women, outcome of their pregnancy for 92 women (92.0%) was a live birth while rest 8 (8.0%) resulted in stillbirths. When further observations were made on these 92 babies, it was found that 20 (21.74%) had LBW while 72 (78.26%) had normal birth weight, following the standard criteria. A sample size of 450 was calculated at 95% level of significance, 20% allowable error.

The sample size was computed using method, often applied for descriptive studies, given below (Indrayan, 2006):- Sample size (n) = $Z^2 \cdot 1 - \alpha/2 \cdot p \cdot (1-p) / d^2$, where d is the specified absolute precision on either side of the proportion. Here, p = 21.74, 1-p = q = 78.26 and taking d = 20% and sample was calculated as 346. Giving further allowance of non-coverage as well as non-response, on safer side, a sample of size (n) 450 was finally taken and we studied all the women who were admitted for delivery.

Information gathered and observations made were recorded on a predesigned & pretested questionnaire and outcomes were seen in the form of still births and live births & LBW and normal weight babies. The data were analyzed and interpreted by using percentages & Chi-square test and p < 0.05 was used as the definition of statistical significance.

IFA intake was classified as regular, if the mother had taken a course of 90-100 tablets during whole pregnancy, it was called irregular if she had taken less than 90 tablets and it was grouped into no tablet group if the mother reported that she not taken even a single tablet.

Inclusion Criteria: Women who had delivered in the maternity ward of the hospital and their newborn babies.

Exclusion Criteria: Multiple pregnancy and women who had not given the consent.

Result: Among all, 172 (38.22%) mothers did not have any ante- natal check up while another 160 (35.56%) mothers had 3 or more checkups. 118(26.22%) mothers had 1-3 ante- natal check up. Best pregnancy outcome was seen in mothers who had 3 or more checkups and in these mothers 146(95.42 %) pregnancies terminated in live deliveries with normal birth weight while in case of those mothers who did not undergo any ante natal check up, only 112 (72.72 %) mothers delivered normal birth weight babies.

Relationship between ante natal checkups and pregnancy outcome in the form of still births and live births was statistically significant ($p < 0.05$). Still births were highest (10.47%) in mothers who did not have any antenatal check up and relationship between ante natal checkups and pregnancy outcome in the form of LBW and normal birth weight babies was also highly significant statistically ($p < 0.001$). Frequency of LBW babies was highest in mothers who did not undergo any ante natal check up. (Table-1)

Among the mothers who took full course of iron and folic acid tablets, 1(2.22 %) pregnancy was terminated in still birth, 4(9.09 %) in LBW babies and 40(90.09 %) in live born normal weight babies. In contrast, in mothers who did not take any IFA tablet, 20(8.51%) pregnancies terminated in still birth and 53(24.65 %) in LBW babies and 162(73.35%) in live normal weight babies.

Relationship between iron and folic acid intake and pregnancy outcome in the form of still births and live births was statistically not significant ($p < 0.5$). Relationship between iron and folic acid intake and pregnancy outcome in the form of LBW and normal birth weight babies was highly significant statistically ($p < 0.001$). Frequency of LBW babies was high in mothers who had not taken any IFA tablets. (Table-2)

Table 1: Pregnancy outcome according to ante natal checkups

Ante-natal Checkups	Still Birth		Live birth						Grand Total	
			Low Birth Weight		Normal Birth Weight		Total			
	No.	%	No.	%	No.	%	No.	%	No.	%
Nil	18	10.47	42	27.27	112	72.72	154	89.53	172	38.22
1-3	10	8.47	26	24.07	82	75.93	108	91.53	118	26.22
≥3	7	4.38	7	4.38	146	95.42	153	95.63	160	35.56
LBW and normal birth weight - $\chi^2 = 34.14$ d.f.= 2, $p < 0.001$										

Table 2 : Iron and folic acid intake and pregnancy outcome

Iron and Folic Acid Intake	Still Birth		Live birth						Grand Total	
			Low Birth Weight		Normal Birth Weight		Total			
	No.	%	No.	%	No.	%	No.	%	No.	%
Regular (90-100 tab.)	1	2.22	4	9.09	40	90.09	44	97.78	45	10.00
Irregular	14	8.24	18	11.54	138	82.05	156	91.76	170	37.78
No tablets	20	8.51	53	24.65	162	73.35	215	91.49	235	52.22
Still births and live births- $\chi^2 = 2.80$, d.f.= 2, $p < 0.50$										
LBW and normal birth weight- $\chi^2 = 20.10$, d.f.= 2, $p < 0.001$										

Discussion: Antenatal care (ANC) is care given to a pregnant woman before delivery. The purpose of ANC is to prepare the mother for child birth in order to promote a favourable outcome for the mother and the child. While several studies suggest that certain components of ANC may have limited impact on reducing maternal morbidity and mortality, some of the dangers of pregnancy and child birth can be

avoided if the pregnant woman attends ANC.⁶⁻¹⁰

We observed that out of total 450 mothers studied, the outcome of 35(7.78 %) pregnancies was in the form of still births and 415(92.22%) of live births and among live births, 75(18.08%) babies were low birth weight. Gupta et al observed percentage of still birth in their study amounting to 1.8%.¹¹ But regarding low birth weight a similar finding was observed by Deswal et al.¹²

Regarding antenatal check up and pregnancy outcome, best pregnancy outcome was seen in mothers who had 3 or more checkups and in these mothers only 4.38 % pregnancies terminated in LBW babies. In contrast, in those mothers who did not undergo any antenatal check up, 27.27% mothers delivered LBW babies. The association between antenatal check up and frequency of LBW babies was highly significant statistically. Gawande et al (1994) obtained LBW proportion of 46.4 % in no care group, 40.9 % in inadequate care and 30.9% in adequate antenatal care group.² This difference was statistically significant. Das et al had also drawn similar conclusion.¹⁰ The impact of antenatal check up on pregnancy outcome may be due to the fact that antenatal checkups results in early detection of high risk cases and complications and their prevention or treatment. According to Celia A Brown et al, women attending for two ANC visits were more likely to have a healthy weight baby (OR 4.39; 95% CI 1.36–14.15).¹³

In our study, a highly significant statistical association was found between IFA intake and pregnancy outcome. Among the mothers who took full course of IFA tablets, 9.09% pregnancies terminated in LBW babies while in mothers who did not take any tablet, 24.65% pregnancies terminated in LBW babies.

During pregnancy the blood volume increases by 30%; 50 % increase in plasma volume and 18-25% in the red cell volume. This results in dilution of the red cells and a reduction in

haemoglobin concentration. The dilutional anaemia is further aggravated if the increasing demands of iron and folic acid during pregnancy are not met. IFA intake increases haemoglobin concentration, decreases anaemia and thus causes a reduction in abortions, premature births, still births and low birth weight babies. In our study 42% mothers were found to be anaemic. A highly significant association ($p < 0.001$) was found between maternal haemoglobin concentration and still births and highly significant association ($p < 0.001$) between maternal haemoglobin concentration and delivery of LBW babies.

With decrease in haemoglobin concentration, an increase in still births was observed. In mothers having normal haemoglobin, 4.60% pregnancies terminated as still births and 12.05% in the delivery of LBW babies, while in severe anaemic group 46.15% pregnancies terminated as still births and 71.42% ended in the delivery of LBW babies.

Deshmukh et al attained an odds ratio of 4.81 in anaemia with LBW babies.¹⁵ Naik et al and Anand et al also obtained a significant association of haemoglobin concentration with low birth weight babies.^{16,17}

Conclusion: Still births and LBW babies were high in mothers who did not go any antenatal checkup and relationship between iron and folic acid intake and pregnancy outcome in the form of LBW and normal birth weight babies was found statistically highly significant ($p < 0.001$). Iron and folic acid intake and antenatal care improved the pregnancy outcome significantly. The most powerful of all interventions, the 'key of key' is the education of the girls. Organizing access to antenatal care is potentially important since it also offers opportunities for counselling and risk detection. Operational strengthening and convergence of relevant programmes including the Reproductive and Child Health Programme, the Integrated Child Development Services

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Programme and Literacy Mission. Advocacy at the political level is needed to secure commitment, allocation of resources and appropriate policy development. Effective communication, empowerment of individuals and families through appropriate IEC is a critical need.

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