

Population Changes with a Special Reference to Mortality

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Abstract

The age structure of a population is governed largely by demographic factors, though these factors in turn are influenced by economic and social conditions. The three factors that contribute to changes in population age structure are fertility, mortality and migration. These demographic factors are reasonably independent of each other. The key components of population changes such as fertility, mortality, and migration are always measured as age- and time-specific events. Mortality is defined as the estimated total number of deaths in a population of a given sex and/or age, divided by the total number of this population, expressed per 100,000 population, for a given year, in a given country, territory, or geographic area, Social Awareness and Actions to Neutralize Pneumonia Successfully (SAANS) initiative implemented since 2019 for reduction of Childhood morbidity and mortality due to pneumonia. The principal reason for the higher rate of population growth, particularly between 1941 and 2022, was a substantial drop in the mortality rate without a corresponding decline in the fertility rate. The present paper deals with mortality, its rates, types, causes and remedial measures to reduce mortality rates.

Keywords: Mortality, Rates, Types, Causes, Remedial Measures

INTRODUCTION

Mortality is the branch of demography that studies rates and causes of deaths for a population as a whole. Mortality refers to the number of deaths that have occurred due to a specific illness or condition. Mortality is often expressed in the form of mortality rate. This is the number of deaths due to an illness divided by the total population at that time. Mortality is defined as the demographic event of death. Since death is a biological phenomenon that occurs just once to each individual, the analysis is simpler than, say, the study of fertility wherein the event of birth can occur with varying frequency among women. Mortality, in demographic usage, is the frequency of death in a population. In general, the risk of death at any given age is less for females than for males, except during the childbearing years (in economically developed societies females have a lower mortality even during those years). The number of deaths in a population during a given time or place, the proportion of deaths to population is mortality rate. The mortality among the infected mounted daily. The number lost or the rate of loss or failure.

Mortality is defined as being mortal or being susceptible to death. The opposite of mortality is immortality. Mortality definition is the frequency of death in a given population out of the many other components of demography such as demographic size, geographical distribution and composition, etc. Mortality definition is used as a factor of change in demographic. Mortality as one of the components of demography

is measured as mortality rate. In simple terms, the rate of mortality definition states the death rate in a particularly given region which brings changes in the demographics of that particular region. Hence, it is an important concept in the study of population. Mortality is defined as the estimated total number of deaths in a population of a given sex and/or age, divided by the total number of this population, expressed per 100,000 population, for a given year, in a given country, territory, or geographic area.

Meaning of Mortality Rate

Mortality meaning provides the basis for mortality rate and its estimation. Mortality is the possibility of and susceptibility to death, and hence, the rate of mortality or the death rate is the measurement of the number of deaths that occur in a particular population, scaled to the size of that population per unit of time. Globally, this rate is taken as the measurement of the number of deaths per 1000 people per year. So, when the mortality rate is described as 11.5, it means that in total 11.5 people have died per 1000 people in a given area for a given population. In percentage, it is expressed as 1.15% of the total population.

This concept is not to be confused with morbidity. Morbidity is either the prevalence or incidence of a disease. Hence, the morbidity rate is the rate of disease in a population. Morbidity and mortality meaning is thus different in the sense that morbidity is the condition of the prevalence of disease and mortality is the condition of death. For example, during the COVID-19 pandemic, the morbidity rate increases with the spread of the disease amongst the population. And the mortality rate is obtained with the increasing incidences of death whatever the cause may be. So, even though during the pandemic, the morbidity rate can be higher or lower or similar to the mortality rate but only in numbers. But they are both different. The morbidity rate is the prevalence of a specific disease and hence varies depending upon the disease but the mortality rate is the rate of death and is irrespective of the cause. Various causes can affect the rate of mortality. Some more specific mortality rates that affect population demographic over a period of time are perinatal mortality rate, maternal mortality rate, Infant mortality rate, child mortality rate, standardized mortality rate, age-specific mortality rate, infection fatality rate, etc.

MORTALITY RATES

There are various types of mortality rates such as Crude mortality rate, Counts all deaths, Age-specific mortality rate, Counts only deaths in specific age group, Infant mortality rate, Counts deaths in children less than 12 months of age, divides by number of live births in same time period, Maternal mortality rate and Under-5 mortality rate. The number of deaths (D) in a given year divided by the total population (P) is termed mortality rate. It is expressed in terms of population units. Most common types of mortality rates include crude mortality rate, infant mortality rate (IMR) and maternal mortality rate (MMR). They provide a snapshot of current health problems, suggest persistent patterns of risk in specific communities, and show trends in specific causes of death over time. Many causes of death are preventable or treatable and, therefore, warrant the attention of public health prevention efforts.

CAUSES OF MORTALITY

Cardiovascular diseases are the leading cause of death globally. The second biggest causes are cancers. The other leading causes include Heart disease, Cancer, COVID-19, Accidents (unintentional injuries), Stroke (cerebrovascular diseases), chronic lower respiratory diseases, Alzheimer's disease, Diabetes etc.

The top 10 Causes of Death in Developing Countries are Coronary Heart Disease. The most common of all the causes of death in developing countries is coronary heart disease (CHD), Lower Respiratory Infections, HIV/AIDS, Prenatal Conditions, Stroke and Other Cerebrovascular Diseases, Diarrheal Diseases, Malaria and Tuberculosis.

Causes of Decline in Mortality Rates

The Causes of Decline in Mortality Rates in Developing Countries include (1) Disease Control Medicines, (2) Public Health Programmes, (3) Medical Facilities, (4) Spread of Education, (5) Status of Women, (6) Food Supply, (7) Life Expectancy etc.

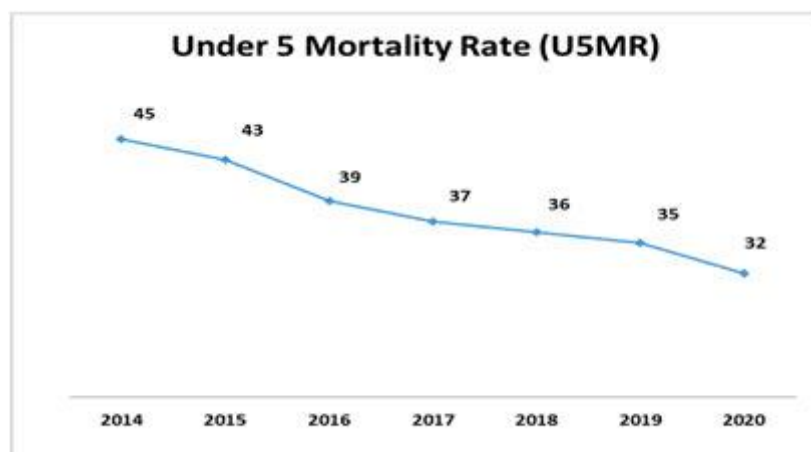
Age-specific mortality rates: a rate for a specific age group. Infant mortality rate: number of deaths in children less than 1 year of age divided by the number of live births in the same period, in a specified population. Perinatal mortality rate is the sum of neonatal deaths and fatal deaths (stillbirths) per 1000 births. If the mortality rate is high, the population growth rate becomes negative. Hence, as the mortality rate increases, the population growth decreases.

Statistics of Mortality

There are various causes of mortality. The causes of death influencing the components of demography differ greatly between the developed and less developed countries. According to Jean Ziegler, who was a United Nations Special Rapporteur on the Right to Food for 2000 to March 2008, stated that mortality is caused mainly due to malnutrition. The causes of death because of malnutrition accounted for 58% of the total mortality in the year 2006. Another cause of death is age-related death. Of approximately 1, 50,000 people that die each day worldwide, almost two-thirds i.e. 1, 00,000 per day die because of age-related issues. In industrialized nations, this proportion is much higher and reaches almost 90%.

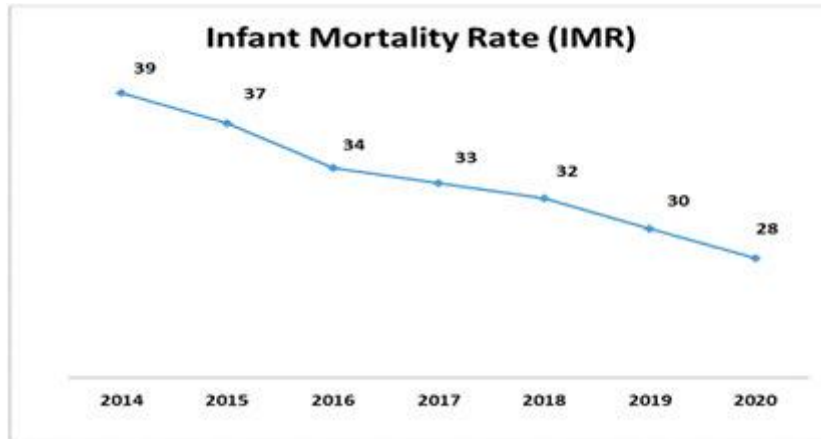
Under 5 Mortality Rate

The U5MR for the country has shown a significant decline of 3 points (Annual Decline Rate: 8.6%) from 2019 (32 per 1000 live births in 2020 against 35 per 1000 live births in 2019). It varies from 36 in rural areas to 21 in urban areas. U5MR for females is higher (33) than for males (31). There has been a decline of 4 points in male U5MR and 3 points in female U5MR during the corresponding period. The highest decline of U5MR is observed in the states of Uttar Pradesh and Karnataka.



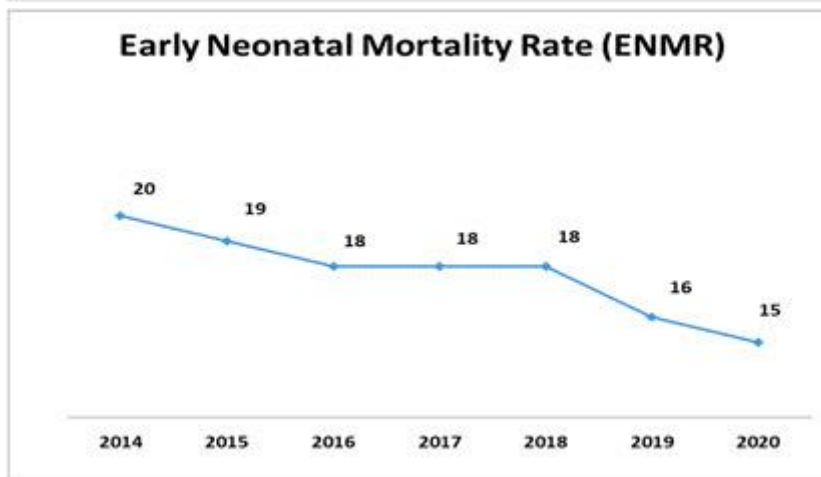
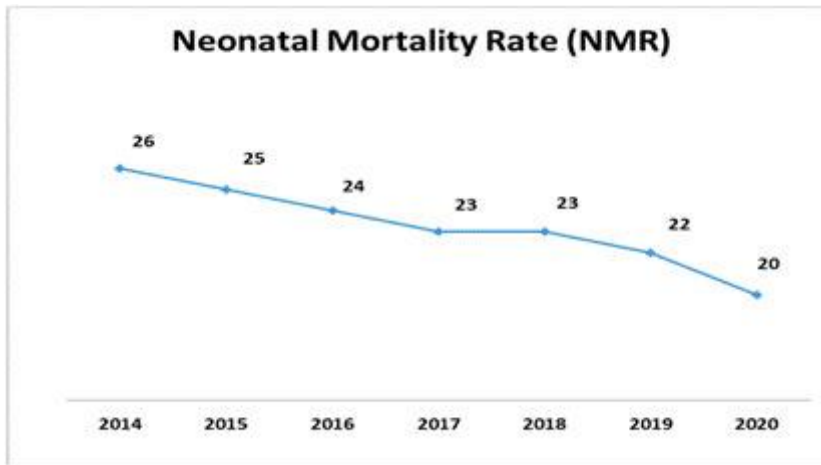
The Infant Mortality Rate (IMR)

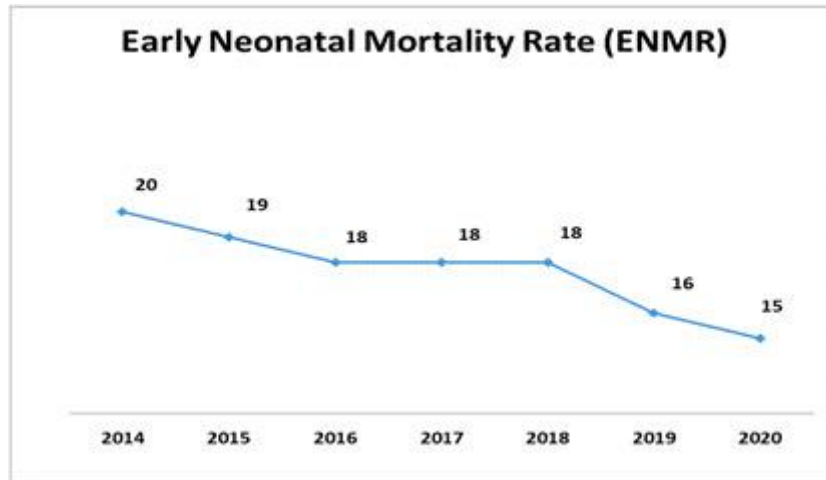
IMR also registered 2-point decline to 28 per 1000 live births in 2020 from 30 per 1000 live births in 2019 (Annual Decline Rate: 6.7%). The Rural-Urban difference has narrowed to 12 points (Urban 19, Rural-31). No gender differential has been observed in 2020 (Male -28, Female - 28).



Neonatal Mortality Rate

It has also declined by 2 points from 22 per 1000 live births in 2019 to 20 per 1000 live births in 2020 (Annual Decline Rate: 9.1%). It ranges from 12 in urban areas to 23 in rural areas.





1. **Source:** Office of the Registrar General of India, Ministry of Home Affairs

RELATIONSHIP BETWEEN MORTALITY AND ECONOMICS

A significant relationship between mortality and economics exists and is determined by scholars. When there is a low standard of living because of low incomes the mortality rate increases. This is because a low standard of living results in malnutrition which is already identified as one of the significant causes of mortality. There is a lack of hygiene and sanitation, an increase in exposure to and spread of disease, and a lack of proper medical care and facilities which leads to a cycle as poor health leads to an increase in treatment cost aggravated the low living standards and becomes a strain on low-income households thus further leading to low living standards and decreased hygiene and health conditions. This is known as the health poverty trap. Indian economist and Nobel Prize winner, Amartya Sen felt that the mortality rates are one of the possible indicators of economic success and failure.²

Another important factor that can influence the mortality rates adversely is the short term price increase. Scientific studies have shown that with an increase in food prices, there is an increase in the rate of mortality. Such effects are shown to have a high impact on vulnerable and low-income populations as compared to the population with higher income and living standards. With respect to the nations of the world, it is found that the national income of a country which is also an indicator of the standard of living of that country is one of the largest factors contributing to mortality rates. The mortality rates are found to be higher in countries with low national income as compared to countries with high national income. These factors in turn direct the demographic environment of a country. The demographic environment meaning, the population factors such as age distributions, births deaths, sex, education, etc. which determine the standard of living of a country are thus greatly influenced by mortality.³

These economic factors affect gravely the living conditions of children below the age of five years. It is found that in low-income countries, there is a higher risk of children dying from malaria, diarrhoea, respiratory infections, etc. which are easily preventable in high-income countries. Hence, this in turn affects the overall demographics of the nation. Hence, there is a visible and factual correlation between mortality and economic growth.

FACTORS EXACERBATE MORTALITY RATES

Malnutrition

According to the National Family Health Survey-5 (NFHS-5) the incidence of anaemia in under-5 children (from 58.6 to 67%), women (53.1 to 57%) and men (22.7 to 25%) has worsened in all States of India (20%-40% incidence is considered moderate).

Non-institutional Deliveries

Whether the child is born at home or in a facility also determines the infant's survival rate. Infection risks are high in the case of a non-institutional birth. Although the share of India's institutional deliveries increased to 88.6% in 2019-2021 (NFHS-5) from 40.8 % in 2005-06 (NFHS 3), it is still much lesser when compared to the developed countries.

Lack of Immunity and Low vaccine Compliance level

Pneumonia, Prematurity, low birth weight, Diarrhoeal diseases, Neonatal infections, Birth asphyxia, etc. are also the reasons that lead to infant deaths.

Lack of Education

Maternal education increases the chances of mothers being aware of different health issues and thus taking the correct and appropriate steps toward preventing such issues.

Age of the Mother

At the time of birth, the age of the mother plays an important role. For example, there exists an inverse relationship between the age of mothers and the incidence of anaemia in children. There are evidence related to the fact that the children of younger mothers are more anaemic.³

Way Forward

Infrastructure & Quality Improvement

Infrastructure and quality of hospitals also play a crucial role to reduce further the mortality rates. Quality improvement seeks to achieve predictable results and improve outcomes in terms of healthcare developments.⁴

Urban-Rural Disparities

There is a need to bring out the systemic changes that are feasible in every part of the country, from the urban to the rural areas that can reduce the socio-economic stress in these areas.

Political Will

The availability of funds (from Centre) as well as its judicious use by the States is vital in effective implementation of the framed policies and overhauling of the required health infrastructure.⁵

Integrated Approach

Concerned ministries can collaborate with each other to ensure better coordination, convergence and holistic integration of different schemes.

Need to Focus on all the Indicators

There is an urgent requirement to look at the situations from the facets of each and every indicator and monitor them very carefully so that the world does not lose any mother or child unnecessarily.⁶

Private Player Participation

The involvement of private players is not an urgent requirement but their sincere engagement and complementing role to the state can ease the burden of the government. The role of the state in delivering health to its people cannot be overemphasised.⁷

CONCLUSION

Mortality which is defined as the condition of being dead is an important parameter to assess the growth and development of a given society and a nation. The causes that affect mortality rate are best indicators of prevailing conditions of human health and life from poor countries to the rich. Thus, mortality is an important concept to understand a given country and its demographic environment. The decline in mortality appears to have played only a secondary role. The decline in the infant mortality rates is the most remarkable. One of the factors responsible for the rapid increases in the values of expectation of life at birth in the state is the success achieved in controlling infant mortality. There has been a perceptible fall in the infant mortality rate during the last three decades owing to improvements in maternity and childcare facilities. Inoculation and immunization programmes also have been successfully implemented in past decades.

REFERENCES

1. Office of the Registrar General of India, Ministry of Home Affairs
2. Jha, P. (2014), Reliable direct measurement of causes of death in low- and middle-income countries,. *BMC Med* 2014;12:1–10.
3. Registrar General India, Centre for Global Health Research, Maternal Mortality in India: 1997–2003 Trends, Causes and Risk Factors [Internet]. New Delhi, India: Registrar General India, Centre for Global Health Research; 2006. [<http://www.cghr.org/wordpress/wp-content/uploads/RGI-CGHR-Maternal-Morta...>]. Accessed 21 November 2020.
4. WHO (2019) . Trends in Maternal Mortality 2000 to 2017: Estimates by WHO, UNICEF, UNFPA, World Bank Group and the United Nations Population Division. Geneva, Switzerland: World Health Organization; 2019.
5. Rai, R.K., Barik, A. And Chowdhury, A. (2022), [Use of antenatal and delivery care services and their association with maternal and infant mortality in rural India](#), *.Sci Rep.* 2022 Oct 3;12(1):16490. doi: 10.1038/s41598-022-20951-9
6. Krishnan, A. A. (2022) [Different Kind of Security: Public Healthcare in India](#). *J Indian Inst Sci.* 2022;102(2):663-669. doi: 10.1007/s41745-022-00325-w. Epub 2022 Aug 10
7. Bhat, P.N.M. (1987), Mortality in India: Trends and Patterns, (Unpublished Ph.D. thesis submitted to the University of Pennsylvania, Philadelphia, PA, USA).