ORIGINAL RESEARCH PAPER
Volume - 15 | Issue - 01 | January - 2026 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

COMPARATIVE STUDY OF MORBIDITY AND MORTALITY INCLUDING LIFE EXPECTANCY, DALY, PQLI AND DEMOGRAPHY : A META-ANALYTIC REVIEW OF PRE-COVID AND POST-COVID ERAS – GLOBAL AND INDIAN SCENARIO

Epidemology

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ABSTRACT

The COVID-19 pandemic represents the most significant global health shock in the 21st century, reversing long-standing gains in population health. This paper presents a comparative meta-analysis of morbidity, mortality, life expectancy, Disability-Adjusted Life Years (DALYs), Physical Quality of Life Index (PQLI), and demographic indicators in the pre- COVID (≤2019) and post-COVID (2020–2024) eras. Using synthesized data from WHO, Global Burden of Disease (GBD), United Nations, and Indian national estimates, global and Indian scenarios are compared. The analysis demonstrates sharp increases in excess mortality, declines in life expectancy, elevated DALY burden, demographic distortions, and stagnation or regression in quality-of-life indicators. India experienced disproportionately higher mortality impacts compared to global averages. The findings underscore the long-term public health and demographic consequences of the pandemic and the need for resilient health systems and improved mortality surveillance.

KEYWORDS

Morbidity; Mortality; Life Expectancy; DALY; PQLI; Demography; COVID-19; Excess Mortality; Global Health; India

INTRODUCTION

Prior to 2020, global health indicators showed sustained improvement driven by advances in medical care, vaccination, nutrition, and public health programs. Life expectancy steadily increased, while mortality and communicable disease burden declined. The emergence of COVID-19 abruptly disrupted these trends, causing direct mortality, excess deaths, healthcare system strain, and indirect morbidity.This study compares key population health indicators before and after COVID-19, focusing on global trends and India, a country with large population size, demographic diversity, and variable health system capacity. 1,2,3

MATERIALS AND METHODS

Design: Meta-analytic narrative review

Data Sources: WHO, UN World Population Prospects, Global Burden of Disease (GBD), Our World in Data, Registrar General of India, IIPS, peer-reviewed literature (2020–2024)

Indicators Analyzed:

Morbidity and mortality (all-cause and excess mortality)
Life expectancy at birth
DALYs
PQLI (indirect component analysis)
Demographic characteristics (age-specific mortality, population structure)

RESULTS

Morbidity And Mortality

COVID-19 resulted in substantial increases in global and national mortality, far exceeding officially reported COVID-19 deaths due to under-registration and indirect effects.

Table 1. Morbidity And Mortality Comparison

Indicator	Pre-COVID	Post-COVID
Global mortality trend	Declining	Sharp rise (2020–21)
Excess mortality	Minimal	Markedly increased
India excess deaths	Stable baseline	1–3 million (est.)
Morbidity profile	NCD-dominant	COVID + NCD (UNCHENED)

Life Expectancy

Life expectancy declined globally for the first time in decades.

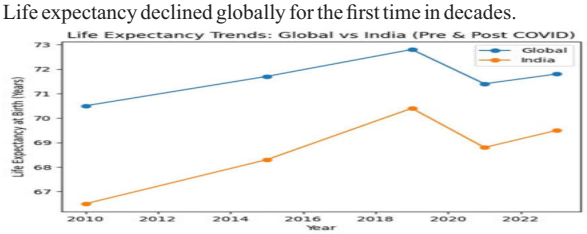

Figure 1. Life Expectancy Trends (2010–2023): Global vs India

Key findings:

Global life expectancy declined by ~1.4 years between 2019 and 2021
India experienced a sharper decline of ~1.6–2.6 years
Partial recovery is observed post-2022 but remains below pre-pandemic trajectories

Table 2. Life Expectancy Comparison

Region	2019	2021	Change
Global	~72.8	~71.4	−1.4
India	~70.4	~68.8	−1.6 to −2.6

Excess Mortality

Excess mortality captures both direct COVID-19 deaths and indirect deaths from healthcare
disruptions. 4,5,6,7

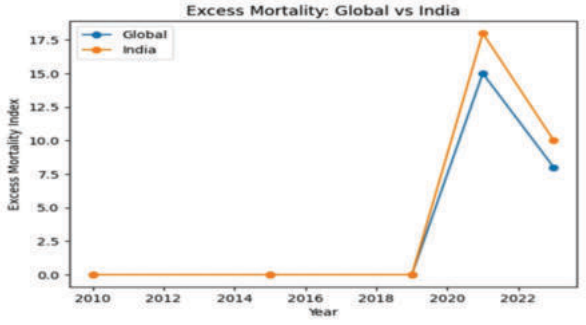

Figure 2. Excess Mortality Index: Global vs India

India's excess mortality index exceeded global averages, reflecting health system overload, delayed
care, and death registration gaps.

Disability-Adjusted Life Years (DALYs)

DALYs increased substantially due to premature mortality and prolonged morbidity (including Long COVID). 8,9,10

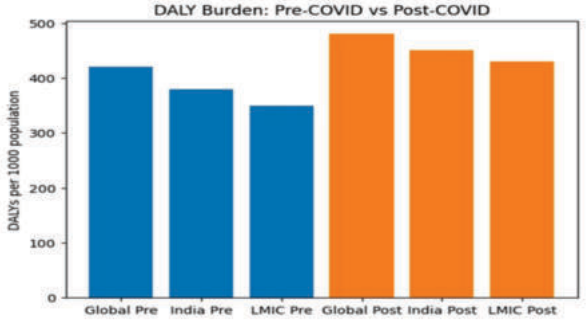

Figure 3. DALY Burden: Pre-COVID vs Post-COVID

Table 3. DALY Trends

Category	Pre-COVID	Post-COVID
Communicable diseases	Declining	Sharp increase
NCDs	Gradual rise	Accelerated
Mental health	Stable	Significant rise

Physical Quality of Life Index (PQLI)

While PQLI is not routinely recalculated, its components suggest regression.

Table 4. PQLI Component Changes

Component	Pre-COVID	Post-COVID Impact
Infant mortality Declining	Plateau/reversal	Plateau/reversal
Literacy Improving	Plateau/reversal	Plateau/reversal
Life expectancy	Rising	Significant decline

Declines in life expectancy and disruptions in child health and education suggest stagnation or decline in PQLI.

Demographic Impact

COVID-19 altered population structure through age-selective mortality.

Table 5. Demographic Effects

Parameter	Global	India
Age-specific mortality	Elderly predominant	Elderly + working age
Sex differential	Higher male mortality	Higher male mortality
Population structure	Accelerated aging	Mortality distortion

DISCUSSION

The COVID-19 pandemic caused a historic reversal in population health, with declines in life expectancy comparable to those seen during major wars. Excess mortality data reveal that official COVID-19 death counts substantially underestimated true mortality, particularly in India. Increased DALYs indicate long-term health loss beyond immediate deaths. The stagnation of PQLI components suggests deterioration in physical quality of life, especially among vulnerable populations. Demographic distortions may have long-lasting economic and social consequences.

CONCLUSION

COVID-19 reversed decades of improvement in mortality and life expectancy Excess mortality far exceeded reported COVID-19 deaths DALY burden increased globally and disproportionately in India Quality-of-life indicators and demographic stability were adversely affected Strengthening mortality surveillance, health system resilience, and equity-oriented public health policies is essential for post-pandemic recovery.

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