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Post Pandemic Impact on the Various Fertility Indicators of India

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Abstract

Pandemic period (COVID-19) in India recently has been over; however its long-term effects are predicted to be seen in future on different social, economic, political and demographic aspects of economy. The present paper has analysed the pre pandemic, during pandemic and post pandemic impacts on various indicators of fertility. The indicators selected for the study are CBR also called as (Crude Birth Rate), IMR(Infant Mortality Rate), CDR also known as Crude Death Rate and Fertility Rate which is also called as TFR. Forecasting has been done for the period 2024-2030 by using FORECAST.ETS function from the excel 2016 software on the basis of previously available data for the period of 2000 to 2023. The results derived from the study shows that the TFR(Total fertility rate) and CDR(Crude birth rate)would not be very much affected by the pandemic and it would continue to decrease at 1%. However, the mortality indicator CDR(Crude death rate) would be stagnant for the period of 2026 to 2030 after a huge increased death rate during pandemic period while IMR(Infant mortality rate) would continuously show the declining trend at an increasing rate.

Keywords: *Pandemic, Fertility, Mortality, Forecasting, COVID-19.*

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1. INTRODUCTION

Anticipations of all important functions of an economy as production, consumption, investment are all dependent on the future population levels and the population in turn depends on the fertility rate of the country. In India, where the fertility rates were quite high a few decades back, today it has started to shrink or followed a declining trend and also the mortality rates have been controlled whether it is a crude death rate or infant mortality rate. Also, it is said that fertility can be brought down to zero as this is in our hands but not the mortality. However, with the advancement of the medical facilities, the deaths are controlled to a significant level. But because of some human error in 2019, a pandemic named CORONA – VIRUS or COVID-19 took birth in China and the whole world suffered from huge rate of deaths. SARS-COV-2 was a virus because of which Corona, the most threatening disease, first

experienced by the people of China in the city of Wuhan in December 2019. It was the deadliest epidemics and pandemics in history. But, do these huge deaths cause a reduction in population or will it going to affect the indicators of fertility in future? The answer to all these questions has been tried to be made in this paper. First of all, let's see what is the demographics of India in pre-pandemic, during pandemic and in post pandemic phase:

Table-1: Demographics of India in 2017, 2019 and in 2023

S.no.	Variables	2017	2019	2023
1.	Population	1,354,195,680	1,383,112,050	1,425,785,850
2.	Density	411.95people per km	420.75people per km	473.42 people per km^2
3.	Growth rate	1.16%	1.03%	0.68% (2022)
4.	Birth rate	18.3 births per thousand people	17.8 births per thousand people	16.1 births per thousand people
5.	Rate of Deaths	7.24 deaths per thousand people	7.27 deaths per thousand people	6.6 deaths per thousand people
6.	Life expectancy	68.97years	69.5 years	72.0 years
7.	Fertility Rate	2.27 children born per woman	2.22 children born per woman	2.00 children born per woman
8.	Infant Mortality rate	33.41deaths/1000 live births	30.92 deaths/1000live births	29.94 deaths/1000 live births (2018)
9.	Gross Domestic Product	$2,651.49Billion	$2,835.61Billion	$3.75trillion(nominal)
10.	GDP per capita	$1,958	$2050	$2601(nominal)
11.	Unemployment	7.73%	6.51%	7.95% (July 2023)

Source: Demographics of India, Wikipedia

The table shows the demographics of the country India according to which the population of India is increasing at a rapid rate and is currently 1,425,785,850 in 2023 and the density is also following the same trend. However, the rate at which the population was increasing slowed down in 2023 and came down to 0.68% in 2022 after the pandemic situation from 1.16% in 2017 before pandemic situation. Birth rate continuously followed a declining trend while the rate at which the deaths were decreasing in the country was slowed down due to the pandemic. Unemployment was increased, while the other variables as Life expectancy, Gross domestic product and GDP per capita were continuously increasing.

2. LITERATURE REVIEW

Bujard and Anderson (2022) in the paper titled "Fertility declined near the end of the COVID-19 pandemic: Evidence of the 2022 birth declines in Germany and Sweden" provided the

data of the Germany and Sweden of 2022 which was related to the unanticipated birth decline and the data was related to the developments of Pandemic which were contextual. The study found out that there is a strong relationship between the beginning of different programmes of vaccination and the fertility decline nine months after this beginning.

Guetto, Bazzami and Vignoli (2022) have tried to analyse that how the decisions regarding fertility are made in uncertain times and therefore worked on the pandemic period fertility decisions of the people. The study found out that there is a causal impact of the different future narratives on the fertility decisions of the people which was found through an online experiment.

Luppi, Arpino and Rosino (2022) have given an overview of amendments in fertility plans during the corona crisis in some selected countries in a sample of young population (18-34). Data collected for 27 March to 7 April 2020. The results which the study derived showed that the plans related to fertility have been edited in all countries negatively and also it was different for all countries. In Germany and France, people postponed the decision of having a child showing that the plans changed moderately. However, in Italy, decision of postponing of having a child was much lower. In United Kingdom, the people who think that fertility plans are likely to have a negative impact on their anticipated income are likely to abandon their decisions of fertility. There were no revision of fertility plans in France and Spain.

Vanella, Greil and Phillip (2023) have analyzed the fertility responses to the pandemic situation in the developed countries. As various policy decisions and planning are based on the population forecasts which in turn is determined by fertility levels. Fertility forecasts need to be made before the pandemic situation to again become an acute situation. Most countries reported stable or slightly increasing number of births.

Ullah, Moin, Araf, Bhuivan and David (2020) have analyzed the anticipated effects which will be there on future rate of births because of the Coronavirus pandemic. The paper overviewed that the consequences which were derived due to pandemic situation are more or the less similar to the consequences which would be faced by any natural calamitic situation.

Emery and Koops (2022) have studied the influences of the pandemic situation on fertility behavior and intentions in Moldova which is in Eastern Europe. The results indicate that the use of intrauterine devices was reduced during pandemic and use of condoms increased while there was no decrease in contraceptives use. The study found out that that there was no significant effect on the fertility decisions of the people during pandemic but the contraceptives were restricted because of which fertility decisions of short term were also very much affected.

Berrington, Ellison, Kuang and Kulu (2021) examined the projections of fertility which are scenario-based by taking into account the influences of Coronavirus pandemic. The aims of this paper are three-fold. First, they will identify the trends of fertility till 2019 in UK. Second, they will identify the influences of pandemic on child bearing behavior and third, they will project the total fertility rates for 2021-2023. The study found out that the fertility will be showing the declining trend over the next 3 years in future as compared to the pre pandemic period.

3. RESEARCH PROBLEM

The previous works are more or less related to the influences of Coronavirus on different indicators of fertility and tried to identify the different factors which have been affected by the pandemic. Certain studies have been conducted on forecasting of fertility after pandemic at different country level. The main aim of the current study is to forecast the prolonged influences of the acute pandemic on various fertility indicators by incorporating the pre-pandemic and during pandemic situation of the country.

4. SELECTED VARIABLES AND METHODOLOGY

The current paper's calculations are done by making the use of the available secondary data which had been derived from the world Bank Database for India . The study period selected for the paper is 2000-2023 (given data period) and 2024-2030 (forecasted period) on the basis of certain forecasting tools. The Variables selected for the current paper include TFR representing fertility rate which measures the total count of children a woman can have during her fecundity period which is (15-49 years); CDR which is representing (crude death rate) implies total

deaths per thousand people ; CBR (crude birth date) which implies number of live births per 1000 people and IMR (infant mortality rate) which implies total deaths of children whose ages are just one year per thousand live births . Forecasting has been done by using FORECASTS. ETS function of excel 2016 software on each of the selected variables for a period of 2024-2030. FORECASTS.ETS[1] function is used for anticipating or predicting the future value on the basis of existing or available values by using the exponential smoothing (ETS) algorithm, (AAA version) .

5. OBJECTIVES

- To identify and analyse various indicators of fertility which could have impact of COVID-19.
- To conduct an observational study by anticipating the exerted impacts Coronavirus on the rate of fertility and its various indicators.

6. DATA ANALYSIS

For each of the fertility indicator selected for the study, the general trend until 2030 has been assessed and calculations are done for the period of 2000-2023 on the basis of the availability of whole data set. The summary of key findings has been presented in the table 2 below so that the reader may not unnecessarily feel overloaded with the entire data set. The full-fledged table showing the trend of growth rates and the forecasted values has been shown in the appendix at the end of the paper.

Table-2: Pre pandemic, during pandemic and post pandemic impacts on indicators of fertility

Pre-Pandemic Period(GV)	TFR(TOTAL BIRTHS PER WOMAN)	Growth %	IMR(PER 1000 LIVE BIRTHS)	Growth %	CDR(PER 1000 PEOPLE	Growth %	CBR(PER 1000 PEOPLE	Growth %
2014	2.333		36.7		6.79		18.984	
2015	2.295	-2%	34.7	-5%	6.67	-2%	18.625	-2%
2016	2.266	-1%	32.8	-5%	6.603	-1%	18.332	-2%
2017	2.243	-1%	31.1	-5%	6.593	0%	18.083	-1%
Pandemic period(GV)								
2020	2.184		26.6		7.35		16.6	
2021	2.179	0%	25.5	-4%	9.448	29%	16.4	-1%
2022	2.159	-1%	27.69	9%	9.1	-4%	16.3	-1%
Post pandemic period(FV)								
2025	2.098		18.240		7.217		15.795	
2027	2.056	-1%	14.701	-11%	7.258	0%	15.472	-1%
2029	2.014	-1%	11.095	-14%	7.247	0%	15.111	-1%
2030	1.993	-1%	9.19	-17%	7.25	0%	15.138	0%

Note: CBR= Crude birth rate, TFR=Total fertility rate, CDR= Crude death rate, IMR= Infant mortality rate, GV= given values, FV= Forecasted values. Source: Author's calculation.

The above table is split into three parts. The first part of the table is showing the pre-pandemic period from 2014-to 2017. Which are the given values. The trend which can be seen for Total fertility rate is decreasing which can be depicted by annual growth rate. Till 2014, 1% decrease can be observed but after 2016, it was decreasing at a constant rate. Infant Mortality rate was also showing a declining trend at a constant rate. Crude rate was also declining at a decreasing rate of 1 % till 2017. This trend of declining growth rates was hindered when the pandemic period started from 2019 which can be observed in the second part of the table. The situation got worsened for some variables. As Crude death rate which was declining got a huge increase of 29% in 2021. However, the situation got controlled and it started declining at a rate of 4% from 2022. Infant mortality rate got a

huge increase of 9 % in 2022. However Total fertility rate and the crude birth rate were not very much affected by the pandemic period and maintained the trend which was declining but at the constant rate. As per the table, the indicator which very much got affected by the pandemic period is the CDR (crude death rate) which would be stagnant till 2030(neither increasing nor decreasing). TFR which signifies (Total fertility rate) and CBR which signifies (Crude birth rate) will be decreasing but at a constant rate.

7. CONCLUSION

As per the above discussion, the conclusion comes out that the worsened situation during pandemic period will be controlled somewhere in 2030's, however for some variables may be after 2030's the situation will come under control. As of now, more of governmental efforts and attention is required on the improvement of health sector and medical treatments. Although, with earnest efforts of frontline workers and timely vaccination programme, the situation of acute pandemic is under control, but as per the predictions made for certain indicators of fertility, still more of efforts are needed for controlling Crude death rate and infant mortality rate. Corona was spread in the country without any age difference because of which pregnant women also got very much affected by this pandemic, resulting a huge rate of infant mortality rate. Although IMR is decreasing at an increasing rate, still the long-term impacts are not ignorable. India is a country having highest demographic dividend. The deaths need to be controlled as else we are not very far to see the situation of ageing in our country.

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