IMPACT OF MATERNAL AGE AND BIRTH SPACING ON MORTALITY OF CHILDREN IN INDIA

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ABSTRACT

Maternal age and the interval between births have an essential influence upon the probability that a child will survive infancy and early childhood. So, this paper seeks the impact of mother's age, birth spacing on infant and child mortality in India.

Data: NFHS-4 (2015-16) data

Methods:

For each of our dependent variables, we estimate an equation is explaining the influences on it of the birth-interval and parity variables and the age of the mother. For pregnancy outcome, these equations are estimated by polytomous logit.

Results:

1. The relative risk of child mortality is less likely to occur when the maternal age during child pregnancy is between 20-30 years and it about 18% less likely when maternal age during child pregnancy is 30 years and above in the comparison of the reference category which is 20 years and below.

2. The relative risk of child mortality more likely to occur when the birth spacing of the child is between 2-3 years, and it is around less likely when the birth spacing of the child is three years and above in the comparison of the reference category which is two years and below.

Keywords: pregnancy outcome, maternal mortality, birth-interval, neonatal mortality, birth spacing, maternal age.

Background:

There is a global reduction in child mortality, but the trends differ between developed and developing countries. The highest childhood mortality found in sub-Saharan Africa. Around 16 million girls aged 15-19 years and one million girls under 15 years of age gave birth every year which constitute 11 percent of total delivery. Out of which 95 percent in lower and middle-income countries. India is the country with an unusually high number of child mortality in the world.

Childbearing patterns, such as maternal age and the interval between births have an essential influence upon the early childhood mortality. Newborns born to adolescent are a more significant risk to baby and newborn at the later ages are also at greater risk of child mortality. Among the causes of infant and child death, children born as a result of pregnancies categorized as "too young, too old, too frequent, or too many" constitute high risks for mortality, and generally out of dead children there is a higher percentage of physically weak or disabled.

Recent World fertility surveys have contributed an impressive amount of comparative data from developing countries which reconfirm significance these relationships, particularly birth spacing or child spacing have a crucial factor contributing to child mortality. Few studies have shown that birth interval between two studies dramatically influences the survival of both the children. The very short birth interval is more hazardous, as when the birth-interval is very less then if found that both the children have certain risk factors. In low-income countries, the children with shorter birth interval are more likely to face the risks of death as compared to the children with a relatively longer birth interval. Too short birth interval does not only increase the risk for the baby in the first year, but it also holds the risk till the adulthood of the child. Such children are twice more likely to die before reaching the fourth birthday.

Worldwide, approximately 25% of women have their child before the age of 20 years; the percentage is higher in developing countries. Young maternal age at childbearing is associated with an increased risk of preterm birth, and intrauterine growth restriction, nutritional deficiency, complications during birth increases the chances of infant and child mortality. These associations result from behavioral, social, and biological factors. Mothers with younger age may breastfeed the child for comparatively shorter duration than older mother. More adolescent mothers may be immature in behavior and therefore can be less capable of meeting the infant's need and may not be able to take proper care of the infant. They tend to less schooling, less education, less experience, and unstable partnerships than older mothers.

Thus neonates born to mothers aged less than 20 years and more than 35 years have higher chances of death. Other risk factors according to existing literature are unfavorable socioeconomic conditions, previous reproductive history, and preexisting clinical conditions. On the other hand,

pregnancy in women older than 35 years is an observable trend in developed and developing countries, including India. Here we aimed to explore the effect of maternal age and birth spacing separately on child mortality. We adjusted for socioeconomic confounding factors and controlled wealth index, religion, caste, mother's education, place of residence and parity as potential mediators of associations.

Data source and Methodology: For the current study, women's file and household file of NFHS-4 (2015-16) dataset is used which is a nationally representative sample survey conducted in India and the Demographic health survey of India. The NFHS is a cross-sectional survey of 259,627 women aged 15 to 49 years. The NFHS gathered information on demographics, educational level, household wealth, and child mortality.

Methodology: This study has used various statistical techniques to fulfill its objectives. We have shown child mortality by maternal age during pregnancy and birth spacing through cross-tabulation, separately. Further, logistic regression analysis to assess the association between child mortality with maternal age and birth spacing and the other selected background characteristics of the respondents.

Description of the variables: The primary outcome variable of this study is child mortality defined as age at death during 0-60 months. This variable is binomial; it takes the value of 1 if the child dies within 60 months and takes off 0 if otherwise.

The primary predictor variable, in the case of the first objective, is maternal age during pregnancy. In the second objective, the primary predictor variable is birth spacing between the previous child to the last child, and the other different socio-economic variables are- Place of the residence, educational level of the mother, religion, social group, wealth indices and birth-order.

Results: Table 1 shows the percentage of child death in the defined age groups. Among the 42,879 women giving birth at age less than 20 years, 5.56 percent of children faced death. Death of children was 5.5 percent who were born to the women of age 30 years and above. Relatively lesser number of children had faced death who were born to mothers in the age group of 21 to 30 years. Table 2 shows the percentage of child death in the three defined groups. The highest portion of child death was contributed by the women belonging to the group of the birth interval of fewer than two years, counting to a percentage of 6.47. Percentage of child death to the women who gaped their birth by 2 to 3 years or more than three years were relatively less.

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Table 1: percentage of child death with mothers' age, India (2015-16)

Age of mother	Percentage of child death	Total number of women
20 years & below	5.56	42,879
21-30 years	4.15	179,948
30 years & above	5.5	36,800
Total		259,627

Table 2: percentage of child death with different birth Interval, India (2015-16)

Birth interval	percentage of child death	Total number of women
Less than 2 years	6.47	49,172
2-3 years	3.92	49,445
More than 3 years	3.54	64,040
Missing cases	4.64	96,970
Total		259,627

Table 3 shows the odds ratio of Child mortality by maternal age during pregnancy and their background characteristics. The result shows that through all the predictor's variables are not significant, but maternal age, place of residence, mother's education, religion, social group, wealth indices and birth-order are determining factors of the child mortality. The relative risk of child mortality is 20 percent is less likely to occur when the maternal age during child pregnancy is between 20-30 years, and it is around 3 percent less likely when maternal age during child pregnancy is 30 years and above in the comparison of the reference category which is 20 years and below. While in the case of the maternal educational level, those mothers whose educational level is secondary are 7 percent less likely to report on the child mortality than the illiterate mothers. We can see an unambiguous picture that as the wealth index is increasing, the relative risk of child mortality is decreasing.

Table 3. Odds of Child mortality by Maternal Age and socioeconomic characteristics of women, India (2015-2016).

Maternal age during child birth	Odds ratio	P value	Confidence Interval Lower	Higher
Below 20 years®	1			
20-30 years	0.80	0.000	0.76	0.85
30 years & above	0.97	0.463	0.90	1.05
place of residence				
Urban®	1			
rural	1.00	0.982	0.95	1.06
Birth weight				
Low Birth weight®	1			
High Birth Weight	0.39	0.000	0.37	0.41
Not present	1.33	0.000	1.26	1.40
Education				
Illiterate®	1			
primary	1.07	0.017	1.01	1.13
secondary	0.93	0.006	0.89	0.98
Higher	0.76	0.000	0.68	0.84
Birth order				
First®	1			
Second	0.78	0.000	0.74	0.82
Third & above	0.90	0.000	0.86	0.95
Social group				
SC®	1			
ST	0.95	0.075	0.89	1.01
Others	0.83	0.000	0.74	0.92
Religion				
Hindu®	1			
Muslim	0.88	0.000	0.83	0.93
Christian	0.68	0.000	0.62	0.74
Others	0.75	0.000	0.67	0.84
Wealth Index				
Poor®	1			

poorer	0.98	0.379	0.93	1.03
middle	0.92	0.006	0.87	0.98
richer	0.84	0.000	0.78	0.90
richest	0.69	0.000	0.63	0.75
Constant	0.11	0.000	0.10	0.12

All the categories are significant at 95 % level of confidence.

Table 4: Odds of Child mortality by Birth spacing and socioeconomic characteristics of women, India (2015-2016).

Birth interval	Odds ratio	P-value	Confidence Interval	
			Lower	Higher
Less than 2 years®	1			
2 to 3 years	0.60	0.000	0.56	0.63
More than 3 years	0.59	0.000	0.56	0.63
Not available	4.81	0.000	4.00	5.79
place of residence				
Urban®	1			
Rural	1.00	0.881	0.94	1.05
Birth weight				
Low Birth weight®	1			
High Birth Weight	0.41	0.000	0.39	0.43
Not present	1.37	0.000	1.30	1.45
Education				
Illiterate®	1			
primary	1.06	0.057	1.00	1.12
secondary	0.91	0.000	0.87	0.96
Higher	0.71	0.000	0.64	0.79
Birth order				
First®	1			
Second	4.64	0.000	3.87	5.57
Third & above	5.84	0.000	4.84	7.05
religion				
Hindu®	1			
Muslim	0.88	0.000	0.84	0.93

Christian	0.69	0.000	0.63	0.76
Others	0.76	0.000	0.67	0.85
Wealth Index				
Poor Ⓡ	1			
poorer	0.97	0.247	0.92	1.02
middle	0.91	0.001	0.86	0.96
richer	0.83	0.000	0.77	0.89
richest	0.68	0.000	0.62	0.74
Constant	0.02	0.000	0.02	0.02

All the categories are significant at 95 % level of confidence.

Table 2 shows the odds ratio of Child mortality by birth spacing between the previous child to the last child and their background characteristics. The result indicates that through all the predictor's variables are not significant, birth spacing, place of residence, mother's education, religion, social group, wealth indices and birth-order are determining factors of the child mortality. The relative risk of child mortality is 40% is more likely to occur when the birth spacing of the child is between 2-3 years, and it is around 41% less likely when the birth spacing of the child is three years and above in the comparison of the reference category which is two years and below. We get the inverse relationship between the wealth index and child mortality, which as the wealth index is increasing, child mortality is less likely to occur.

Conclusions: The evidence of increased mortality with very early pregnancy and late pregnancy is thus established. On the other hand, the increased mortality with a reduced birth interval is also evident from the current study.

People have been spacing childbirths for years through withdrawal, abstinence, and breastfeeding and with other methods of contraception. Some contraceptive methods are available in the modern society which is easy to use. They must be made accessible and available in different cultures, and the areas which are remote and less developed should be given special care to educate the couples about the consequences and shortcomings of younger and older maternal age and short birth intervals. From the above association, it is seen that timing, spacing, maternal care, mothers' knowledge, etc. are an essential factor for the survival of children. We also know, however, that mortality is only the tip of the iceberg there are adverse cases like potentially ill children and disable children who are the consequences of either extreme ages of the mother or shorter intervals of births. Excessive deaths were found among children when they were born into large families, among children born too close together, or among children born to teenage mothers is a clear indicator that infection and illness or nutritional deficiencies are also more common in these groups.

By controlling for socioeconomic factors, the physiological effect of young motherhood on child health can be separated out from the social disadvantage that young mothers are also likely to face. The findings could critically inform family planning policies and programs aimed at delaying first birth beyond the teenage years. The results also specify that filling the nutritional gap of the mothers and educating them could help to meet the goal of minimum child mortality.

Therefore, we emphasize the need for more significant investment in the prevention and promotion of maternal health, especially in the extremes of maternal age and particularly for adolescents, seeking to reduce gestational diseases and preventable infant deaths. Longitudinal studies that specifically work with extremes of maternal age and appropriate birth interval should be encouraged to elucidate these findings better and contribute to the existing literature.

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