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Impact of Birth Spacing on Child Survival In Rural Uttar Pradesh

LOW survival prospects of children in India during infancy and early childhood, particularly in rural areas of the country, is the biggest obstacle to the acceptance of small family norm and widespread adoption of family planning programme. To achieve a significant breakthrough in family planning acceptance in the countryside, a substantial reduction in infant and child mortality is needed. Besides stray studies conducted earlier, the analysis of the World Fertility Survey data pertaining to 26 developing countries from Asia, Africa and Latin America has brought to light the fact that the main causative factor underlying high infant and child mortality in these countries is short spacing of births (Hobcraft, McDonald and Rutstein, 1983,1984). The estimates have also been made of the possible reduction in infant mortality by increasing birth spacing (Swenson, 1977, Trussell and Pebley, 1984; Maine and McNamara, 1985). The main objectives of this paper are to investigate the influence of the preceding inter-live birth interval on infant and child mortality in rural areas of Uttar Pradesh State and to estimate potential reduction in these rates by having well spaced births.

Framework, Methodology and Data

Two possible mechanisms have been indicated causing the adverse effects of short birth intervals on child survival. The first mechanism is 'maternal depletion syndrome' according to which a mother with repeated pregnancies and especially short birth intervals does not have sufficient time for recovery both physically and nutritionally, particularly in conditions of malnutrition and is more likely to have premature and low birth weight babies having poor survival chances. Another mechanism likely to cause poor survival chances for children in closely spaced families is called 'competition' between siblings, whereby older siblings may take precedence in access to available supplies or all may be at greater risk in sharing too meagre resources. Rapid subsequent pregnancy may also compete by necessitating early termination of breast feeding with consequent deleterious effects on survival of the preceding child (Hobcraft, McDonald and Rutstein, 1983).

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Besides the above, there is a possibility of indirect association or a common cause in child spacing effects on infant and child mortality. Rapid childbearing is associated with a host of socio-economic attributes that might also raise mortality levels, e.g. income level of family, education of parents, particularly of mothers (Hobcraft, McDonald and Rutstein, 1983). Further, age and parity of mother have been found to influence infant and child mortality (Nortman, 1974; Rutstein, 1983). It is also likely that the survival experience of the preceding child might influence survival prospects of the reference or the index child. The influence of these factors has to be controlled to understand the true relationship between birth spacing and child survival.

Birth spacing of less than two years has been considered to be too short (Maine and McNamara, 1985). In view of the fact that there are only 7 cases of even shorter interval of less than one year, the impact has been investigated for birth interval of less than 2 years, 2 to 3 years, 3 to 4 years and 4 years and above. Increased risk of death linked to short birth intervals is the maximum during infancy and weakens as children grow older but it lasts until they are 5 years old (Maine and McNamara, 1985). Therefore, the impact would be analysed for infancy and early childhood (1-4 years) periods. To control the influence of parity, the impact of the preceding spacing on survival of the child has been investigated separately for second to fifth parity births of the sample mothers. For controlling the influence of other factors, the analysis was confined to only second and third parities because in fourth and fifth parities the number of births was not adequate. In respect of maternal age, in situation of the study area, where over two-fifths of the sample mothers terminated their first pregnancy below age 18 years and over three-fourths below age 20 years, the control of maternal age at first termination which itself has a strong negative influence on infant and child mortality was considered more appropriate. In view of low level of formal education of sample mothers, the cases have been classified by literacy status of mother. In regard to economic status, three characteristics, viz. size of land holding, family income and type of housing, have been used in classification. Although, the analysis of the impact by demographic and socio-economic factors was conducted both for infancy and early childhood and within infancy for neonatal and post-neonatal periods, for brevity of presentation the results have been presented for infant mortality alone which taken as a whole is the most sensitive index of survival of the child.

The study is based on an analysis of the data collected from a sample of 1256 mothers, who had given birth to a child during 1982-83 in Sikandarpur Karan PHC of Unnao district in Central Uttar Pradesh in connection with the study on Maternal and Child Health Care and Family Size Motivations in Rural Uttar Pradesh (Saksena and Srivastava, 1986).

Analysis

The influence of preceding birth interval on infant and early childhood mortality for the second to the fifth child has been analysed in Table 1.

The percentage of births by length of spacing does not vary much by birth order. The shortest spacing group of below 2 years constitutes about 20% in all parities. The variations in proportion of births in other spacing groups among parities are in 2 to 3 year group from 44.1% to 47.7%, in 3 to 4 year spacing group from 22.3% to 24.1% and in the longest spacing group of 4 years or more from 9.1% to 12.3%.

The analysis reveals a sharp and statistically significant negative influence of short birth spacing on infant mortality in conformity with the findings of a major study conducted using WFS data for 26 developing countries (Hobcraft, McDonald and Rutstein, 1983) and of other studies conducted in the state of Punjab (Sweemer, 1984) and the neighbouring countries of Bangladesh (Swenson, 1977) and Pakistan (Cleland and Sathar, 1984). It is seen from the table that infant mortality in all parities is three times or more for cases of less than 2 years of spacing as compared to that for the spacing category of 3 years or more. In general, early childhood (1-4 years) mortality also declines with increase in spacing. The finding suggests that high infant and child mortality in India is attributable largely to short intervals after which successive births take place.

TABLE 1 : INFANT AND CHILD MORTALITY PER 1000 LIVE BIRTHS BY PRECEDING BIRTH INTERVAL

Preceding birth interval (in year)	II Child		III Child		IV Child		VI Child	
	<1	1-4	<1	1-4	<1	1-4	<1	1-4
<2	210	110 (219)	216	100 (171)	215	108 (130)	247	43 (93)
2-3	130	77 (509)	119	69 (394)	92	92 (315)	118	76 (211)
3-4	70	74 (244)	71	71 (198)	58	65 (155)	61	43 (115)
4+	24	57 (124)	47	10 (106)	67	0 (60)	34	34 (59)
χ^2_3	33.89***	4.14	25.18***	8.44*	21.80***	7.68	22.34***	2.73

Notes : 1. ' The number of live births for which infant and child mortality have been computed for a birth order is given in brackets.

2. In the table, the subscripts indicate the degrees of freedom attaching to the % value, and the asterisks the level of significance: * $P < 0.05$; ** $P < 0.01$; *** $P < 0.001$

Impact by Demographic and Socio-Economic Characteristics

In order to control the influence of survival status of the preceding child, subsequent birth interval, maternal age at first termination and literacy status of the mother and economic status of the family, the impact of preceding birth spacing on infant mortality for second and third parity births has been analysed in Table 2 by the above categories.

The impact of short spacing on infant mortality is not altered even when the preceding child dies early. The finding implies that competition between siblings is not an important factor. The impact of subsequent birth interval being short on mortality of the index child is prominent only in the shortest preceding birth spacing category, suggesting that possible

early termination of breast feeding affected most the children, whose preceding birth interval was also short resulting possibly in their being underweight. The analysis by maternal age at first termination reveals that the adverse impact of short birth spacing on child survival was the maximum when the mother had started childbearing below age 18 years. The finding implies that erosion of her physical and nutritional status caused by short birth spacing was superimposed upon her depletion caused by commencement of procreation in immature

TABLE 2 : IMPACT OF PRECEDING BIRTH SPACING ON INFANT MORTALITY PER 1000 BY DEMOGRAPHIC AND SOCIO-ECONOMIC CHARACTERISTICS

Characteristics	II Child Birth spacing (years)				III Child Birth spacing (years)			
	<2	2-3	3 [†]	4+	<2	2-3	3-4	4+
Maternal Age at first Termination (years)								
<18	260	140	66	£	244	138	82	36
18-20	188	153	63	53	156	99	69	*
20+	107	72	79	*	310 [#]	119	55	*
Survival of Preceding Child								
Child dead	213	172	18	*	250	186	103	*
Child surviving	208	116	77	29	194	98	71	32
Subsequent Birth Interval (years)								
<2	175	91	105	*	189	102	77	*
2+	147	94	89	61	143	84	83	41
Education of Mother								
Illiterate	219	138	71	30	223	129	89	45
Literate	184	103	42	*	194	89	17	*
Size of Land Holding (acres)								
<2	235	174	106	24	246	119	74	31
2+	197	125	68	£	130	90	49	40
Monthly Income (Rs.)								
<300	220	132	80	*	283	162	116	*
300-499	253	129	38	£	185	128	56	23
400+	145	128	114	£	170	71	47	54
Type of Housing								
Pacca	154	103	51	*	158	83	28	*
Kachcha	211	147	.89	26	257	106	72	31
Thatched	237	97	32	£	282	168	105	71

* Less than 30 cases belonging to 4 years and over birth spacing group have been included in the lower spacing group and given as 3+. Elsewhere # denotes that the rate is based on less than 30 births.

£ As the impact of subsequent birth interval on infant mortality can not be found, its impact on early childhood mortality (1-4 years) has been seen.

physical state. However, control of none of the above characteristics could eliminate the influence of short birth spacing. Likewise, strong negative influence of birth spacing on infant mortality is seen in all socio-economic categories. The findings are in line with the findings of Trussell and Hammerslough (1983), who demonstrated for Sri Lanka that the length of previous interval had a substantial effect on infant and child mortality in the presence of controls for age of mother and birth order as well as several other variables. Thus, the principal conclusion regarding positive impact of the preceding birth spacing on child survival remained valid when possible sources of association between short intervals and mortality were excluded, thus lending credence to the proposition that the two are connected by a causal chain.

Expected Reduction in Infant Mortality Through Increased Spacing: Policy Implication

For estimating the likely reduction in infant mortality through increased spacing in the study area, the combined data from second to fifth parity births have been used. Taking these four parity births together, infant mortality was 219 per 1000 in the minimum spacing of below 2 years and it consistently declined to 117 per 1000 in the spacing category of 2 to 3 years, 66 per 1000 in the spacing category of 3 to 4 years and to only 40 per 1000 in the spacing category of 4 years or more. The corresponding rate of child mortality (1-4 years) was 96 per 1000 in the shortest spacing category of below 2 years, which consistently declined with increase in spacing to 78 per 1000, 66 per 1000 and 29 per 1000 respectively in successively higher spacing categories.

Simple calculations show that one year increase in spacing in each class would lead to reduction of about 43% in infant mortality, 23% in child mortality (1-4 years) and 35% in total mortality in early childhood. Alternatively if mothers in all spacing categories below 3 years increase their spacing to join the spacing group of 3 years or more, there is likely to be 51 % reduction in infant mortality and 42% reduction in total mortality in early childhood. These rough estimates are relevant not only for the study area but all over India too, there could be substantial reduction in infant and child mortality through increased birth spacing and the extent of reduction would depend on the proportion of births in the short spacing categories and the existing variation in mortality levels by birth spacing in specific areas. Besides achieving a significant improvement in survival prospects of children in India, increase in inter-birth spacing is likely to have a negative influence on fertility as well.

Conclusion

The analysis of mortality during infancy and early childhood faced by 3103 children born in second to fifth parities by previous birth spacing in a rural area of central Uttar Pradesh has suggested that high mortality is causally related with short birth spacing. Infant mortality among children born less than 2 years after the preceding child was three times or more as compared to the corresponding rate for the children born after 3 years or more of the preceding birth. The estimates based on the findings suggest a possible reduction of 51 %

in infant mortality and 42% in total mortality in early childhood if mothers bearing their children with less than 3 years of spacing increase their spacing to 3 years or more.

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