SMALL FOR DATE BABIES—A RISK APPROACH

By

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SUMMARY

Varied and multiple factors are associated with low birth weight babies. Quantification of risk attributable to 10 important factors and/or clinical parameters was done in a case/control study of 511 new borns. Low socio-economic conditions affecting lifestyle of mother carried maximum risk. This factor has totally been neglected in present ANC service pattern.

Introduction

Risk approach has become an important managerial tool in efficient health administration as it effectively utilises limited resources by defining the priorities. Aetiology of low birth weight which is an important cause of perinatal mortality has been studied in details in various geographical areas (Perara and Lwin, 1984). Statistically significant association between 'small for date babies' (SDB) and numerous variables has been established, in various field studies which incriminate different clinico-socio-demographic conditions (Nair *et al,* 1963; Basu and Puri, 1962; Achar and Yankauer, 1962). However a large magnitude of risk factors itself defeats the risk approach and management priorities have to be based on risk grading by quantification even among those who are 'at risk'.

Material and Methods

A prospective cohort of pregnancies from 3 antenatal clinics in Pune, was studied from 1982-1983. Relevant information was collected in a pretested form using interview technique. Mothers were under continuous clinical surveillance throughout period of pregnancy. Final analysis was based on a sample of 511 mothers for whom all monitoring records were available, who were apparently healthy without any episode of sickness during pregnancy and who delivered normally at the end of full term gestation.

Results and Discussion

Low Birth Weight Babies (LBWB) prevalence was 29% as 148/511 infants had birth weight less than 2500 gms. Epidemiological technique of case/control study was utilized for scrutiny of differences between two groups (Low birth weight and normal birth weight infants). Based on previous field studies 10 commonly incriminated aetiological factors/indicators were graded for risk. Based on past experience a critical level for each variable was decided which divided the group into two, mothers 'at risk' and those 'not at risk'. Redistribution of observations in a four fold table for each risk factor was

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utilized to find whether there was any statistically significant association between two variables by calculating X^2 (Table I).

TABLE I
Features of Cohort and Case-control Studies

Cohort study population	Case-control study		
	Cases (LBWB)	Control to (NBWB)	Total
Risk factor present	a	b	a + b
Risk factor absent	c	d	c + d
Total	a + c	b + d	a+b+c+d

1. *Maternal age*: Age less than 18 years and more than 30 years was considered a risk. Contrary to expectation no statistically significant association was found between two variables.

2. *Socio-economic status*: Kuppuswamy's classification (1976) was used and grades 4 and 5 were taken as risk factors. Strong association between low socio-economic status and L.B.W.B. was found. It was also carrying highest risk—RR, ARP and PARP.

3. *Uterine height*: Is a commonly used indicator of growth assessment. Fundal height less than 32 cms at 36 weeks of gestation was taken as a risk factor. Significant correlation between two variables was seen and seemed to be second most important factor.

4. *Haemoglobin*: Maternal haemoglobin is a good indicator of nutritional status of pregnant mother. Cut off point at haemoglobin of less than 10 gms% was taken for risk determination.

5. *Weight of mother*: Weight gain is a common parameter used for assessment of foetal growth and maternal health. Reference Indian woman weighs 45 kgms. But many full term mothers were found to weigh less than this. Mothers less than 45 kg were considered as at risk.

6. *Parity*: Repeated pregnancies followed by prolonged lactation is a source of drain on maternal tissues affecting infant weight in further pregnancies. Parity of more than four was taken as at risk.

7. *Height of mother*: Though height is influenced by genetic and past environmental factors during growth period of mother, its significant association with birth weight of child has been well documented. Mothers having height less than 145 cms were graded as at risk.

8. *Maternal weight gain*: is a better indicator of foetal growth than mother's weight. Weight gain of less than 5 kg during 14-36 weeks of pregnancy denoted risk.

9. *Abdominal girth:* Though influenced by many variables girth is a commonly utilised parameter. Mothers having abdominal girth of less than 90 cms at 36 weeks were taken as at risk.

10. *Gain in abdominal girth*: Difference in girth measurements at 24-36 weeks was calculated. Level of risk was gain less than 10 cms.

Risk assessment indicators

Numerous yardstics are available for risk measurement. No indicator gives the absolute value and each has some merits and few demerits. However the proportional grading of various factors follows

the similar pattern for most indicators. In this article, R.R. and O.R. have been used to measure aetiological fraction and ARP and PARP have been calculated to measure Community Impact.

Relative risk

Relative risk (R.R.) is the traditional measure of an exposure disease association and is defined as the probability of disease development in exposed persons divided by the probability of diseases development in unexposed subjects. No association is indicated by R.R. = 1, R.R. greater than 1 implies excess disease risk in exposed persons were a R.R. less than unity corresponds to diminished disease risk in exposed persons. R.R. within range of 1.7-2.5 indicates moderate hazard and strong hazard when value exceeds 2.6

$$\text{R.R.} = \frac{a \div (a + b)}{c \div (a + d)}$$

Odds Ratio

Odds Ratio (O.R.) gives indirect risk estimate and does not depend on underlying research design which helps in comparison of various studies.

$$\text{OR} = \frac{ad}{bc}$$

Attributed risk

Attributed risk (A.R.) is defined as disease rate in exposed individuals that can be attributed to suspected cause. Relative risk is useful in aetiological research however for public health concern it is often useful to measure population impact of exposure. Two indicators have been considered in this study.

Attributable risk proportion

Attributable risk proportion (ARP) is the proportion of total disease risk in exposed persons which may be attributed to their exposure. $\text{ARP} = \frac{\text{OR} - 1}{\text{OR}}$

Population attributable risk proportion (PARP)

Another population health impact measure is also known as aetiological fraction and corresponds to proportion of disease risk in all persons which may be attributed to factor under investigation.

$$\text{PARP} = 1 - \frac{(c \times b + d)}{(d \times a + c)}$$ (Table III).

Risk grading of various factors has been shown in Table III according to magnitude of R.R. More or less same order is maintained for all indicators. Low socio-economic levels affect the lifestyle and nutrition of mother and constitute the top priority risk. Same is reflected by contributory role of Hb%. Others are not the aetioligical factors but have been graded because these are commonly utilised assessment indicators in any antenatal clinic.

Total uplifting of socio-economic position of mother is not possible. But in the present set-up of antenatal health services no thought is given to life pattern of the mother. Rarely dietary advice is offered which being beyond her means is ignored by the mother.

If supplementary feeding programme based on locally available cheap foods at least for at risk mothers could be started it would fetch rich dividends. Dietary supplement would ensure regular attendance and better ANC superivision. It would make the mother more receptive to

TABLE II
Riskwise prevalence of Low Birth Weight Babies

Risk Factor	Risk level	No. of mothers at risk	No. of mothers not at risk	No. of LBWB in at risk mothers (%)	No. of LBWB in not at risk mothers (%)	X^2	Association
Age	Less than 20 More than 30	113	398	33 (29.2%)	115 (28.9%)	0.003	Not significant
Socio-economic status	Class IV & V	465	46	144 (31.0%)	4 (8.7 %)	9.038	Significant
Parity	Four & more	113	398	53 (46.9%)	95 (23.9%)	21.59	„
Height of mother (36 weeks)	Less than 145 cms	102	409	44 (43.1%)	104 (25.4 %)	11.6	„
Weight of mother (36 weeks)	Less than 45 kg	21	490	13 (61.9%)	135 (27.55%)	9.94	„
Height of uterus (36 weeks)	Less than 32 cms	103	408	67 (65.1%)	81 (19.9%)	79.5	„
Abdominal girth (36 weeks)	Less than 90 cms	104	407	44 (42.3%)	104 (25.6%)	10.5	„
Weight gain (14-36 weeks)	Less than 5 kg	110	401	47 (42.7%)	101 (25.2%)	12.1	„
Gain in abdominal girth (24-36 weeks)	Less than 10 cms	97	414	51 (52.6%)	97 (23.4%)	31.1	„
Haemoglobin gm%	Less than 10 gm%	129	382	67 (51.9%)	81 (21.2%)	42.8	„

TABLE III
Low Birth Weight Babies—Risk Grading

	O.R.	R.R.	ARP	PARP
Socio-economic state	4.71	3.56	0.79	0.77
Uterine height	7.51	3.28	0.87	0.39
Hb %	4.02	2.45	0.75	0.30
Weight of mother	4.27	2.25	0.77	0.07
Gain in abdominal girth	3.62	2.24	0.72	0.25
Parity	2.82	1.97	0.65	0.23
Height of mother	2.23	1.70	0.56	0.17
Weight gain	2.22	1.7	0.55	0.002
Abdominal girth	2.14	1.66	0.53	0.16
Age	1.015	—	—	—

advice given for improving her lifestyle. Experience at various ICDS projects strengthens these recommendations.

Risk grading suggests that socio-economic betterment with improvement in lifestyle pattern would carry high cost effectivity in prevention and control of LBWB prevalence and should form a part of ANC services at least on trial basis.

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