AN EPIDEMIOLOGICAL SURVEY OF MATERNAL FACTORS RELATED TO BIRTH WEIGHTS AT A REFERAL HOSPITAL IN NORTHERN INDIA

N. R. BISWAS ● R. UPPAL ● K. BISWAS ● G. SHOBA ● S. KARMARKAR
G. I. DHALL ● P. L. SHARMA

SUMMARY

Five hundred and thirty two women and their off springs comprised the sample of this study. Mothers delivering their babies at the Nehru Hospital were subjected to measurement of height, weight and weight height product index (WHPI), and their age, parity and hemoglobin estimation were documented. For the new born the birth weight (BW) and period of gestation (POG) were noted. The correlation of WHPI to BW was positive. The period of gestation (POG), and BW shows a positive correlation.

INTRODUCTION

Maternal nutrition and the growth of the fetus have a close association. Complications of pregnancy like toxemia and hypertension can affect the supply line of nutrients to the fetus and cause growth retardation. Maternal parity is also an important variable. Several attempts have been made to identify socio-economic determinants of birth weight in developing countries.

The present study had the objective of examining maternal height, weight, age, parity, hemoglobin and period of gestation of women admitted at the Nehru Hospital (attached to PGIMER) for child birth. The birth weight of the newborn was related to these maternal variables.

MATERIAL AND METHODS

Five hundred and thirty two women admitted to the maternity wards/labour room for child birth and their new borns

constituted the subjects for this study.

For each mother, the age, height, weight, parity, hemoglobin levels were noted. For the new born, the sex, birth weight and period of gestation. Any complicating disease of pregnancy was noted; as well any complication in the new born.

Using the formula (Bhatia et al 1989), weight height product index (WHPI) was calculated. Simple correlations were examined using bivariate statistical analysis, between WHPI and BW, age and BW, POG and BW.

RESULTS

Weight height product index (WHPI) was calculated using the formula.

$$\frac{Wt \ (Kg) \ x \ Ht \ (cm)}{67.5}$$

Table I shows the range of WHPI related to the BW with actual numbers and percentages of mothers with complications during pregnancy. The correlation between the WHPI and BW is positive with a r value of 0.61.

Maternal age in relation to BW is shown in Table II. The largest number of child births were in the 20-25 year range. Their value was - 0.76 showing a negative correlation. The correlation between BW and POG was highly positive with r value of 1. BW of babies who went beyond 37 weeks (POG) upto a term was highest (Table III).

Table IV lists the parity of women comprising this sample and their hemoglobin levels. Table V lists the complicating diseases in the mother and the new born.

Out of the total number of new borns, male born were 267 and female 287. Twin-pregnancy was seen in 19 and triplets in

Table I

Height weight product index (HWPI) in mothers relation to birth weight (BW)

HWPI	Range of BW of baby	Percentage	Actual No.
< 100.0	2.6-3 Kg	2.06 (0.75)	11 (4)
101-120	2.6-3 Kg	6.95 (2.32)	37 (7)
121-140	2.6-3 Kg	11.3 (2.63)	60 (14)
141-160	2.6-3 Kg	4.32 (1.32)	23 (7)
161-180	3.1-3.5 Kg	2.82 (1.12)	15 (6)
181-200	2.6-3 Kg	0.75 (0.37)	4 (2)
> 200	— 3.1-3.g Kg	0.56 (0.18)	3 (1)
	— 2.1 - 2.5 Kg	0.56 (0.37)	3 (2)

Figures in parenthesies indicate baby born of diseased mother.

Table II

Maternal age in relation to birth weight

	Maternal age	Wt. range	Percentage	Actual No.
1.	< 20 yr.	2.6-3.0 Kg	1.1	6
2.	20-25 yr.	2.6-3.0 Kg	20.6	110
3.	26-30 yr.	2.6-3.0 Kg	9.7	52
4.	31-35 yr.	2.6-3.0 Kg	3.7	20
5.	36-40 yr.	2.1-2.5 Kg	0.56	3

$r = -0.76$

Table III

Period of gestation in relation to birth weight

	Period of gestation	Brith weight	Percentage	Actual No.
1.	< 35 wk	1.5-2.0 Kg	5.07	27
2.	35-37 wk	2.6-3.0 Kg	8.8	47
3.	> 37 wk (Upto term)	2.6-3.0 Kg	25.7	137

Table IV

Distribution of gravida, parity and hemoglobin levels in total sample

Maternal factors		Actual No. of cases	Total cases
GRAVIDA	Prime	199	
	Multi	333	532
PARITY	P_0	128	
	P_1	173	
	P_2	78	
	P_3	22	
	P>3	12	413
HAEMOGLOBIN	< 9	12	
(Hb in g%)	9-11	239	
	11.1-14	200	
	> 14	2	453

Table V
Incidence of complicating diseases in the mother and new born

Diseased	Disease	Actual No. of cases
MOTHER	Heart disease (including congenital dis.)	35
	Pregnancy-induced hypertension	31
	Diabetes mellitus (including gestational type)	27
	Antepartum haemorrhage	26
	Other minor ailments	20
	Urinary tract infection	8
	Eclampsia	7
	Upper respiratory tract infection	5
Total case = 159		
Congenital anomalies BABY	Skeletal abnormality	8
	Central nervous system disorder	4
	Cardiovascular abnormality	2
	Alimentary tract abnormality	1
Total case = 15		

2 women. There were 542 live births and 17 still births.

DISCUSSION

The findings of this survey should be interpreted in the light of the constraints which a cross sectional design imposes on analysis and interpretation of data. As this was a sample from a three tier hospital, the sample of necessity was not representative of the whole community.

In the more affluent societies, 5.7% of all babies are born with a low birth weight of 2500 gm (Ebrahim - 1987). In developing countries, the incidence of low birth weight varies from 15-45 percent and in two thirds of cases no specific causes can be found (Viller & Belizao 1982). A linear and positive increase in nutritional status of infant occurred with increase in weight, height of mothers. Novotny has shown that infant growth was poorest in mother with low anthropometric measurements (Novotny - 1987).

The WHPI gives a true picture of maternal stature irrespective of tall or short mother. This index has been found superior to the weight for height ratio, where both of these are studied in relation to body weight. Correlation to BW was found to be positive r = 0.61. The correlation to maternal age and BW was

r = 0.76 as the birth weight went down in the higher age group.

The period of gestation to birth weight relation shows a highly positive correlation (r = 1). Parity is known to influence birth weight; but as this sample was highly skewed in terms of referral cases, this was not determined.

The general nutritional status judge from the hemoglobin levels of 9-14 gm% was good in most women. This could be representative of the north Indian community.

Table V lists the complications encountered in the mother and new born. Both values are on the higher side as would be expected of a referral hospital.

REFERENCES

1. Bhatia DB, Tyagi NK, Sur AM, Satya K : Ind. Pediatr. : 26;353;1989.
2. Ebrahim GJ : Ind. Jt. Trop. Pediatr. : 38;114;1987.
3. Novotny R, Haas JD : J. Trop. Pediat. : 33;309;1987.
4. Viller J, Belizao JM : Am. J. Obstet. & Gynec.: 143;793;1982.