

Role of Women Education in Determining Birth Rates

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I. BACKGROUND

Birth rate is a very integral component measuring population growth. As birth rates are directly related to the health status of a woman, emphasis are made to study the impact of various factors viz. age of the woman, nutrition, income, education, culture, etc., affecting birth rates. This paper reveals that birth rates in general are declining, one of the main causes being the increase in women's literacy rate. It focuses on the number of births per woman in a population given emphasis on their educational level. The number of children per woman was very high in the past and up to the second half of the 20th century. Globally, up to the year 1965 an average woman had more than five children. Over the last fifty years the global fertility rate has halved and globally the average woman has three or less than three children.

II. REVIEW OF LITERATURE

From a theoretical perspective, several channels have been emphasized. First, education raises a woman's permanent income through earnings, tilting her optimal fertility choices towards fewer off-springs of higher quality (Becker 1960, Mincer 1963, Becker and Lewis 1973, Wills 1973). Second, under positive assortative mating, a woman's education is casually connected to her mate's education, so that the effect of education on household permanent income is augmented through a multiplier effect (Behrman and Rosenzweig, 2002). Third, education may improve an individual's knowledge of, and ability to process information regarding, fertility options and healthy pregnancy behaviours (Grossman 1972). The study made by Pradhan and Canning 2016 of education and fertility in Ethiopia estimated that an additional year of schooling in Ethiopia would lead to a seven percent reduction in the probability of teenage pregnancy and a six percent decrease in the probability of marriage. In broad terms Education may affect a women's fertility and child investment choices through either income or learning (Michael 1973).

The literature also gives emphasis on the role of education in augmenting an individual's decision of motherhood and health. With respect to fertility, Rosenzweig and Schultz (1989) provide evidence that a woman's education explains the ability to effectively use contraception. Thomas Strauss and Henriques (1991) shows that education predicts a woman's ability to acquire and process information. One of the most cited examples is smoking (Currie and Moretti 2003). Considering smoking being one of the causes for low birth rates, through anti-

smoking campaigns in schools or health class, teenagers could learn about the dangers of smoking and be discouraged from adopting the habit of smoking.

III. OBJECTIVES

The objective of the paper is:

- To study whether 'Woman Education' as an empowerment tool towards development and prosperity is the main factor for reduction in birth rates.
- To analyze whether high level of female education is a reason for fewer and healthy births.
- To study some of the factors leading to decline in birth rates.

IV. METHODOLOGY

This paper uses secondary data. This study uses the time series data of 57 years on female education and crude birth rates. The paper uses the World Development Indicators from World Bank.

The paper studies birth rates globally, country-wise annual number of births, enrollment of women in schools/ higher education and the woman's fertility rate. There is a negative correlation between the different levels of female education and the total fertility rate (TFR) in a population.

V. BROAD REASONS FOR THE DECREASE IN BIRTH RATES

Following are some of the reasons which could lead to decline in birth rates:

(i) Education refers to the process of receiving or giving systematic instruction at school or university. Female education has a greater impact on the age of marriage and delayed fertility than male education. It has been observed that higher the level of education of a woman more delayed is her marriage and in turn fertility. It was found that more educated women have higher opportunity costs of bearing children in terms of lost income (Pradhan, 2016). They prefer to concentrate on their career which provides them for their livelihood. According to the ideation theory, more educated women may learn different ideas of desired family size through school, community, and exposure to global communication networks. Data show that the higher the level of a woman's educational attainment, the fewer children she is likely to bear. Given that fewer children per woman and delayed marriage and childbearing could mean more resources per child and better health and survival rates for mothers and children (Pradhan, 2015). When a woman is educated she tends to

be more knowledgeable about prenatal care and child health and hence have greater confidence that their children will survive compared to illiterate women. Illiteracy also leads to decline in births because such women do not have the proper knowledge to be taken heed of during her gestational period. Three mechanisms influence the fertility decision of educated women: (1) the relatively higher incomes and thus higher income forgone due to childbearing leads them to want fewer children. The better care these women give increases their children's human capital and reduces the economic need for more children; (2) the positive health impacts of education, on both women and their children, mean women are better able to give birth and children's higher survival rate reduces the desire for more; and (3) the knowledge impact of education means women are better at using contraceptives (Jungho Kim, 2016). According to a study done by the Population Connection Organization (2016) data from 219 countries from 1970 to 2009 found that for every one additional year of education for women of reproductive age, child mortality decreased by 9.5 percent. Investments in women's education have proven especially effective at lowering fertility rates since better educated women tend to marry later and have fewer and healthier children. Educated women are more physically capable of giving birth than uneducated women; but want fewer children and control birth better. Educated women provide better care at home, thus increasing the value of their children's human capital and reducing the need for more children. (Jungho Kim, 2016).

(ii) Culture, Media & Family Planning: In today's populous world, most governments try to promote having smaller families in order to control population. Gone are the days when women and families with their particular country's culture preferred having many children, sometimes as many as 12 to 15 and even more. This notion has now been replaced by having two or few children. The government help in assisting families achieve this goal through family planning programs or small family norms. Family planning refers to all active efforts to choose the number of children a family wants. It focuses on decision making and execution on a personal level. When it comes to such programs, it has been seen they play an important role in providing information through social media, counseling to couples and even supplying modern contraceptive methods which prove effective in bringing down sizes of families which literally means decline in birth rates. One major reason why family planning is highly important today is to bring down the number of unwanted pregnancies. Awareness of safe family planning methods nowadays compared to yesteryears has reduced the number of unwanted births thereby decline in overall birth rates.

(iii) Contraceptives: Another reason leading to declining birth rates is the increase in the use of contraceptives. A contraceptive is a device, drug or method used to prevent pregnancy or to basically control birth of a child from taking place. There are various kinds of contraceptives methods used in today's world. Use of condoms and pills top the list as the most commonly used type of

contraception. The other methods include contraceptive diaphragm, the cervical cap/ femcap, Intrauterine Device (IUD) which are of two types hormonal and copper-based devices, contraceptive implant, contraceptive sponge, contraceptive injections, vaginal ring, contraceptive patch, sterilization which may be surgical or non-surgical, Natural Family Planning, etc. However whichever contraceptive method a couple may choose to adopt not to conceive a child, it has to be taken into account that human errors and method malfunction although less likely can take place, depending on the use and effectiveness of the particular method. In general though, the use of contraception is followed and does significantly lower ones chances of becoming pregnant. The reasons to why contraceptives are used are usually in case a couple is not ready to take up the responsibility of bringing up a child. It may be due to reasons like family planning, wherein a couple do not want children or it may not be the right time i.e. they would want a child but after some years, spacing the timing of births of their children so that they can concentrate on the child or children they already have or they do not feel that they are ready to be become parents as they may be too young or they are have children and the couple feel like their family is complete. It may be used by some women who want to have more control over their lives, i.e. no added responsibility of raising up a child as they want to focus on their career. Contraceptives may also be used by couples when they are not able or ready to take up the financial responsibilities involved in having a baby or it have also be used for health reasons wherein bearing a child would prove harmful for the woman. All the above reasons of using contraceptives lead to the end goal of couples towards not bearing a child however ultimately and on a greater note, declining birth rates.

(iv) Nutrition: Another factor, which, if not paid importance to, does also lead to decline in birth rates. Nutrition refers to the substances that one takes into one's body as food and the way that they influence one's health. Based on a 2500 calorie minimum required daily diet, the FDA recommends at least 50gms of protein, 300gms of carbohydrates 25gms of dietary fiber and aim to get less than 80gms total fat, 25gms saturated fat, 300mg of cholesterol and 2400 mg sodium. When one does not get the adequate requirement mainly due the lifestyle that we follow these days it leads to deficiencies which may not be noticed. Such deficiencies, excesses, or imbalances in a person's intake of energy and nutrients result in malnutrition. Nowadays most people get so busy with their respective work schedules that they miss out on having breakfast or lunch and proper meals. This ultimately leads to people ending up on eating junk food lacking the proper nutritional requirements thus leading to malnourishment. These deficiencies and malnourishment in woman can lead to infertility and difficulties in conceiving. A woman cannot control the causes of infertility but she can definitely control her eating habits which plays a vital role in conceiving. Maintaining healthy weight and food selection is important for a woman to prepare herself for

pregnancy and enhance fertility. The National Infertility Association reports that 30 percent of infertility cases are due to weight extremes, which can alter hormone levels and throw ovulation off schedule. For women who are overweight, as little as 5 percent weight loss could improve fertility. On the other hand, women who are underweight, with a body mass index below 18.5 (18.5 to 24.9 is considered normal), may experience irregular menstrual cycles or stop ovulating altogether, according to the American Society of Reproductive Medicine. (Caroline Kaufman, 2017). Thus intake of proper nutritional meals is very important without which it leads to deficiencies leading to infertility thus declining birth rates.

(v) Lack of medical facilities: Women living in urban areas are connected to good hospitals and good health care facilities which help them carry out their pregnancy well, although it may be observed that urbanization is generally associated with low fertility. On the other hand, rural area women faces issues of lack of information, lack of health care connectivity, poor sanitation levels all which lead to all kind of odds during her pregnancy period leading to decline in birth rates.

(vi) Stress: In today's highly competitive rat race world, working women are faced with a lot of work and home pressure which leads to stress, anxiety, depression, etc. These conditions affect the health of women. Symptoms like insomnia, loss of appetite or eating less than usual and sometimes even eating more than usual and binging on food stuff, losing interest in things one normally loves doing, etc., sets in. When one is stressed out, getting pregnant becomes difficult. Research shows links between stress, anxiety, depression and infertility. Research also indicates that stress may have an impact on other aspects of fertility beyond ovulation, including problems with fertilization and implantation in the uterus. Many a times the physical cause of infertility can be treated medically, however, with high stress levels, getting pregnant can still be difficult.

(vii) Mother's age: It has been noticed that there exists a negative correlation between mother's age and birth rates. Research studies show that as a woman gets older she tends to conceive fewer children. The numbers of births continue to fall as the average age of mothers rise. The average age a woman gives birth has shifted from mid 20s to late 20s and early 30s i.e. the average age of a woman at childbirth has increased. The focus of child bearing has shifted to later age groups leading to general decline in fertility age group. This shift is either the result of focus

on career or not finding the right match, leading to delayed marriages and thereby delay in conceiving. Further with regards to teenage pregnancies, although the rates have declined, it has been seen that when adolescent girls do get pregnant, they are immature and fail to take up the responsibility of precautions to be taken during her gestational period. Adolescent girls who get pregnant usually come from situations of homes with high incidence of poverty, violence, use of drugs and hence pregnancy at a young age. In addition, these adolescent girls have a higher than average history of learning problems and school dropout and some experience postpartum depression. These problems stunt the development of these adolescents and add to this the responsibility of bringing a child may lead to additional problems for themselves and their infants. Children born to teen mothers are at increased risk for behavioral, social, and learning problems. (Garrison and Marriane, 2009).

(viii) Employment and Income: Income refers to the money gained on a regular basis usually for being employed for some kind of service or through investments. It has been seen that there exists a negative correlation between income and birth rates i.e. higher the income fewer the number of children born to a woman. In most cases the higher the level of education, the better the job prospects, better income but fewer children. In a 1974 UN population conference in Bucharest, Karan Singh, a former minister of population in India, illustrated this trend by stating "Development is the best contraceptive." During the last few decades there has been a rise in the numbers of working women. Long gone are the days where the place of a woman was the four corners of her home. Women now are more career oriented. They are doing tremendously well in all walks of life. Hence women are becoming increasingly reluctant to abandon a professional career for the sake of having a family (Gutierrez-Domenech, 2004). Their employment in whichever field possible proves them to be supplementary income providers. Women with high incomes usually bear lesser number of children resulting in low birth rates whereas women with lower incomes bear more children resulting in higher birth rates. For women with lower incomes it has been noticed that more children prove to be a helping hand monetarily. More the children, more the hands at work. It is also seen that families with lower incomes count on their children to take care of their parents during old age, which is usually not the case in higher income families with monetary back up already done. Women with higher incomes usually have higher work stress and responsibilities and hence tend to have fewer children which overall leads to declining birth rates.

VI. DATA ANALYSIS

In considering whether female education actually drives a decline in the birth rates, the paper first studies the top ten populated countries and later analyses their respective birth rates using the data available from the World Bank, World Population Prospectus.

Table 1: Top Ten Populous Countries and Birth Rates

Sr. No.	Country	1960	2000	2010	2015	2016
1	China	20.86	14.03	11.90	12.07	12.00
2	India	42.10	26.46	21.41	19.27	19.01
3	U.S.	23.70	14.40	13.00	12.40	12.40
4	Indonesia	44.56	21.76	20.86	19.35	18.99
5	Brazil	42.34	20.20	15.49	14.41	14.16
6	Pakistan	44.19	32.04	30.18	28.73	28.23
7	Nigeria	46.34	43.15	41.34	39.37	38.89
8	Bangladesh	49.02	27.64	21.22	19.29	18.95
9	Russia	23.79	8.70	12.50	13.30	12.90
10	Mexico	45.53	24.13	19.99	18.51	18.17

Data Source: Compiled from World Population Prospectus: 2017 Revision

As can be seen from the above table, China being the most populous country is showing a decline in the birth rate from 20.86 (per thousand people) in the year 1960 to 12.00 (per thousand people) in the year 2016. India being the second largest populated country also sees a decline in the birth rate from 42.10 (per thousand people) in the year 1960 to 26.46 (per thousand people) in the year 2000, further declining to 21.41 (per thousand people) in 2010 and further to 19.01 (per thousand people) in the year 2016. A similar trend is seen throughout the other countries, while in Russia, in the year 2000 a drastic decline (08.70 per thousand people) is seen owing to the breakup of the Soviet Union. The overall country-wise analysis show that compared to the year 2015 the birth rates have decreased in the year 2016.

The study by Angrist and Krueger (1992) concludes that women are likely to give birth at early ages than woman intend on attaining a specific level of schooling such as college degree.

Table2: School Enrollment (males and females)

Year	Primary Education (Percentage)	Secondary Education (Percentage)	Tertiary Education (Percentage)
1971	78.92	24.04	4.95
1981	84.22	30.42	5.28
1997	93.89	46.05	6.57
2000	94.62	45.08	9.55
2010	109.20	63.31	17.91
2015	108.50	73.98	26.88
2016	114.53	75.18	26.93

Data Source: Compiled from World Population Prospectus: 2017 Revision

The above Table 2 shows that the school enrollment of males and females in the Primary, Secondary and Tertiary level education. In spite of the decline that is seen in school enrollment from primary education to secondary education and further from secondary education to tertiary education, an increasing trend can be seen owing to the fact that the percentage of males and females enrollment in the tertiary level education is increasing. Figure 1 shows a diagrammatical representation of Table 2.

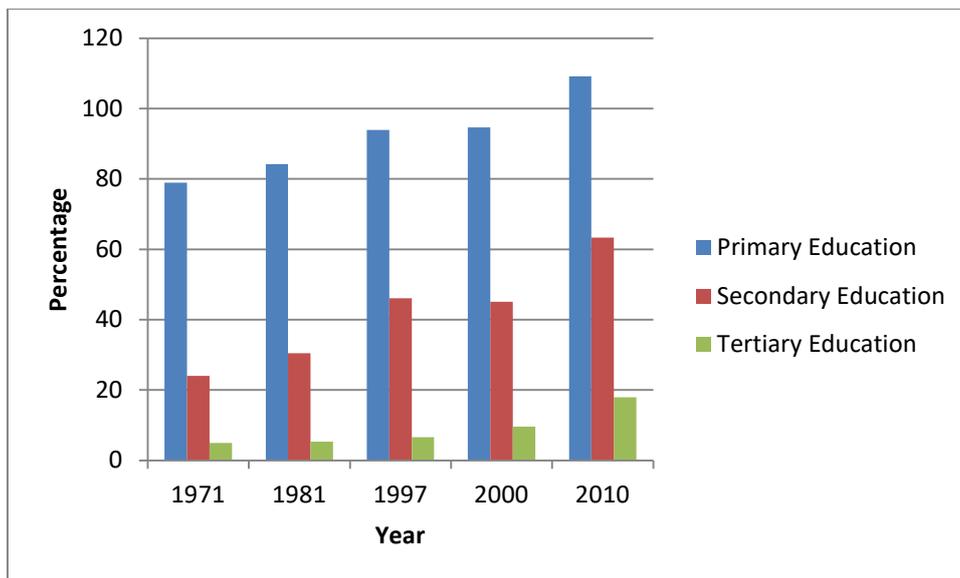


Figure1: School Enrollment (males and females)

Data Source: Compiled from World Population Prospectus: 2017 Revision

Table 3: Relationship between Female Education and Fertility in India

Year	Female Literacy Rate (Percentage)	Fertility Rate (Births per woman)
1981	25.68	4.77
1991	33.73	3.96
2001	47.84	3.24
2011	59.28	2.53
2016	70.21	2.33

Data Source: Compiled from World Population Prospectus: 2017 Revision

There is a negative correlation between the different levels of female education and the total fertility rate in a population. The statistical data clearly supports the casual role of female education in fertility decline. The female literacy rate in the year 1981 was 25.68 percent, further increasing to 47.84 percent in the year 2001 and a rapid increase by 70.21 percent in the year 2016 which evidently indicates that more women are getting themselves educated. Whereas, the fertility rate show a decline in the number of births per woman from 4.77 births in the year 1981 to 2.33 births in the year 2016. As per the household bargaining model, more educated women are better able to support themselves and have a small family as education brings in more career opportunities.

VII. CONCLUSION

The study based on the data concludes that, higher the level of woman’s educational attainment and career oriented goals, lesser the number of children she is likely to have. The innovation approach links ‘Education’ to improving the capacity of the economy to develop new ideas and technologies. The basic human capital approach is that education improves the overall skills and abilities of

the workforce. Having a more educated woman workforce creates new economic opportunities leading to the improved services which can lead to greater national and personal wealth. Access to family planning, reduced child mortality, access to education and work opportunities does influence the number of children a woman bears. This paper concludes that Women empowered through Education tend to have fewer children resulting in the overall decline in Birth Rates.

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