MATERNAL FACTORS INFLUENCING BIRTH WEIGHT IN RURAL POPULATION

by

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SUMMARY

Age and Parity of mother and genetic factors (e.g. sex of child) have not much share in BW determination in rural community. Spacing of more than 2 years will yield better results. Nutritional status of mothers should be improved through education, supplementation and rehabilitation as it has beneficial effects on BW also. Domestic or clinic based antenatal care of mothers, to detected morbidity and assure normal labour, is advantageous in determining BW. All this can be achieved by strengthening infrastructure of health services.

Introduction

Inspite of continuous efforts to improve the quality of maternal and child health, the situation is far from expected. More than 21 million low birth weight babies are estimated to be born every year throughout the world, almost 20 million in the developing countries (W.H.O., 1976). Half of all perinatal and one third of all infant deaths are directly or indirectly due to low birth weight. In a developing country like India, majority of low birth weight (LBW) chidren are in rural areas or in other unprevileged groups. Thus recognition of factors affecting birth weight (BW) needs due attention to assure proper development and intellect in the productive population of future.

Birth weight is a very important determinant that commands the quality of life of the future population. Its importance is much more in a developing country, where a large proportion of mortality in childhood is attributable to it. More than 50 per cent children die before they have ever a chance to add to the productivity of our country. Th expenses incurred upon them in their growing up, nutrition, school education etc. go in vain. The fact that the seed of death in a majority of them was sown even before birth enhances the importance of birth weight. Improvement in BW of a community is thus an unavoidable task in view of attending development.

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Material and Methods

The present study aims at analysing factors that determine BW particularly in rural areas. Records maintained at Rural Health Training Centre, Vallabhanagar, attached to Medical College, Udaipur for 4 years (between June, 1977 to May, 1981) were analysed. Pregnant women who attended antenatal clinic at the centre or were paid domestic visits atleast twice were termed as 'booked'. Investigations could be carried out only in 'booked' antenatal women.

Three hundred and forty-nine new born children who were weighed within 24 hours of birth in the study period were included in the study. New borns whose BW could not be measured due to various reasons were excluded from the present study.

Observations

The mean BW of 159 female children was found to be 2.59 ± 0.40 kg and was lower than that of 190 male children, being 2.63 ± 0.37 kg. However, the difference was found to be insignificant (Z = 1.29).

On analysing distribution of BW according to age of mother, it was revealed that the mean BW was highest in the age group of 26-30 and 31-35 years. but declined with age groups lower than 25 or higher than 35 years of age (Table I).

TABLE I

Distribution of Birth Weight According to Age of Mother

Age of mother (years)	Birth—Weight (kg.)				Total	Mean Birth wt	SD
	<2	2-2.50	2.51-3.0	>3			
upto 20	3	14	11	0	28	2.50 ± 0.34	
21-25	8	87	70	9	174	2.57 ± 0.38	
26-30	1	58	46	11	176	2.67 ± 0.34	
31-35	0	12	11	2	25	2.71 ± 0.33	
above 35	1	2	2	1	6	2.61 ± 0.48	
Total	13	173	140	23	349	2.60 ± 0.36	

$X^2 = 15.61$; df = 12; P >0.05

TABLE II

Distribution of Birth Weight According to Weight of Mother

Parity	Birth—Weight (kg.)				Total	Mean Birth wt.	SD
	<2	2-2.50	2.51-3.0	<3			
I	5	45	30	1	81	2.49 ± 0.43	
II	2	34	33	4	73	2.62 ± 0.91	
III	3	32	23	8	61	2.54 ± 0.38	
IV	1	31	30	7	69	2.69 ± 0.33	
V	1	14	8	5	28	2.67 ± 0.42	
VI +	1	17	16	3	37	2.70 ± 0.36	
Total	12	173	140	23	349	2.60 ± 0.36	

$X^2 = 16.66$; df = 15; P >0.05

Primis comparatively gave birth to lighter children (2.49 kg), though the differences from other parity groups were insignificant (Table II). Thus statistically age of mother and parity had no significant influence on BW in rural areas. On the other hand, it was observed that interval between the present birth and the previous one (spacing) was obviously more important. BW gradually increased with increase in the span of spacing, significant rise occurring after an interval of two years (Table III).

Women with shorter stature (less than 145 cm) gave birth to children with comparatively less BW. The difference was significant as compared to taller women (Table IV).

A correlation could be observed between mean haemoglobin (Hb) levels of mothers and BW offsprings, the latter increasing with rise in Hb values. However, a significant rise in BW could be achieved only after th levels were higher than 10 gm% (Table V).

It was revealed that 'booked' mothers gave birth to children with mean BW of 2.64 kg as compared to 2.49 kg in unbooked and the difference was found to be significant. In the 'booked' mothers, frequency of visits did not affect BW significantly (Table VI).

Thirty-four children was born to mothers who had some systemic or obstetrical morbidity during antenatal period. Their mean BW was 2.46 kg as compared

TABLE III

Distribution of Birth Weight According to Spacing of Births

Duration of last spacing (years)	Birth—Weight				Total	Mean SD	'Z' value
	<2	2-2.5	2.6-3.0	>3			
<2	4	39	12	2	57	2.35 ± 0.41	2.93*
2-3	2	42	41	8	93	2.54 ± 0.30	0.54
3-4	1	36	36	9	82	2.57 ± 0.38	51
>4	1	11	21	3	36	2.61 ± 0.39	
Total	8	128	110	22	268	2.52 ± 0.38	

* Statistically significant.

TABLE IV

Distribution of Birth Weight According to Height of Mother

Height (cm)	Birth—Weight (kg.)				Total	Mean	SD
	<2	2.0-2.50	2.51-3.0	>3			
<145	2	26	4	0	32	2.46 ± 0.18	
146-150	3	55	54	12	124	2.53 ± 0.34	
151-155	1	20	34	6	61	2.60 ± 0.41	
>156+	0	25	18	2	45	2.57 ± 0.31	
Total	6	126	110	20	262	2.61 ± 0.32	

$X^2 = 28.38$; df = 9; P <0.001

TABLE V
Distribution of Birth Weight in Relation to Hb Values of Mothers

Hb (gm%)	Birth—Weight (kg.)				Total	Mean SD	'Z' value
	<2	2-2.50	2.51-3.0	>3			
Upto 8	2	1	0	0	3	2.10 ± 0.36	1.81
8.1-10.0	0	65	49	3	117	2.48 ± 0.32	5.94*
10.1-12.0	4	59	59	17	139	2.71 ± 0.32	0.59
12.1+	0	1	2	0	3	2.80 ± 0.26	
Total	6	126	110	20	262	2.61 ± 0.32	

*Statistically significant.

TABLE VI
Distribution of Birth Weight According to Antenatal Regisration of Mothers

Antenatal Registration	Birth—Weight				Total	Mean SD	'Z' value
	<2	2-2.50	2.51-3.0	>3			
Unbooked	7	47	30	3	87	2.49 ± 0.38	3.26*
Booked	6	126	110	20	262	2.64 ± 0.35	
(a) 1-3 visits	3	101	72	16	192	2.54 ± 0.54	1.60
(b) 4-6 visits	3	19	27	2	51	2.64 ± 0.35	0.47
(c) >6 visits	0	6	11	2	19	2.72 ± 0.76	
Total	13	173	140	23	349	2.60 ± 0.36	

*Statistically significant.

to 2.63 kg in their counterparts. Similarly, children born by normal labour (341 out of 349) had mean BW higher than that of children born by difficult labour. In both instances, differences were statistically significant. (Table VII).

Discussion

In the present study, age of mother has little bearing on BW. On the other hand, Murphy *et al* (1981) found a strong statistical correlation between age of the mother at the time of delivery and BW. Lynch and Roberts (1977) also revealed importance of young maternal age and its relation to child abuse. But these studies were conducted in higher socio-economic groups in developed countries. Fedrick and Adelstein (1978) observed that mothers between 20-29 years were less likely to have LBW babies. In our study also the percentage dropped from 10.6 to 5.1 in the age groups upto 20 and 21-25 years respectively. Many other studies (Wolanski, 1978; Pachauri and Marwah, 1970; Ghosh

TABLE VII

Birth Weight in Relation to Antenatal Morbidity and Type of Labour

Birth weight:	<2	2-2.50	2.51-3.0	>3	Total	Mean SD	'Z' value
Antenatal morbidity							
(a) Present	2	15	19	0	36	2.46 ± 0.32	2.88*
(b) Absent	4	111	91	20	226	2.63 ± 0.34	
Type of labour							
(a) Normal	10	169	139	23	341	2.62 ± 0.42	2.88*
(b) Abnormal	3	4	1	0	8	2.10 ± 0.51	

*Statistically significant.

et al, 1977) have revealed higher incidence of LBW below 20 years of age. These findings show the importance of age of woman at the time of first delivery which depends on age at the time of marriage.

Besides age of mother, her parity is also an important determinant of BW. Ghai (1980) observed that primipara as well as grandmultipara (beyond 4th parity) had smaller babies. However, Pachauri and and Marwah (1971) found that parity was least important in its effect on BW. Our findings also do not show any significant difference. Spacing of births seems to be more important factor than parity as indicated by Ghai (1980), Mukherjee and Sethna (1970) who ellaborate that incidence of LBW was least when spacing was 2-3 years. In the present study also, statistically significant increase in BW could be achieved after spacing of more than 2 years.

An interesting finding was a significant difference in different groups of mothers accordig to height, being more in taller mothers. Khatau *et al* (1979) documented that mothers who were less than 145 cm in height were more prone to have small-for-date babies and our findings are in conformity with their observations.

Nutritional status of mothers affects that of children is an old saying. In the present study mean BW rose significantly as the Hb values increased beyond 10 gm%. Merchant and Seth (1977) observed 30% small-for-date infants belonged to anaemic mothers (less than 50% Hb values). On the other hand, Bhargava (1977) could not demonstrate a significant correlation between nutritional status of the mother and BW of the offspring. But Ghai (1980) puts that mean BW and incidence of LBW infants correlate very significantly with maternal nutrition. Impaired foetal growth is often due to insufficient supply of nutrients to the foetus from mother, which may be as a result of maternal under-nutrition or reduced placental transport of nutrients (Greenwald, 1966).

Care of mother and the growing foetus depends much upon attending antenatal clinic. This would help them in dealing with any morbidity including anaemia and at the same time helps in getting protective immunizations, nutritional supplementation and education etc. The best way

to elicit its effect on BW could be done by comparing mean BW of children born to 'booked' and 'unbooked' mothers. Our analysis showed significant values of registraion at antenatal clinic in improving BW. Murphy *et al* (1981) suggest that period of gestation at 'booking' and number of antenatal attendances had strong correlation with the child abuse. In the present study no significant difference was observed between number of antenatal visits and BW.

Morbidity during pregnancy has adverse effect on the foetus. and the child born to such mothers had significant lower BW values. According to Ghai (1980) A.P.H. causes high proportion of infants who were small-for-date. It has been observed that toxemia interferes with placental circulation and the bio-chemical environment resulting in foetal malnutrition. Maternal infection, directly or indirectly, results in maternal and thus foetal undernutrition. Khatua *et al* (1979) found high incidence of small-for-date infants amongst mothers with rheumatic heart disease and hypertension. Tuberculosis had similar effects. A significant difference in mean BW could be established between children born by normal labour or those presenting difficulties during labour. However, these findings need further ellaboration as only 8 cases of complicated labour featured in the present study.

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