

Factors affecting birth weight in a rural community at IIMSR Medical College and Noor hospital, Varudi, Badnapur, Jalna

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Abstract

Background: Birth weight is an important indicator of maternal health and nutrition during pregnancy and the quality of health care services as well as predictor of neonatal morbidity and mortality. **Aim:** To recognise the influence of various maternal factors on pregnancy outcome which may help us to improve the planning of prenatal care for Indian women and of anticipatory care for the infants. **Method:** The present study was conducted on 654 newborn babies delivered at Noor Hospital of IIMSR, Badnapur over a period of one year. Only babies of known gestational age of uncomplicated pregnancies who were delivered after 37 and before 42 completed weeks were included in this study. **Results:** The average birth weight in the present study was 2.871 kg. The effect of various factors i.e. maternal age, parity, weight gain, education, socioeconomic status and sex of the baby on birth weight of infant was studied. Maternal age group 25-29 years had a protective effect on the birth weight. There was an increasing trend in birth weight with increase in parity, maternal education and antenatal visit. **Discussion:** Maternal age, Parity, nutrition, education, antenatal care and sex of the infant were found to be important and significant factors contributing to the birthweight of the infant. An improvement in health care system, an awarenesses in general population towards values of antenatal care and better health of the mother at the onset of reproductive life have helped to improve the birthweight of babies and decrease the perinatal mortality ratio.


Keywords: Birth weight, maternal age, parity, socioeconomic status, education, antenatal care.

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INTRODUCTION

Birth weight is the single most important criterion for determining the neonatal and infant morbidity and mortality. Low birth weight is a sensitive indicator of the socio-economic conditions and indirectly measures the health of mother and the child. At birth, fetal weight is accepted as a parameter that is directly related to the health and nutrition of the mother as well as an important

determinant of the chances of the newborn to survive and experience healthy growth and development. The prenatal period is one of the most vulnerable in the human life cycle. During this period, the mother serves as a gate-keeper and child health is dependent on whether she admits into her own system those elements that are essential to a healthy pregnancy. These include adequate nutrition, timely medical care and sufficient education to make informed choices on behalf of her unborn child. Major determinations of birth weight include maternal factors such as maternal nutritional status at conception (i.e. maternal height and weight), parity, child spacing, maternal age, gestational weight gain in accordance with dietary intake, chronic infection (like malaria); behavioral factors like tobacco chewing, educational level and socio-economic factors like household income, housing tenure, occupational class, maternal employment status, access to good quality prenatal care. Studying the determinants of birth weight is important for both public and clinical perspective. Such information would be crucial in

understanding the secular trends and changes in the socio-economic status of people which would influence the birth-weight of infants. During the past decade, several interventional programmes including reproductive and child health have been launched all over India to improve the health status of the mother and children. The present study was designed to examine the socio-demographic variables affecting the birth-weight of newborn in the rural areas of Badnapur, Jalna. A study of this nature is important in view of the need to identify critical variables that are amenable to appropriate intervention to enhance the survival and life chances of children.

MATERIAL AND METHODS

This is an observational population based study. The present study was conducted on 654 newborn babies delivered at Noor Hospital of IIMSR Medical College, Badnapur, Jalna over a period of one year i.e. January 2014 to December 2014. Only babies of known gestational age of uncomplicated pregnancies who were delivered after 37 and before 42 completed weeks were included in this study. Newborns were weighed and the general physical conditions assessed immediately following delivery. Information regarding maternal factors like maternal age, parity, spacing between pregnancies, maternal education and her occupation was obtained. Analysis was carried out using descriptive statistics and chi-square test of significance was employed in testing for association between the variables. The level of significance was set at 0.05.

RESULTS

The mean birth weight was 2.871kg [S.D. = 0.407] and ranged between 1.6kg and 4.2kg.

Table 1: Mean and SD of Birth weight in kg

Birth weight in kg	
Mean	2.871
SD	0.407

Maternal age group 25-29 years had protective effect on birth weight i.e. average birth weight of newborn baby between 25-29 years is 3.23 kg [S.D. = 0.55] while maternal age >30 years had almost equal risk on birth-weight as <25 years maternal age.

Table 2: Comparison of AGE Group and Birth weight

Age	No of Sample	Mean±SD	F-Value	p-value
18-23	334	2.82±0.40		
24-29	282	2.92±0.40		
30-35	35	2.91±0.44	4.629	0.003 HS
>35	3	3.23. ±0.55		
Total	654			

(p<0.01) – Highly significant (HS); (p<0.05) – Significant (S); (p>0.05) – Not significant (NS);

Table 3: Comparison of Parity and Birth weight

Parity	No of Sample	Mean±SD	F-Value	p-value
I	177	2.75±0.33		
II	286	2.90±0.41		
III	142	2.95±0.41		
IV	42	2.90±0.52	6.387	0.000 HS
V	3	3.25±0.75		
VI	4	2.76±0.46		
Total	654			

(p<0.01) – Highly significant (HS); (p<0.05) – Significant (S); (p>0.05) – Not significant (NS); Out of 654 newborns included in the study, 326 were male babies and 328 were female babies. The mean birth weight for male babies was 2.89kg, while that of female babies was 2.86kg. There was no significant statistical difference in the mean birth-weight of male and female babies.

Table 4: Relation of birth-weight to sex of child

Characteristics	Total	Birth weight (Mean±SD)	p-value
Male	326	2.89±0.41	
Female	328	2.86±0.40	0.462NS

(p<0.01) – Highly significant (HS); (p<0.05) – Significant (S); (p>0.05) – Not significant (NS);

Table 5: Relation of birth weight to socio-economic status

Socio-economic status	ANC Total	Birth weight (Mean±SD)	p-value
Housewife/Educated working mothers	197	3.034±0.901	
Labour work	457	2.881±0.612	0.0119 S

(p<0.01) – Highly significant (HS); (p<0.05) – Significant (S); (p>0.05) – Not significant (NS);

The housewife and educated working women were having children with birth-weight 153gms more (P < 0.001) which was statistically significant as compared to the children of labourers.

Table 6: Relation of birth weight to ethnic groups

Religion	Total No.	Birth weight	p-value
Hindu	434	2.83 ± 0.39	
Muslim	320	2.96 ± 0.42	0.000 HS

(p<0.01) – Highly significant (HS); (p<0.05) – Significant (S); (p>0.05) – Not significant (NS);

It is traditionally believed that different ethnic groups show different patterns of growth. On average, the newborns of Muslim population was heavier than the newborns of Hindu population. More recently, the Multicentric Growth Reference Study group confirmed this brief showing that variability in infant growth was greater within population groups than between the different country groups.

Table 7: Relationship between number of antenatal visit and birthweight

Number of ANC visits	ANC Total	Birth weight (Mean±SD)	p-value
< 3	76	3.002±0.251	0.0389
>= 3	578	2.77±0.974	

($p < 0.001$) – Highly significant (HS); ($p < 0.05$) – Significant (S); ($p > 0.05$) – Not significant (NS);

The birth weight of the children whose mother had regular ANC visit (i.e. ≥ 3) had 250gm heavier babies as compared to those who had less ANC visits which was statistically significant.

DISCUSSION

The mean birth-weight in the present study was 2.871kg (S.D. = 0.407) which was similar to other studies conducted by Athavale *et al*, New Delhi and Aparajita Dasgupta *et al*, West Bengal and was 200gm more than the mean birth weight in the study conducted by Agarwal *et al*, New Delhi.

Maternal Age

The study results establish that birth-weight is significantly associated with mother's age. More number of mothers below 20 years of age and above 30 years of age have delivered more low birth-weight babies. In India, 34 percent of the women in the age group of 15-19 years are married and contribute to 19 percent of births a year with a variation of 59 percent to 21.4 percent according to a study conducted in Madhya Pradesh. The law to prevent marriage of female before the age of 18 years in India has not been found successful. So, it is highly desired that the concerned authorities should take appropriate initiatives to implement the right age of marriage for females in letter and spirit. It must be seen that females should bear child after they are 20 years old. This initiative would help in reducing the high IMC which is high in the case of younger mothers, especially the mothers below 20 years of age.

Parity

A significant association was found between birth weight and parity, similar to the observation made by Felke Y *et al* and Pinherio *et al*. With increase in parity, there is increase in birth weight.

Sex of the baby

There was no difference in the birth weight of male and female babies which was similar to the observation made by Felte Y *et al*.

Maternal Education and Occupation

Educated working mothers and housewives are better nourished and have an easier workload than mothers doing labour works. The children of these women also were heavier which is similar to other studies (Oni 1986; Tafari *et al* 1980; Van Sprundel *et al* 1988). Maternal education improves the financial resources available to

the child directly and indirectly through the choice of partner, timing of fertility and number of off springs.

Antenatal Care

Non-utilization of antenatal care during pregnancy was independently and significantly associated with low birth weight ($p < 0.05$) which is in agreement with the findings of Pinherio A. *et al*, Nadiaye O *et al*, Abu-Heija *et al* and Gortaz-uzan. Only 65 per cent of the mothers in India received at least one antenatal check up during the three years preceding the survey (NFHS-2). The awareness to avail this facility will improve the utilization and decrease the percentage of low birth weight babies and infant mortality. There is a greater need to increase the coverage of ANC for all pregnant women.

Fetal Origin of Adult Disease

Dr. David barker first popularised the concept of Fetal origins of adult disease (FOAO). The FOAO hypothesis holds that events during early development have a profound impact on one's risk for development of future adult disease. Low birth weight, a surrogate mothers of poor Fetal growth and nutrition, is linked to coronary artery disease, hypertension, obesity and insulin resistance.

CONCLUSION

Birth weight is positively and significantly influenced by mothers age, parity, educational level, antenatal care and household income. The policy implication is that improvement in the health status of the children (proxied by birth weight) can be attained through concerted efforts to improve the education levels of the women and provision of quality reproductive health care services to expectant mother.

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