COMPARITIVE ANALYSIS OF IMR OF INDIA WITH OTHER DEVELOPED AND DEVELOPING COUNTRIES

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ABSTRACT:

In spite of reducing child mortality, deaths of infants in India on the first day of birth is still way too high and likely to hamper it from achieving the millennium development goal for curbing infant mortality rate (IMR) In 2012, as many as1.013 million babies died on the first day of birth in India, accounting for nearly 40 per cent of the total neo-natal deaths that year. Death in the first 28 days of life is considered an indicator of problems during pre-natal period and delivery.About0.75million neonates die every year in India, the highest for any country in the world. The neonatal mortality rate (NMR) declined from 52 per 1000 live births in 1990 to 28 per 1000 live births in 2013, but the rate of decline has been slow and lags behind that of infant and under-five child mortality rates. The slower decline has led to increasing contribution of neonatal mortality to infant and under-five mortality. Almost all states have witnessed this phenomenon, but there is still a huge disparity in NMR between and even within the states. The neonatal period—the first 28 days of life—carries the highest risk of mortality per day than any other period during the childhood. The daily risk of mortality in the first 4 weeks of life is ~30-fold higher than the post-neonatal period, that is, from1 month to 59 months of age. This has resulted in a slow decline in neonatal mortality rate (NMR) in most countries including India, and has hampered their achieving the Millennium Development Goal-4(MDG4)by year2015.This report provides an overview of the burden, trends and causes of neonatal mortality, burden of common morbidities, and coverage of key interventions in India. In this report there is deep study of trends of IMR in some developed and developing countries and then comparison with India IMR has been done.

INTRODUCTION:

Infant mortality is a very sensitive issue for countries specially for developing and developed countries it's a very imp parameter of assessing the health status of that country.

Public health is a sector under which mortality issues is taken care of. Epidemiology is the component of public health which deals with all type of diseases and its risk or outcomes.

The public health care system in India evolved due to a number of influences from the past 70 years, including British influence from the colonial period. The need for an efficient and effective public health system in India is large. Public health system across nations is a conglomeration of all organized activities that prevent disease, prolong life and promote health and efficiency of its people. Indian healthcare system historically dominated by provisioning of medical care neglected Public health. [2]20% of all maternal deaths and 25% of all child deaths in the world occur in India. 34 out of 1000 children are dead by the time they reach the age of5. 58% of Indians are immunized in urban areas compared to only39% in rural areas. Communicable disease is the cause of death for 53% of all deaths in India.

Public health initiatives that affect people in all states, such as the National Mental Health Program, are in stilled by the Union Ministry of Health and Family Welfare. There are multiple systems set up in rural and

urban areas of India including Primary Health Centres, Community Health Centres, Sub Centres, and Government Hospitals. These agencies must follow the standards set by Indian Public Health Standards documents that are revised when needed.

Public health systems is the colonial period were focused on health care for British citizens that were living in India. The period saw research institutes, public health legislation, and sanitation departments, although only 3% of Indian households had toilets at this time. [2] Annual health reports were released and the prevention of contagious disease out breaks was stressed. At the end of the colonial period, death rates from infectious diseases such as cholera had fallen to a low, although other diseases were still rampant.

In modern day India, the spread of communicable diseases is under better control and now non-communicable diseases, especially cardiovascular diseases, are major killers. Healthcare reform was prioritized in the 1946 Bhore Committee Report which suggested the implementation of a health care system that was financed at least in part by the Indian government.[1] In 1983 the first National Health Policy(NHP) of India was created with the goals of establishing a system with primary-care facilities and a referral system. In 2002, the updated NHP focused on improving the practicality and reach of the system as well as incorporating private and public clinics into the health sphere. In the context of universal health coverage, the recent policy focus in India, there is an attempt to ensure that every citizen should have adequate access to curative care without any financial hardships. Equally relevant is the acknowledgement of social determinants of health as an important determinant of population health and the need to have a public health cadre within the existing healthcare system. This call for a need to distinguish between 'Public health' system and 'Public' sector health care system as the latter uses public to indicate the primary role of government and not necessarily as population as used in public health.

Public health funding has been directed to helping the middle and upper classes, as it targets creating more health professional jobs, expanding research institutions, and improving training. This creates unequal access to healthcare for the lower classes who do not receive the benefits of this funding. Today, states pay for about75% of the public health care system but insufficient state spending neglects the public health system in India.

The healthcare system is organized into primary, secondary, and tertiary levels. At the primary level are Sub Centres and Primary Health Centres (PHCs). At the secondary level there are Community Health Centres (CHCs) and smaller Sub-District hospitals. Finally, the top level of public care provided by the government is the tertiary level, which consists of Medical Colleges and District/General Hospitals. The number of PHCs, CHCs, Sub Centres, and District Hospitals has increased in the past six years, although not all of them are up to the standards set by Indian Public Health Standards.

The report highlights that the new-born mortality rate among the wealthiest 20 per cent of India's population is 26 per1, 000 babies. In the case of poor households, 56per1,000infants die in the very first month of life.

As it's a huge problem in India in this report there is comparison of Indian health condition with other countries as well as infant mortality rates comparison has been done. Based on findings I have done statistical analysis to know which are the main factors contributing to high infant mortality.

At the end I'm going to recommend some solutions also based on country scenario and need.

RESEARCH METHODOLOGY:
Why we have chosen these two countries-
We chose China because it had roughly the same per capita income in 1960 as India did. Our analysis showed that even though China and India are constantly compared, until now, China has outperformed India across most wealth and health indicators.

Brazil, one of the BRICS (Brazil, Russia, India, China and South Africa) countries, serves as a comparison with another emerging economy that is estimated to become one of the largest in the world over the next 30 years. Have taken Brazil and china for comparison as these countries

Gross Domestic Product (GDP)

	India	Pakistan	China	South Korea	Brazil	Malaysia
1960	81.3	82.5	89.5	158.2	210.0	234.9
2016	1,709.4	1,468.2	8,123.2	27,538.8	8,649.9	9,502.6

Figure 01 : Comparative analysis of China and Brazil: Exploring emerging economies with differing trajectories in wealth and health indicators.

But India's Infant mortality rate reduces76% over 55years, but other comparative countries did better.

In 55 years, India's infant mortality rate (IMR)–the number of babies per 1000 who died before their first birthday–an indicator of the strength of the health system, reduced76% from 165 deaths per 1000 children in 1960 to 38 deaths in 2015, the latest year for which data are available, according to the World Bank.

But four of the five countries we used as comparison did much better than India, showing that though the IMR in India has fallen, progress in improving health systems has been slow.
Between1960 and 2015, Brazil's IMR reduced by 92%,.China's IMR reduced 92% between 1969 and 2015, compared to 73% over the same period in India.
The infant mortality rate is a good indicator of child health, and a 'crude indicator of community health, poverty and socio economic status of a community and availability of quality health services and medical technology, "according to the Association of Maternal and Child Programs, a United States-based public health advocacy organization.
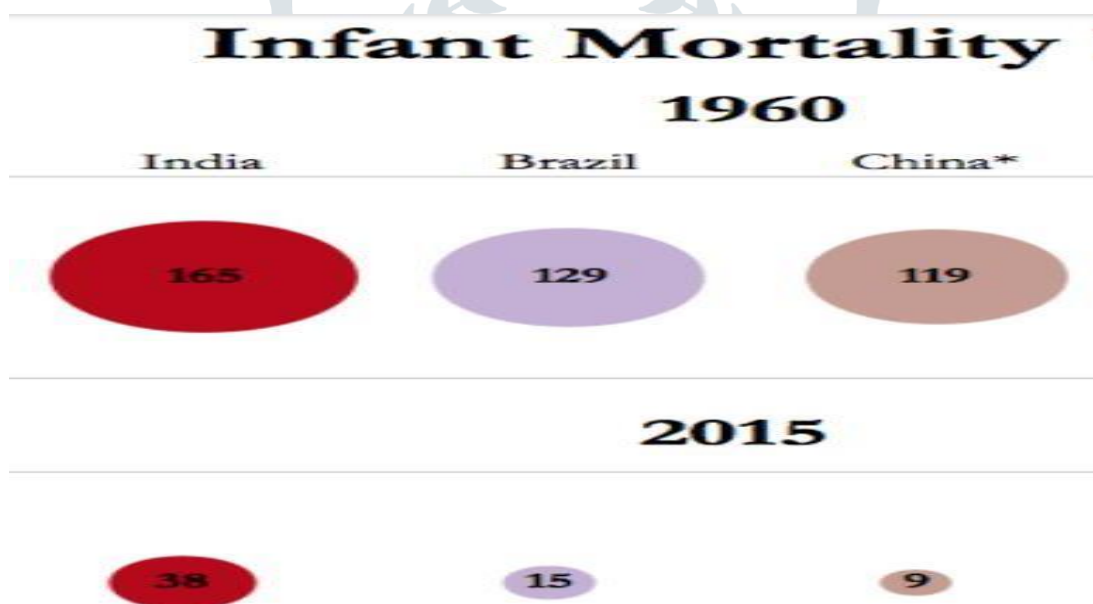

Figure 02: Comparative Infant Mortality Rates: Tracking Progress in Brazil, China, and India from 1960 to 2015

RESULTS AND DISCUSSION:

As we have seen in these 56 years India has made significant growth in improving or decreasing IMR rate but comparative countries did better than India in the same given period.
So it was a retrospective analysis from past to present growth analysis we did.
Now by applying forecasting statically I will predict future condition and improvement in IMR scenario, whether these countries will make significant improvement or not specially India whether India will likely achieve MDG objective of IMR or not
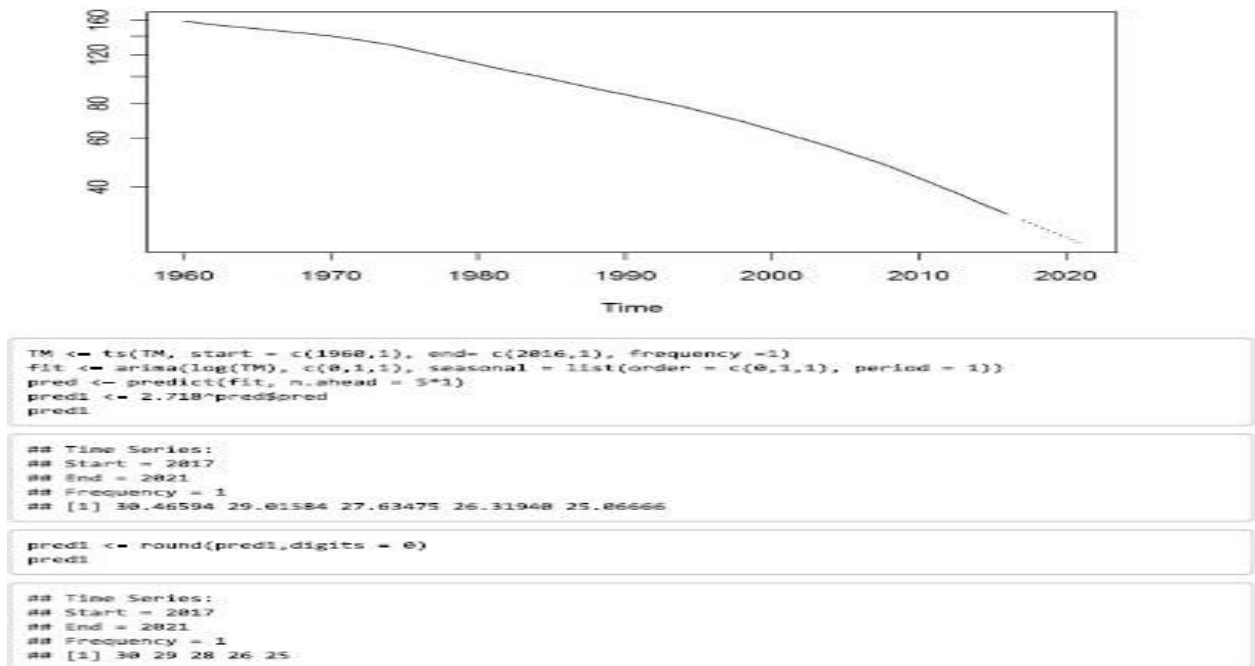
INDIA IMR FORE CAST TILL2021


```
TM <- ts(TM, start = c(1960,1), end= c(2016,1), frequency =1)
fit <- arima(log(TM), c(0,1,1), seasonal = list(order = c(0,1,1), period = 1))
pred <- predict(fit, n.ahead = 5*1)
pred1 <- 2.718^pred$pred
pred1
```

```
## Time Series:
## Start = 2017
## End = 2021
## Frequency = 1
## [1] 30.46594 29.01584 27.63475 26.31948 25.06666
```

```
pred1 <- round(pred1,digits = 0)
pred1
```

```
## Time Series:
## Start = 2017
## End = 2021
## Frequency = 1
## [1] 30 29 28 26 25
```

Figure 03: We can see in report India is likely to decrease its IMR by 25/1000 live birth.

BRAZIL IMR forecast


```
TM <- ts(TM, start = c(1960,1), end= c(2016,1), frequency =1)
fit <- arima(log(TM), c(0,1,1), seasonal = list(order = c(0,1,1), period = 1))
pred <- predict(fit, n.ahead = 5*1)
pred1 <- 2.718^pred$pred
pred1
```

```
## Time Series:
## Start = 2017
## End = 2021
## Frequency = 1
## [1] 12.97489 12.55795 12.15440 11.76383 11.38580
```

```
pred1 <- round(pred1,digits = 0)
pred1
```

```
## Time Series:
## Start = 2017
## End = 2021
## Frequency = 1
## [1] 13 13 12 12 11
```
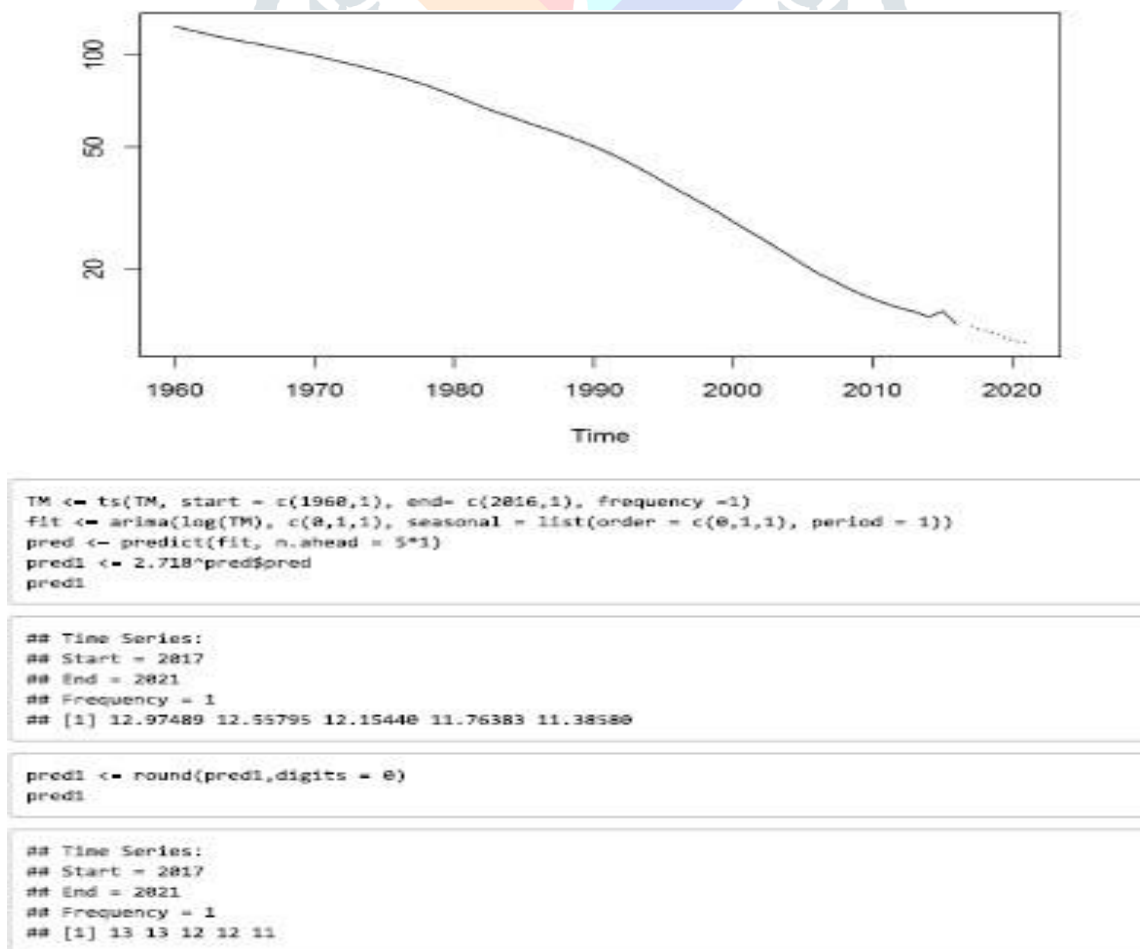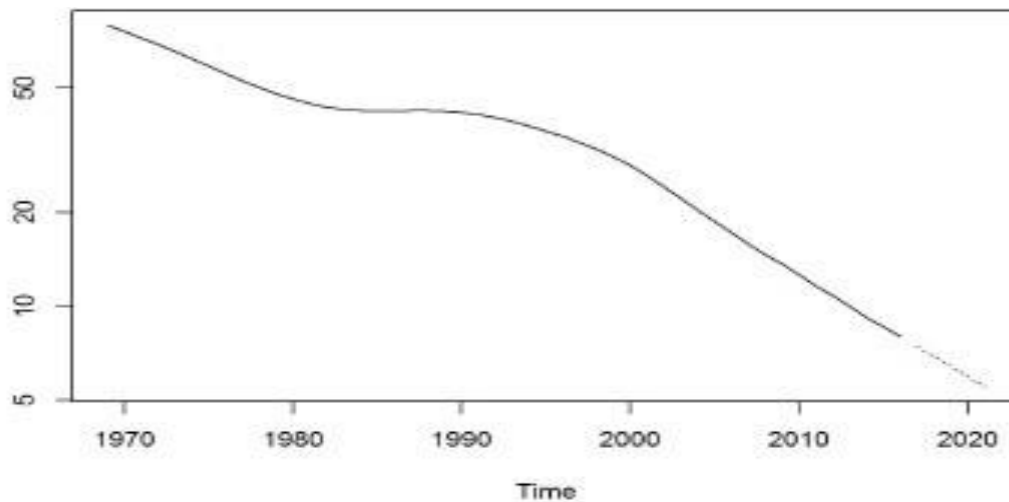
Figure 04: We can see Brazil is likely to decrease its IMR 11/1000 live birth by 2021

CHINA IMR FORECAST


```
TM <- ts(TM, start = c(1960,1), end= c(2016,1), frequency =1)
fit <- arima(log(TM), c(0,1,1), seasonal = list(order = c(0,1,1), period = 1))
pred <- predict(fit, n.ahead = 5*1)
pred1 <- 2.718^pred$pred
pred1
```

```
## Time Series:
## Start = 2017
## End = 2021
## Frequency = 1
## [1] 51.14868 49.22403 47.37180 45.58927 43.87382
```

```
pred1 <- round(pred1,digits = 0)
pred1
```

```
## Time Series:
## Start = 2017
## End = 2021
## Frequency = 1
## [1] 51 49 47 46 44
```

Figure 05: We can see China is going to achieve more likely IMR rate
of 4/1000 live births by 2021

We saw via our secondary research analysis as well as via forecast that India has made significant growth in IMR still far behind performance and achievement than comparative countries.

Now by comparing all the parameters which are the main associated factors in reducing or accelerating IMR, we will try to find loopholes and pain areas as in why India is not able to reduce its IMR rate despite of all Gov interventions and efforts.

Table 01: Country mapping/ analysis 1980 - 2017

CONCLUSSION:

IMR REDUCTION	INDIA(76%)			CHINA (92%)		
Parameters 1980	2017	% growth		1980	2017 % growth	**Gap/difference** Of growth rate and present condition
Births attended by 34.2 % Skilled health staff(% of total)	81.4%	52%		94	99.9% 5.9%	Better, Less18.5%
Contraceptive 36 prevalence, any methods(% of women ages 15-49)	54	18%		69.5	87.9 18%	Same
Health care exp % of 4.1 GDP	3.8	0.3%		4.49	5.3 0.81%	Reduced,1.5
Literacy rate, youth 40 female(% of females ages 15-24)	81	40%		82	99 17%	23%,18%
Pregnant women 62 Receiving prenatal Care (%)	75	13		73	97 24	11%,22%
Teenage mothers (% 24% of women ages 15-	8% (46972)	16%		none	None none	Still 46972 young girls are pregnant

India's IMR, while showing improvement over the years, still remains relatively high compared to developed countries and even some developing nations. The comparison underscores the critical role of healthcare infrastructure, education, economic development, and social policies in reducing infant mortality rates.

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