



## Paternal and Maternal Age on the Risk of Recurrent Miscarriage, Bangladesh Perspective

Dr. Sharmin Akter<sup>1</sup>, Mohammad Mozammel Hoque<sup>2</sup>, Md. Shariful Islam<sup>3</sup>,  
Ilias Hossain<sup>4</sup>, Sk Raghob Raihan<sup>5</sup>, Meherunnesa Faria<sup>6</sup>, Sazin Islam<sup>3\*</sup>

<sup>1</sup>Central Medical College, Comilla, Bangladesh

<sup>2</sup>General Food Assistance Program, BRAC, Cox's Bazar, Bangladesh

<sup>3</sup>Department of Public Health, First Capital University of Bangladesh, Chuadanga, Bangladesh.

<sup>4</sup>CRAAIN Project, Rupantar, Khulna, Bangladesh

<sup>5</sup>Khulna City Medical College, Khulna, Bangladesh

<sup>6</sup>Department of Food & Nutrition, Akij College of Home Economics, Dhaka, Bangladesh

### ABSTRACT

The risk of miscarriage rises as the parents' age rises. Many researches, on the other hand, focus solely on the effect of maternal age. This study looked at the impact of maternal and father age on miscarriage. Couples between the ages of 19 and 50 were studied who had experienced pregnancy loss. The age of the mother and the age of the father were compared. As a control group, couples consisting of a woman and a man both between the ages of 20 and 29 were used. Miscarriage risk was shown to be increased when the woman was 35 years old or older and the man was 40 years old or older. However, due to the limited sample size in this study, this could not be proven. If both the male and female partners are older, the chances of pregnancy loss increase.

**KEYWORDS :** Miscarriage, Parental Age, Age Effect, Bangladesh

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### I. INTRODUCTION

The loss of three or more clinically identifiable pregnancies spontaneously during early gestation was once characterized as recurrent miscarriage. The current meaning, on the other hand, relates to the spontaneous loss of two or more pregnancies in a row before twenty weeks of pregnancy<sup>1</sup>.

With the advancement of contemporary technology, the average life expectancy is increasing. Because of changes in marriage patterns, lots of competition and career opportunities, changes in contraception use, social support, and possibly other factors (e.g. stress, pollutants, and smoking) that seem to be responsible for the increase in miscarriage rate, women have been increasingly delaying the start of motherhood in recent decades. This pattern has been seen all around the world and among all demographic groupings. Both modern and ancient scientists have been fascinated by the relationship between parental age and fertility.

The study of the age effect on human reproduction is complicated by the multiple physiological changes that occur in males and females, as well as the influence of environmental and socioeconomic factors on reproductive outcomes. The goal of this study was to see if parental age had an impact on the pregnancy outcome. Spontaneous abortion is the most common problematic reproductive event, with up to 10% of clinically confirmed concepts miscarried during pregnancy<sup>2</sup>.

Errors during gametogenesis in either parent, fertilization, or the early cellular divisions of the zygote can cause chromosomal defects in the zygote, and many more pregnancies fail before they are clinically identified. Only 30% of all pregnancies result in a live birth. After two previous miscarriages, the probability of miscarriage increases to 30% and 35% after the third.<sup>3</sup> Most studies have found that women over the age of 35 have a higher rate of infertility, spontaneous abortion, pregnancy difficulties, and congenital abnormalities than younger women.<sup>2,4,5,6,7,8</sup> About 30-40% of males in the reproductive age group have sperm production abnormalities, either quantitatively or qualitatively.<sup>3</sup> Similarly, paternally inherited genetic mutations may cause spontaneous abortion, which may become more common as paternal age increases due to the continuing replication of stem cells after puberty.<sup>9</sup>

In population-based studies, the effect of father age on pregnancy outcome after natural conception has been explored. Previous studies show that the spontaneous abortion rate was considerably greater in women with male partners over 45 years old compared to those with partners under 25 years old in a study.<sup>9</sup> Researchers reported that in comparison to women with partners 25 years old or younger, partners of women 40 years or older had a nearly three-fold increase in spontaneous abortion.<sup>10</sup>

When compared to the post-fertilization event, gametogenesis errors result in the most chromosomally defective pregnancies. This study looked at the impact of maternal and father age on miscarriage.

## II. MATERIALS AND METHODS

The first group consisted of 400 individuals from 200 couples (ages 19 to 50) with a history of more than two miscarriages and no live births, and the control group consisted of 200 individuals from 100 couples (ages 20 to 50) who had one or more normal children. The patients and controls had no occupational or environmental exposure to radiation (electromagnetic radiation), extreme temperatures, or hazardous substances such as insecticides and pesticides.

Studies have shown the ages of 20 and 29, there was no effect of maternal age on spontaneous abortion. As a result, the male and female age groups of 20-29 years are chosen as a reference in this study.<sup>2,11</sup> The age of the mother was classified into four categories: 20-29 years, 30-34 years, 35-39 years, and 40-50 years. The age of the father was classified into four categories: 20-29 years, 30-34 years, 35-39 years, and 40-50 years.

## III. RESULTS

The ladies were 29.3 years old on average, with ages ranging from 19 to 45. Women in the control group were on average 29.5 years old, with a range of 20 to 45 years. The average number of abortion instances was between 3 and 6. The group with three abortions had a greater frequency of couples (83.5%), followed by the group with four abortions (10.5 percent) (Table 1).

**Table 1- Women with a history of recurrent miscarriage have a higher rate of abortions.**

No of Abortions	No. of Couples	%
3	167	83.5
4	21	10.5
5	10	5
6	2	1
<b>Total</b>	<b>200</b>	<b>100</b>

Table 2 shows case group, the distribution of father and maternal age. 145 couples out of 200 had three abortions, with the males being 40 years or older and the females being 35 years or younger.

**Table 2- In the case group, males and females were distributed according to the number of abortions and the age criteria.**

		Cases (couples=200)			
Variable→	Age Category	F<=35	F>35	Total	
Abortions↓	3				
		M<=40	145	8	153
		M>40	11	3	14
	<b>Total</b>	<b>156</b>	<b>11</b>	<b>167</b>	
>3		M<=40	27	1	28
		M>40	2	3	5
	<b>Total</b>	<b>29</b>	<b>4</b>	<b>33</b>	

Table 3 shows both the Case and Control groups, the distribution of father and mother age was examined. Males in the age range of 30-34 years and ladies in the age range of 20-29 years made up the majority of the couples (61 percent). Then came 33 (16.5 percent) couples with males ranging from 35 to 39 years old and ladies ranging from 30-34 years old.

There were 27 couples, each having a male and female between the ages of 20 and 29. In the control groups, the majority of couples (32%) had males in the 30-34 year range and females in the 20-29 year range, while 15 (15%) had males in the 35-39 year range and females in the 30-34 year range. According to the

Kolmogorov-Smirnov test, the difference in the distribution of couples in the two groups was statistically insignificant, with a p-value of 0.4154.

**Table 3- Males and females are divided into two groups based on their age criteria.**

	Case (couples=200)				Control (couples=100)			
Maternal age (year)	20-29	30-34	35-39	>= 40	20-29	30-34	35-39	>= 40
Paternal age (year)								
20-29	27	0	0	0	8	0	0	0
30-34	61	19	2	0	32	18	1	0
35-39	16	33	15	0	9	15	5	0
>= 40	3	11	11	2	0	4	5	3

Table 4 presents a breakdown of couples based on the number of abortions and the age of the male and female partners. In a study of 200 abortions, 168 (84%) couples had three abortions, while 32 (16%) had more than three. In the three abortions group, the majority of couples, 52 (31 percent), had males between the ages of 30-34 and females between the ages of 20-29. This was followed by 30 (18%) couples with males in the 35-39 year age group and females in the 30-34 year age group. There were 25 (15%) couples with both males and females in the 20-29 year age range who had three abortions.

**Table 4- In the case group, males and females were distributed according to the number of abortions and the age criteria. (n=200)**

Variable	Maternal age →	20-29	30-34	35-39	>= 40
	Paternal age ↓				
<b>Abortions</b>					
<b>3 (n=168)</b>	20-29	25	0	0	0
	30-34	52	12	1	0
	35-39	15	30	11	0
	>= 40	3	10	8	1
<b>&gt; 3 (n=32)</b>	20-29	2	0	0	0
	30-34	9	7	1	0
	35-39	1	3	4	0
	>= 40	0	1	3	1

Maximum, i.e. 9 (28%) couples had males in the age range 30-34 years and females in the range 20-29 years in the category of more than 3 abortions, followed by 7 (22%) couples with both males and females in the age range 30-34 years.

Table 5 shows the gender and age-related distribution of key chromosomal abnormalities. Out of 200 couples in the Case group, 4 (2%) males and 6 (3%) females had abnormalities. None of the couples in the Control group had any abnormalities.

**Table 5- In two groups, abnormalities are distributed according to gender and age criteria.**

Abnormality	Age category	Cases (n=200)	Control (n=100)
<b>Males</b>	20-29	0	0
	30-34	1(0.5%)	0
	35-39	1(0.5%)	0
	>= 40	2(1%)	0
	<b>Total</b>		<b>4(2%)</b>
<b>Females</b>	20-29	4(2%)	0
	30-34	0	0
	35-39	2(1%)	0
	>= 40	0	0
	<b>Total</b>		<b>6(3%)</b>

Table 6 shows the distribution of polymorphic people in two categories based on gender and age. In the Case group, 14 (7%) males and 11 (5.5%) females had polymorphism, whereas in the Control group, 5 (5%) males and 3 (3%) females in 100 couples had polymorphism.

**Table 6- Gender and Age Distribution of Polymorphic Variation in Study Participants.**

<b>Polymorphic Variation</b>	<b>Age category</b>	<b>Cases (n=200)</b>	<b>Control (n=100)</b>
<b>Males</b>	20–29	1 (0.5%)	0
	30–34	6 (3%)	4 (4%)
	35–39	6 (3%)	1 (1%)
	>= 40	1 (0.5%)	0
	<b>Total</b>	<b>14 (7%)</b>	<b>5 (5%)</b>
<b>Females</b>	20–29	6 (3%)	0
	30–34	2 (1%)	1 (1%)
	35–39	2 (1%)	2 (2%)
	>= 40	1 (0.5%)	0
	<b>Total</b>	<b>11 (5.5%)</b>	<b>3 (3%)</b>

Using the two-sample test for equality of proportions, the difference in the proportion of males with polymorphism in the two groups was statistically insignificant, with a p-value of 0.6752 ( $p > 0.05$ ). Similarly, with a p-value of 0.4981 ( $p > 0.05$ ), the difference in the proportion of females with polymorphism in the two groups was statistically insignificant.

#### IV. DISCUSSION

The goal of this study was to see if parental age had an impact on pregnancy outcomes. The quantity of oocytes in females naturally declines due to the process of atresia. The maximum complement of oocytes in a female fetus at 20 weeks of pregnancy, according to the American Society for Reproductive Medicine recommendations, is 6-7 million. At birth, there are around 1-2 million oocytes; at puberty, there are 300,000-500,000 oocytes; at age 37, there are 25,000 oocytes; and at age 51, there are 1,000 oocytes.<sup>12</sup>

Several studies have found that women above the age of 35 are more likely to experience spontaneous abortions.<sup>2,11</sup> According to a 2002 study the chance of spontaneous abortion was higher among women over 35 years old when their spouse was 40 years old or older than when he was 35–39 years old.<sup>4</sup> Researchers found that maternal age had an effect on pregnancy only after 35 years of age in a multiple logistic regression analysis research.<sup>13</sup> The risk of miscarriage was assessed in relation to maternal age at conception, and the findings revealed a j-shaped curve with a considerable increase in slope beyond 35 years. The fetal loss occurred in more than a fifth of all pregnancies in 35-year-old women, and more than half of all conceptions in 42-year-old women.<sup>2</sup> A study by 2001 compared males aged 23-39 years to men aged 59-74 years, they discovered that older men had a higher prevalence of sperm chromosome abnormalities.<sup>14</sup>

Growing male age is linked to a gradual and significant increase in the probability of fathering children with various genetic abnormalities.<sup>15</sup> Because sexual activity reduces with age, it's difficult to distinguish the effects of sexual behavior from age. Miscarriage, premature delivery, low birth weight, fetal death, and birth abnormalities such as congenital heart disease, cleft lip, cleft palate, and Achondroplasia have all been linked to advanced paternal age.<sup>16</sup> Multiple genetic or chromosomal problems, single-gene mutations, and structural abnormalities in sperm chromosomes (e.g. Reciprocal translocations) could all be factors. In men aged 36-57 years, DNA damage in sperm was shown to be three times higher than in individuals younger than 35 years.<sup>16,17,18</sup> Other than age, occupation, smoking, and environmental exposure are key factors in males that influence sperm quality and, as a result, pregnancy outcome. Sperm DNA fragmentation can be caused by stress, infection, alcohol consumption, and competitive sports. According to some sources, the relationship between spontaneous abortion and maternal age and gravidity of the pregnant woman, as well as the time between successive pregnancies, is important. As a result, it is believed that couples who want to have a baby face a struggle in maintaining the relative safety of having a baby when the mother is 35 years old and in maintaining the right spacing between pregnancies.

It demonstrates that couples who want to lower the chance of recurrent pregnancy loss should not wait too long to start a family and should utilize a variety of contraceptive techniques to allow for breaks between consecutive pregnancies in order to maintain a healthy reproductive life.

## V. CONCLUSION

The age of the parents was found to have a negative link with fertility in couples who had repeated losses in this study. We were unable to find any significant impact of father age on pregnancy outcome after controlling for parental age. This study has yet to provide a clear picture of the role of parental age on pregnancy. Although our sample size was insufficient to detect effects of parental age, our findings can be interpreted as indicating the upper limit of any negative pregnancy outcome.

We can learn more about the processes of the parental age effect and its relationship to pregnancy losses thanks to large-scale research and converging evidence. As a result, older couples, defined as those who have a female who is 35 years or older and a male who is 40 years or older, should be warned that they are at a greater risk of miscarriage.

Couples who are contemplating pregnancy should seek advice to learn more about the impact of age on fertility. Women over the age of 35 who have failed to conceive after six months of trying should be evaluated and treated right away. The detection of genetic causes informs couples who experience recurrent miscarriages about the danger of passing genetic defects, which can affect the possibility of a successful treatment, the health of offspring, and treatment alternatives.

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