

## **The effect of birth intervals on maternal health**

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### **ABSTRACT**

The paper investigates the effect of birth intervals on maternal health. A survey data of birth spacing was analyzed, accounting for causal effects of birth spacing on subsequent maternal mortality rates. Results suggest that greater spacing is positively associated with maternal and child health. Birth interval lesser than 3 years, have been identified as having potentially serious implications for the health of child as well as mother.

**Key Words :** Birth intervals, spacing, maternal mortality

### **INTRODUCTION**

Despite of many major achievements in health a large number of women in our region continue to die from preventable causes related to maternity. The maternal deaths in the South-East Asia region account the highest in the world. Worldwide 5,36000 women are dying of pregnancy related complication annually. India is carrying 25% of global burden (Khandale and Kedar, 2017). Nearly five women die every hour in India from complications developed during childbirth, WHO has said. Nearly 45,000 mothers die due to causes related to childbirth every year in India which accounts for 17 per cent of such deaths globally, according to the global health body (Anonymous, 2016).

In our country as in other developing countries, the causes of maternal deaths are deeply rooted in the continuing low status of women. The health consequences of gender discrimination against women are reflected in many ways. Many women are still illiterate and we know that the higher the rate of women illiteracy, the lower the rate of maternal death. Inadequate nutrition also leads to complications. Majority of pregnant women in our region suffer from anemia which is a major contributor to maternal death.

Another important compelling health consequence related to women having to go through the pregnancies which are too closely spaced or take the high incidence of adolescent pregnancies. This exposes young women to a much higher risk of maternal mortality even before they are biologically or socially ready to bear the demands of child bearing and child rearing.

Maternal, reproductive and child health (research) are partly overlapping concepts.

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Maternal health refers to the health of women during pregnancy, childbirth and the postpartum period.

The maternal depletion hypothesis argues that short intervals do not allow mothers adequate time to recover their nutritional stores, leading to suboptimal nutritional status during pregnancy. This, in turn, leads to compromised fetal growth and increased risks of adverse maternal and perinatal outcomes (Winkvist *et al.*, 1992).

While publications by the World Health Organization (WHO) and other international organizations recommend waiting at least 2–3 years between pregnancies to reduce infant and child mortality, and also to benefit maternal health. Recent studies supported by the United States Agency for International Development (USAID) has suggested that longer birth spacing, 3–5 years, might be more advantageous (Anonymous, 2005).

### **Maternal mortality :**

According to the World Health Organization (WHO), A Maternal death is defined as death of any woman while being pregnant or within forty-two completed days of termination of pregnancy irrespective of duration or site of pregnancy from any cause related to or aggravated by pregnancy but not from accidental or incidental causes (Park, 2009).

The risk of maternal death includes two types of risks:

- The risk of getting pregnant, which is a risk related to fertility and its control or lack of control
- The risk of developing a complication and dying while pregnant, in labor, or postpartum.

Short intervals do not allow women's bodies to fully recover from their previous birth in other ways, such as by depleting fetal stores or by decreasing muscle tone in reproductive tissues (Conde-Agudelo *et al.*, 2012).

### **Birth intervals:**

Birth intervals can be defined in many ways. Different programmes and researches use different measurements. According to report of WHO technical consultation on birth spacing, the four principle measures can be converted to birth-to-pregnancy intervals as follows:

1. Birth-to-birth intervals minus nine months = birth-to-pregnancy interval
2. Inter-outcome interval minus nine months = birth-to-pregnancy interval
3. Birth-to-conception interval = birth-to-pregnancy interval
4. Inter-pregnancy interval = birth-to-pregnancy interval

The inter-pregnancy interval is the best way to study the relationship with maternal health because it includes some pregnancies that end in induced or spontaneous abortion. This is important because fetuses conceived but not born also influence maternal and child health.

### **Measuring birth intervals:**

Estimating actual and preferred intervals is important because they serve as powerful tools in research, programming and advocacy. The choice of measurement method depends on the intended use of the data. Researchers often compare actual and preferred birth

intervals to estimate the potential demand for family planning services. Programmes find it useful to measure percentage of a population with intervals shorter than three years.

**Justification of study problem:**

The close spacing of the pregnancies also contributes to maternal deaths. Although not always addressed specifically, promoting birth spacing has long been a central goal of family planning programmes around the world 150. The survey was conducted to explore the association between birth spacing and risk of adverse maternal outcomes. Overall, lesser pregnancy intervals, possibly less than 3 years, are independently associated with an increased risk of maternal death and anemia. This paper seeks a better understanding of the effects of the lengths of birth intervals on maternal mortality and morbidity. This study aimed at eliciting such information so that effective steps at required stage can be undertaken to ensure healthy mother and healthy babies.

**METHODOLOGY**

The present study “The effect of birth intervals on maternal health” visiting 5 aganwadies of Allahabad district was carried out using the following methodology:

**Design and selection of sample:**

A two stage sampling procedure was adopted for the study-

**Selection of city:**

The Allahabad district was selected purposively for the study because it is a middle size city.

**Selection of respondents :**

From the selected area 300 ladies were selected according to income levels of their families.

- LIG (low Income Group)- Upto Rs. 40,000/ month
- MIG (Middle Income Group)- Rs. 40,000 to 70,000/ month
- HIG (High Income Group)- Above Rs. 70000

**Research design :**

The survey research design was adopted to generate the data. The selected respondents were personally interviewed and necessary information was collected using a pre tested schedule.

**Instrument:**

In order to collect the data, a self-administered questionnaire was used.

**Tools of study:**

*Diet survey:*

Using questionnaire method, the researcher collected the dietary data. Dietary survey

was conducted to assess the nutritional status of the respondents. The two days recall method was done of each respondent using the nutritive value for Indian food by Gopalan *et al.*

*Anthropometric measurement:*

The anthropometric measurements of the respondents such as height (cm) and weight (kg) was recorded. On the basic of which BMI was calculated.

**Method of analysis:**

The tabular method was used for analyzing the data.

**RESULTS AND DISCUSSION**

The present study which is related to “The effect of birth intervalson maternal health” visiting fiveanganbaries of Allahabad district, Uttar Pradesh, was carried out to meet various objectives as described earlier. All the table figures in brackets are in parenthesis:

**Educational status:**

The Table 1 shows that most of the respondents were literate upto Intermediate. In MIG 48 % people were literate upto intermediate, 30% were graduate while only 22% hadpost-graduation degree. In HIG most of the respondents were post graduate (55%). In this group 31% respondents were graduates while only 14% were literate upto intermediate. Educational status ofLIG was not found good. 62% women belonging to LIG were educated upto intermediate.

<b>Table 1: Educational status</b>			
Income group	Intermediate	Graduation	Post-graduation
LIG (100)	62	28	10
MIG (100)	48	30	22
HIG (100)	14	31	55
Average	124	89	87
Per cent	41.3%	29.6%	29.0%

LIG = Low Income Group, MIG = Middle Income Group, HIG = High Income Group.

**Nature of work done:**

The Table 2 depicts that most of the respondents were home makers (76.3%) and only 23.6% were working women. In MIG 20% women were working and 80% were home makers on the other hand in HIG 33% were working women and 67% women were home

<b>Table 2: Nature of work</b>		
Income group	Working	Home maker
LIG (100)	18	82
MIG (100)	20	80
HIG (100)	33	67
Average	71	229
Per cent	23.6%	76.3%

LIG = Low Income Group, MIG = Middle Income Group, HIG = High Income Group

makers. In LIG only 18% women were working and 82 % were home makers.

**Type of the family:**

The result of Table 3 shows that nuclear family was the most common type in all the three income groups *i.e.* 64.3% of the total population. The percentage of nuclear families in HIG exceeded the remaining income groups and reach 78 %; in LIG, this percentage fell to behind HIG and MIG and dropped to 52 %. When structure of families were inspected, it was found that joint families were more common in LIG and nuclear families were more common in HIG.

Table 3 : Type of the family		
Income group	Joint	Nuclear
LIG (100)	48	52
MIG (100)	37	63
HIG (100)	22	78
Average	107	193
Percent	35.6%	64.3%

LIG = Low Income Group, MIG = Middle Income Group, HIG = High Income Group.

**Age at marriage**

The income group also plays a potentially important role in discouraging the early age marriage. The result suggests that financial status affects the marriage decision. In LIG 77 per cent of women aged upto 18 at the time of their marriage while 23 per cent of marriages were preceded above the age of 18 years. Overall, a large majority of women tend to marry upto 18 years *i.e.* 61.6% (Table 4).

Table 4 : Age at marriage		
Income group	Upto18 years	Above 18 years
LIG (100)	77	23
MIG (100)	70	30
HIG (100)	38	62
Average	185	115
Per cent	61.6%	38.3%

LIG = Low Income Group, MIG = Middle Income Group, HIG = High Income Group

**Number of pregnancies:**

The Table 5 shows that most of the respondents had 2 pregnancies (49%), 96 respondents

Table 5 : Number of pregnancies			
Income group	2 pregnancies	3 pregnancies	Above 3 pregnancies
LIG (100)	44	21	35
MIG (100)	20	60	20
HIG (100)	83	15	2
Average	147	96	57
Per cent	49%	32%	19%

LIG = Low Income Group, MIG = Middle Income Group, HIG = High Income Group.

had 3 pregnancies and remaining 57 mothers gave birth to more than 3 children. It was observed that percentage for maximum numbers of pregnancies (above 3 pregnancies) were recorded highest (35%) in Low Income Group and it was lowest in Higher Income Group (2%).

**Age at delivery of first child:**

The age of a woman when she has her first child has a significant impact on mortality rate associated with the birth. The Table 6 shows that most of the respondents (53%) delivered their first child upto 20 years of age while the remaining (47%) delivered their first child above 20 years of age.

In LIG 66 per cent of women aged upto 20 years at the time of their first delivery while 34 per cent of first deliveries were preceded above the age of 20 years. In case of MIG 60 % women aged upto 20 years at delivery time of their first child. Overall, a large majority of women tend to deliver their first child upto 20 years *i.e.* 53%.

Table 6 : Age at delivery of first child		
Income group	Upto 20 years	Above 20 years
LIG (100)	66	34
MIG (100)	60	40
HIG (100)	33	67
Average	159	141
Per cent	53%	47%

LIG = Low Income Group, MIG = Middle Income Group, HIG = High Income Group.

**Use of family planning techniques:**

Data was collected on utilization of family planning methods as well as barriers to accessing family planning services. About 43 per cent of respondents reported ever use of family planning techniques. The most common methods used were the male condom and the pill. Among ever users, women thought that contraceptives were not effective for birth control; However two-third did not consider Family Planning safe.

Use of family planning techniques in LIG was poor (84%) and child mortality and maternal mortality rates were higher. In HIG use of these techniques was common *i.e.* 87%. It was 68 % for MIG. The percentage of nonusers of family planning technique in MIG and HIG was 32 and 13 per cent, respectively (Table 7).

Table 7 : Use of family planning techniques		
Income group	Yes	No
LIG (100)	16	84
MIG (100)	68	32
HIG (100)	87	13
Average	171	129
Percent	57%	43%

LIG = Low Income Group, MIG = Middle Income Group, HIG = High Income Group

**Birth intervals between children:**

A positive association between birth interval length and maternal health was consistently

identified. Short intervals below 1 year accounted for 13.3% of the births. Slightly less than one-third of the births occurred in 2 years after the preceding birth while 128 births occurred in 3 years after the preceding birth.

Remaining 13.6% of births occurred in more than 3 years after the preceding birth. These findings strongly suggest that there is direct relationship between short birth interval and income groups (Table 8).

Income group	1 year	2 years	3 years	More than 3 years
LIG (100)	26	45	24	5
MIG (100)	14	27	51	8
HIG (100)	0	19	53	28
Average	40	91	128	41
Percent	13.3%	30.3%	42.6%	13.6%

LIG = Low Income Group, MIG = Middle Income Group, HIG = High Income Group.

**Nutritional status:**

Nearly 36.6% of the study population was overweight while 8.3% of the population was obese. 9 obese women belong to MIG. 3 obese women and 48 overweight women were recognized in LIG and HIG group, respectively (Table 9).

Women’s knowledge of the specific risks associated with excess maternal obesity was poor. Women also reported many incorrect beliefs about weight management in pregnancy.

Income group	Below 18.5 kg/m <sup>2</sup> (Underweight)	Between 18.5-25 kg/m <sup>2</sup> (Normal)	Between 25 -29 kg/m <sup>2</sup> (Overweight)	Above 30 kg/m <sup>2</sup> (Obese)
LIG (100)	53	14	30	3
MIG (100)	41	18	32	9
HIG (100)	22	17	48	13
Average	116	49	110	25
Per cent	38.6%	16.3%	36.6%	8.3%

LIG = Low Income Group, MIG = Middle Income Group, HIG = High Income Group.

**Special diet during pregnancy:**

Maintaining a healthy balanced diet is important for maintaining optimal health throughout life. For women of maternal age, good nutrition is important for preparing the body for the demands of pregnancy. The need of most of the nutrients is increased during pregnancy to meet the high demands of both the growing fetus and mother who herself goes through a period of growth to carry the child and prepare for lactation.

Considering their changes in dietary behavior it was concluded that only 48.3% of the women started consuming special diet during pregnancy. More than 50% of pregnant women did not exceed the RDAs in their intakes of diet. In LIG 74% respondents had not changed their diet. Only 26% respondents had taken diet according to their special need during pregnancy. Respondents who belong to HIG were found more aware about the increased nutritional requirement during pregnancy. In this income group 65% respondents had taken

and 35 % had not taken special diet during pregnancy (Table 10).

Table 10 : Special diet during pregnancy		
Income group	Yes	No
LIG (100)	26	74
MIG (100)	54	46
HIG (100)	65	35
Average	145	155
Percent	48.3%	51.6%

LIG = Low Income Group, MIG = Middle Income Group, HIG = High Income Group.

**Amount of nutrients consumed:**

It is clear from the Table 11 that nutrients consumed by respondents belonging to HIG was almost equivalent to RDA like energy was 2562.19 Kcal, protein 64.4gm, fat 37.7 g, calcium 1004.4 mg, iron 26.8 mg etc. In MIG consumption of nutrients by respondents was lower than the RDA value. In LIG the nutrients consumed by respondents were too low than RDA like energy was 2210.4 Kcal, protein 57.5 gm, fat 30.29 g, calcium 612.9 mg, iron 21.16 mg etc.

Table 11 : Amount of nutrients consumed				
Nutrients	RDA(ICMR)	LIG	MIG	HIG
Energy(Kcal)	2525	2210.4	2433	2562.19
Protein(gm)	65	57.5	63	64.4
Fat(gm)	30	30.29	30.17	37.7
Calcium(mg)	1000	612.9	871.3	1004.4
Iron (mg)	38	21.16	24.36	26.8

LIG = Low Income Group, MIG = Middle Income Group, HIG = High Income Group, RDA = Recommended Dietary Allowance.

**Conclusion :**

In the light of above data analysis and discussion it was concluded that the incidence of infant’s poor health and maternal mortality remained unacceptably high in Allahabad city. The present investigation deals with the relationship between birth spacing and maternal health. It was recorded that educational status, age at marriage age at delivery of first child, no of pregnancies conceived , nature of work undertaken by them (*i.e.* whether working women or housewives) usage of family planning techniques, nutritional status, nature of their family etc. were the governing factors which effect the mother’s health due to birth spacing.

It was also seen that birth intervals adversely effects mother’s health. In case of LIG, MIG women were less affected by these factors than LIG but they had low availability these facilities. The condition of women, who belong to HIG was better than those of LIG and MIG as most of them were educated and had facilities.

It can also be concluded that more the birth spacing, healthier would be the mother. So, steps should be taken to maintain the birth intervals between children. Also family



planning programmes should be encouraged to control risk of maternal mortality in order to have healthy mothers and children.

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