Re-examining the association of birth interval and child health in India: A trend assessment

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INTRODUCTION

A short birth interval has been associated with adverse child health outcomes. Studies have shown that the birth interval less than two years is associated with adverse perinatal and maternal outcomes. Despite this knowledge few government or international health organizations don't have birth spacing policies or programs. Birth spacing can be considered as important aspect of family planning or reproductive health.

Birth interval can be divided into the period of postpartum amenorrhea, the menstruating interval and the period of gestation. The reasons for the variation in birth interval amongst people depend upon the various socio-economic characteristics to which they are exposed. There is association between maternal education and birth spacing, the infants who have as short birth interval and mother is illiterate, unexpectedly have high risk of mortality after the neonatal period than the infants having longer birth interval (Alison whit worth & Rob Stephenson, 2002).

The pregnancy outcomes are more likely to be positive for the cases in which pregnancies are planned. There is a significant relationship between the birth interval and child health. A mother who has recuperated her health is more likely to deliver a full term healthy baby with a normal birth weight. World Health Organization (WHO) and United State Agency for International Development (USAID) recommends longer birth interval to reduce infant and child mortality and also to benefit for maternal and child health (Marston C 2006.)

Longer spacing between two births allow for the optimum use of the parent time inputs and resources for each child, which in turn improves child health. Analyzing the data for nineteenth national demographic and health surveys from around the world, Sommerfelt (1991) found that children born less than 24 months compared with those born more than 24 months after a previous sibling were physically shorter. There is disagreement, however, about the effects of birth interval on malnutrition in children. Boerma & Viann (1984) from Kenya Using data, found that children with short subsequent birth intervals were not at higher risk either for mortality or growth retardation during the perinatal period or first 2 years of life compared with children with longer birth intervals.

Swenson (1984) reported that the proportion of Bangladeshi children in the severely malnourished category is almost high among children born within 12 months of a younger sibling than those children born more than 12 months. Roy (1996) found that, among other factors, subsequent birth interval in Matlab has a significant effect on child nutritional status.

Birth spacing for at least three years can have tremendous health benefits:

For children:

• Lower risk for fetal death

• Lower risk for preterm birth

• Lower risk for low birth weight

• Lower risk for small for gestational age

• Lower risk for neonatal death

• Lower risk of stunting and underweight

For mothers:

• Lower risk for maternal death

• Lower risk for third trimester bleeding

• Lower risk for anemia

• Lower risk for premature rupture of membranes

• Lower risk for puerperal endometritis

• Lower risk of malnutrition (*Reference: Catalyst Consortium, Optimum birth spacing*)

Hence the optimum birth spacing is necessary for the child health. The birth intervals are influencing the prevalence of malnutrition in a society. Malnutrition is responsible, directly or indirectly, for 54% of the 10.8 million deaths per year in children under five and contributes to every second death (53%) associated with infectious diseases among children under five years of age in developing countries (Hasnain & Sophie (2010)).

Malnutrition is of particular concern in developing countries. UNICEF (2006) stated that around 146 million children in developing countries are underweight - that is one out of every fourth child. Out of these, over half of the world's underweight children live in just three countries: Bangladesh, India and Pakistan. Pakistan Demographic and Health Survey (1990/91) examining the nutritional status of children less than 5 years revealed that, 50 percent of children were stunted, 9 percent were wasted while 40 percent were underweight.

OBJECTIVE

The main objective of the study is to examine the trend and association between the birth interval & child health status in India.

DATA SOURCE

The data for the present study is sourced from the three rounds of National Family Health Survey i.e. NFHS-1, NFHS-2 and NFHS-3. All of these three large scale population based survey were

conducted by the International Institute for population Sciences and Macro International, USA (IIPS and Macro International, 2007). The data provides information on national and state level estimates on fertility, mortality, maternal and child health, adolescent reproductive health, high risk sexual behavior, family planning and HIV- related knowledge etc. The information was collected from a national representative sample of 109041 households including 124,385 women aged 15-49 and 74,369 men aged 15-54. It covered 99 percent of the Indian population living in 29 states (IIPS and ORC Macro, 2007).

METHODOLOGY

The present study is undertaken to understand the trend and association of birth interval and child health in India. The important socio-economic and demographic predictors included in the study were based on the information collected on maternal and birth characteristics of each child.

Statistical analysis: Bivariate analysis was performed to examine the association between the birth interval and child health with socioeconomic and demographic background characteristics. Logistic regression is used to investigate which factor is bringing change in the health of the child. It is commonly estimated by maximum likelihood function for dependent variable.

Logistic mode takes the following general form:

$$\text{Logit } P = \ln [p / (1 - p)] = b_0 + b_1x_1 + b_2x_2 + \ldots\ldots\ldots\ldots\ldots + b_ix_i + e_i$$

Where b1, b2… and bi represents the coefficient of each of the independent variables included in the model, while ei is an error term. Ln [p/ (1-p)] represents the natural logarithms of the odds of the outcomes.

RESULTS

The table 1 shows the trend of the changes in the birth interval from NFHS-1 results to NFHS-3. As evident from the results it shows compared to the children born in less than 24 months of birth interval the children with increasing birth interval are less likely to be malnourished. The likelihood of being malnourished also declines in the results of NFHS-2 and NFHS-3. As in the NFHS-1 the children in the birth interval of 24-47 and 48+ months are 13 percent and 25 percent less likely to be malnourished than the children born in the birth interval of less than 24 months. In NFHS – 2 the children born in the birth interval of less than 24, 24-47 and 48 above months of birth interval are 16, 24 and 27 percent less likely to be malnourished compared to the children of less than 24 months of birth interval in NFHS – 1, Whereas for NFHS-3 the children born in the birth interval of less than 24, 24-47 and 48 above months are 26, 34 and 36 percent less likely to be malnourished compared to the children of less than 24 months of birth interval in NFHS-1. Hence the table shows the trend of less likelihood of malnourishment amongst the children in the succeeding NFHS-2 and NFHS-3 results.

An opposite trend is seen in the case of birth order where with every increasing birth order the children are appearing to be more likely to be malnourished in all the three rounds of NFHS. The children with birth order 2, 3, 4 and 5 are seen to be with ascending level of malnutrition. The children in second birth order are 1.2 times more likely to be malnourished than the children of first birth order. Whereas for third, fourth and fifth birth order they are 1.2, 1.3 and 1.4 times more likely to be malnourished than the children of first birth order.

As looking at the wealth index it is seen that with increasing wealth status of people the likelihood of malnourished children is declining. As compare to the poorest the poorer are 11 percent less likely to be malnourished. The middle, richer and richest are 24, 37 and 55 percent less likely to be malnourished than the poorest section of the society.

The level of education has also considerably shown the effect on the level of malnutrition. With increasing level of education the likelihood of children being malnourished is decreasing. As compared to the mothers with no education the children whose mothers have received up to primary education are 6 percent less likely to be malnourished whereas for the mothers who have received secondary and higher education are 21 and 47 percent less likely to have malnourished children.

CONCLUSION

Globally, more than one third of under-five deaths are attributable to under-nutrition (UNICEF, 2009). About 20 per cent of children under-age five in India are wasted, 43 per cent underweight and 48 per cent stunted. In terms of numbers about 54 million children under five years in India are underweight which constitutes about 37 percent of the total underweight children in the world (SOWC 2010). In India, 25 million children under five years are wasted and 61 million are stunted, which constitutes 31 per cent and 28 per cent of wasted and stunted children respectively in the world. There are various studies which have shown the deep relationship between the birth interval and child health. This study is an attempt to show the trend and association between the birth spacing and malnutrition (underweight) in India.

As per findings the birth interval has constantly been increasing from NFHS-1 to NFHS-3. As far as the underweight percentage of the children is concerned it has declined from NFHS 1 to NFHS-3. The relationship of the birth interval and the child health has shown that as the birth interval is increasing it is showing the positive response in reducing the percentages of underweight children through all the rounds of NFHS. Hence a strong relationship of birth interval and malnourishment has been observed.

Table - 1: Combined (NFHS-1, NFHS-2 & NFHS-3) adjusted odds ratios for the underweight children less than 3 years by socio-economic characteristics, India.

Socio-economic characteristics	Exp(B)
BIRTH INTERVAL	
NFHS 1 <24 months	
NFHS 1 24-47 months	.873**
NFHS 1 48+ months	.757**
NFHS 2 <24 months	.839**
NFHS 2 24-47 months	.756**
NFHS 2 48+ months	.733**
NFHS 3 <24 months	.745**
NFHS 3 24-47 months	.656**
NFHS 3 48+ months	.645**
AGE	
<20	
21-30	.865**
31+	.822**
SEX	
Male	
Female	1.031
BIRTH ORDER	
1	
2	1.212**
3	1.274**
4	1.302**
5	1.435**
ANC	
None	
1-3.	.913**
4+	.816**
RESIDENCE	
Urban	
Rural	.895**
EDUCATION	
No Education	
Primary	.946*
Secondary	.801**
Higher	.536**
RELIGION	
Hindu	
Muslim	1.076**
Others	.768**
CASTE	
Schedule Caste	
Schedule Tribe	.907**
others Backward classes	.931**
others	.776**
WOMEN CURRENTLY WORKING	
No	
Yes	1.244**
MEDIA EXPOSURE	
No exposure	
Medium exposure	.980
High exposure	.889**
WEALTH INDEX	
Poorest	
Poorer	.895**
Middle	.759**
Richer	.632**
Richest	.450**
REGION	
North	
Central	1.220**
East	1.206**
North east	.675**
West	1.261**
South	.911**

Note: ** p <= 0.01, *p<= 0.05, ® = Reference category