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## Trends and Differentials of Infant, Child, and Maternal Mortality in Nepal

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### Article Info

### Abstract

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*Mortality is one of the most important indicators of demographic changes. It refers to the number of deaths per thousand mid-year population in a given period of time. The study was based on library based and descriptive research. It was based on secondary data that were selected purposively. The primary purpose of this study was to examine trends and differential factors in infant, child, and maternal mortality in Nepal. This study was based on secondary data from the Central Bureau of Statistics (CBS), the Nepal Demographic and Health Surveys (NDHS), and other relevant research reports, that applied descriptive methods. The researcher found that mortality has gradually declined in Nepal, due to the better health care services, educational improvements, and awareness regarding regular health checkups, delayed marriage, appropriate age for first child and improvement in the services of antenatal and postnatal care. In the case of infant mortality rate (IMR), the differences in number from 172 deaths per thousand live births in 1961 to 28 in 2022. Likewise, child mortality and under-five mortality also declined significantly across both sexes, though determined gender disparities continue. Additionally, maternal mortality rate (MMR), was 515 deaths per lakh live births in 1991, and decreased sharply to 151 in 2021. However, this positive progress regarding mortality, there is the geographical barriers, social- economic and cultural inequalities, and limited access to quality of health facilities particularly in rural areas. This study further explored that the outcomes of mortality area determined by health awareness, income and facilities.*

**Keywords:** Epidemiological transition, infant mortality, mortality trends, maternal mortality, non-communicable diseases

Mortality is one of the most fundamental indicators of a population changes. It is considered a development indicator of a nation. It does not reflect only the health status of individuals but also provides awareness of their health, socio-economic, and cultural conditions of a society. It influences healthy practices and behavior of society (Adhikari, 2080). There are various indicators and measures of mortality. They are Crude Death Rate (CDR), Infant Mortality Rate (IMR), and Maternal Mortality Rate (MMR). The decline pattern of mortality rates is an important part of demographic change. It affects birth rates, life expectancy, and population growth.

As the historical records, in the context of Nepal, the infant and child mortality rate has been rapidly decreased due to improvements in medical technology, public health facilities, sanitation, nutrition, and mortality analysis holds particular importance, as the country has experienced significant demographic shift and epidemiological transitions within the last six decades (Adhikari, 2080). Globally, mortality rates began declining sharply from the 1700s to the late 1800s, particularly in high-income countries (Zinkina et al., 2017). This kind of change contributed to significant improvement in life expectancy, increased awareness to nutritious foods, controlled infectious diseases, regular checkups, which resulted rapidly decreased in mortality (Cutler et al., 2006). In the case of communicable diseases,

historically, international law plays significant role for controlling the communicable diseases in the period on nineteenth century. Even today communicable diseases profile global health policies through international guideline and agreements and guidelines made by world Health Organization (WHO), the World Trade Organization (WTO) and Food and Agriculture organization (FAO) (Aginam, 2002).

During of the nineteenth century, infant and child mortality was very high due to the limited advancement in medicine health and technology and medical treatment. Over the twentieth century, rapid advancement, in medical science and technology was increasing strongly including controlling infectious disease, immunization programs, which leads to decrease communicable disease and reduced vulnerability to mortality (Cutler et al., 2006).

Similarly, the World Health Organization (WHO) has classified the causes of disease or death into five groups: The first one is infectious, parasitic, and respiratory diseases, the second one is cancer, the third one is circulatory or other non-infectious diseases, and other causes such as diabetes, birth trauma, and early child deaths (World Health Organization, 2020).

Similarly, the growing burden of non-communicable diseases is also another determinant of mortality. Some examples of non-communicable diseases are cardiovascular diseases, including heart problems, cancers, chronic respiratory disease, and diabetes. Among non-communicable diseases, cancer has emerged as a major public health concern globally. It is one of the leading causes of mortality especially developed countries rather than developing countries, due to lifestyle, combination of genetic caused by a combination of genetic, environmental factors, and an unhealthy diet, lack of exercise, smoking, alcohol consumption. (Adhikari, 2022). Scholars like Barry et al. (2025) claimed that non-communicable diseases (NCDs) have increased rapidly in the last two decades, creating serious challenges and high mortality problem of mortality for both developed and developing countries. Among all non-communicable diseases especially, cancers, heart diseases, chronic lung diseases, and diabetes are the major public health problems. These diseases are mainly caused by lack of exercise, being overweight, smoking, and alcohol use, consumption of unhealthy diets genetic factors (Shakoor et al., 2025). The education of females and the strong economic status of families play a positive role in decreasing mortality. Data indicate that higher the level of female education and the better the economic status of families lower the level of mortality (Karki et al., 2025).

Maternal mortality means the death of women during their pregnancy or within 42 days of pregnancy-related death due to health problems caused by the pregnancy or delivery related treatment. It does not include deaths from accidents or unrelated health issues (World Health Organization, 2025). The countries in this region are at different stages of epidemiological transition, with some countries are facing a disproportionate burden of infectious disease and maternal mortality (Donkin et al., 2017). Scholar like Khatri and Karkee (2018) claim that the well-being of women and children is influenced not just by biomedical factors like maternal age or care-seeking patterns but also by intricate interactions of social attributes. Rural areas of Nepal, have less infrastructure development such as better access to education, healthcare facilities, transportation, and other facilities compared to urban areas (Adhikari & Adhikar, 2024).

Scholar like Bhandari (2023) also said that, high fertility has historically been one of the major causes of women's deaths. Because in this time woman faces poor health conditions, inadequate nutrition, and limited access to healthcare heightened maternal risks. However, with improvements in health services, nutrition, and reproductive care, maternal mortality has declined significantly in Nepal. This study is based on the Epidemiological Transition Theory, which explains the declining patterns of mortality as a result of socio-economic development.

### Methodology

This article is based on descriptive and analytical methods applied to secondary sources of data. These include census reports from the Central Bureau of Statistics (CBS), the Nepal Demographic and Health Survey (NDHS), and relevant publication from international organizations such as the Population Reference Bureau (PRB). These data sources were purposively selected because they provide consistent time-series data related on infant, child and under five mortalities from the census 1952/54 to the latest census 2021 and the NDHS 2022 report.

## Results

The researcher in this section presents the table first and then analyzes, interpreters and describes simultaneously. Then only presents results. In this section, the researcher presents the table relating to level and trends of crude death rate and then the table is analyzed and described.

**Table 1**

*Level and Trends of Crude Death Rate (CDR) in Nepal 1961AD to 2022 AD*

Census Year (AD)	Death Rate (CDR)	Crude
1961		22
1971		21.4
1981		13.5
1991		13.3
2001		9.6
2011		7.3
2022		8

Source: CBS 2003 and 2014, PRB 2022

Table 1 represents the patterns of crude death rate (CDR) in Nepal from the census of 1961 to 2022. In the 1961 census, the CDR was relatively high at 22 per thousand. Similarly, in 1971, it slightly decreased to 21.4 per thousand, followed by 1981, with 13.5 per thousand, and 1991, with 13.3 per thousand. It rapidly decreased to 9.6 per thousand in 2001 and 7.3 per thousand in 2011 and gradually increased to 8 per thousand in PRB report 2022, because of the COVID-19 pandemic.

In this section, the researcher presents the table relating to the Trends of Infant Mortality Rate (IMR) in Nepal, which is then the table is analyzed and described.

**Table 2**

*Trends of Infant Mortality Rate (IMR) in Nepal 1961 AD to 2022 AD*

Year (AD)	IMR
1961	172
1971	147
1981	97
1991	64.4
2001	48
2011	40.5
2022	28

Source: CBS 1995, 2003, 2014, and NDHS 2022

Table 2 indicates the trends of infant mortality rate (IMR) in Nepal, from the census of 1961 AD to 2011 AD and NDHS report 2022. The data shows that infant mortality has been decreasing trends. The census of 1961 AD, the infant mortality rate was relatively high at 172 per thousand live births. Similarly, in the census of 1971 AD, it gradually decreased to 147 per thousand live births. Likewise, it further dropped out to 97 per thousand in the census of 1981 AD and to 64.4 per thousand in 1991 AD.

Additionally, it declined to 48 per thousand in 2001, 40.5 per thousand in 2011, and further dropped to 28 per thousand in NDHS report 2022. In this section, the researcher presents the table of mortality differentials by place of residence, including infant, child, and under-five mortality across these areas over different years. After that the table is analyzed and described to show the declining trends of mortality between rural and urban populations.

**Table 3**

*Trends of Infant, Child and Under-five Mortality by Urban and Rural Residence in Nepal Mortality by 2006 AD to 2022 AD–*

Indicators of mortality	Urban area				Rural area			
Year	2006	2011	2016	2022	2006	2011	2016	2022
Infant mortality	37	38	28	28	64	55	38	28
Child mortality	10	7	6	5	21	10	7	5
Under-five mortalities	47	45	34	33	84	64	44	33

Sources: Nepal Health Demographic Health Survey, 2011, 2016, and 2022

Table 3 indicates mortality differential by place of residence in terms of rural and urban areas. The data of infant mortality shows in urban areas that it was 37 per thousand live births in NDHS report 2006 and 38 in 2011 and remained the same in 2022. Likewise, in rural areas, the data However, in rural areas, data displays that the infant mortality rate was relatively high at 64 per thousand live births in 2006, it slightly decreased to 55 in 2011, then rapidly declined to 38 in 2016 and further decreased to 28 in 2022. Similarly, the child mortality rate in urban areas was relatively lower, with 10 in 2006, 7 in 2011, 6 in 2016, and 5 in 2022. However, rural areas high in child mortality were 21 per thousand in 2006, 10 in 2011, 7 in 2016, and 5 in 2022. The under-five mortality rate in rural areas was very high at 84 per thousand live births in 2006, which reduced to 64 in 2011, 44 in 2016, and 33 in 2022. In urban areas, the under-five mortality rate was comparatively lower at 47 in 2006, 45 in 2011, 34 in 2016, and 33 in 2022. So, the data explored that there is steady decline in infant, child, and under-five mortalities across both urban and rural areas.

In this section, researcher presents the trend of early childhood rates, including neonatal, infant, and under five mortalities. After that, the table is analyzed and described to show the declining trends of mortality over time period.

**Table 4**

*Trends in Early Childhood Mortality Rates*

Mortality	Years in AD				
	2001	2006	2011	2016	2022
Neonatal	39	33	33	21	21
Infant	64	48	46	32	28
Under 5	91	61	54	39	33

Sources: NDHS 2001, 2006, 2011, 2016, and 2022

Table 4 explores the trends of early childhood mortality in Nepal, from the census of 2001 AD to 2022 AD. The data show that the trends of neo national, infant and under-five mortalities have been decreasing over time. The NDHS report 2001 shows the neonatal mortality rate was 39 per thousand live births. It slightly decreased to 33 per thousand in the NDHS report of 2006 and 2011. In the latest report of NDHS 2016 and 2022, it rapidly decreased to 21 per thousand live births.

In the case of infant mortality, NDHS reports from 2001 show it was relatively high 64 per thousand live births, and in 2006, it dropped to 48 per thousand live births, followed by 46 per thousand in NDHS 2011. In the NDHS report of 2016, it further decreased to 32 per thousand, and in the 2022 NDHS report, it declined to 28 per thousand live births. The under-five mortality rate was very high at 91 per thousand, in 2001, 61 per thousand in 2006, 54 per thousand in 2011, 39 per thousand in 2016, and 33 per thousand in 2022. The data reflect that the overall trend of early childhood mortality in Nepal has been decreasing between 2001 and 2022.

In this section researcher present the trends of mortality, including infant, child and under five mortalities, by province based on the Nepal Demographic and Health Survey (NDHS) 2022. After that the table is analyzed and described to highlight the declining trends of mortality by provinces.

**Table 5***Provincial Distribution of Infant, Child and Under-Five Mortality in Nepal, 2022*

Name of Provinces	Infant Mortality	Child Mortality	Under 5 Mortality
Koshi	28	6	34
Madhesh	38	5	43
Bagmati	21	3	24
Gandaki	19	5	23
Lumbini	34	8	41
Karnali	36	10	46
Sudurpashim	40	9	49

Sources: Nepal Demographic and Health Survey 2022

Table 5 highlights provincial variations in infant, child, and under-five mortality in Nepal. Infant mortality is lowest at 19 per thousand live births in Gandaki province and slightly higher at 21 per thousand in Bagmati province. In contrast, the highest infant mortality is observed in Sudurpashim province at 40 per thousand live births, followed by Madhesh at 38 per thousand and Karnali province at 36 per thousand live births.

In the case of child mortality, the highest rate is 10 per thousand live births in Karnali province, followed by 9 per thousand live births in Sudurpashim province, and 6 per thousand live births in Koshi province. Under-five mortality, representing the overall risk of dying before age five, ranges from 23 per thousand live births in Gandaki and 24 per thousand live births in Bagmati to 46 per thousand live births in Karnali and 49 per thousand live births in Sudurpashim province.

In this section, the researcher explores the table indicating of trend of maternal mortality over different time periods. Then the table is analyzed and described to demonstrate the declining trends of maternal mortality over the time.

**Table 6***Trend of Maternal Mortality in Nepal 1991 -2021*

Census Year (AD)	MMR
1991	515
2001	539
2006	281
2011	229
2021	151

Source: CBS 1995, 2003, 2011, and 2023

Table 6 shows the trends of maternal mortality rate (MMR) from the census of 1991 to 2021. In the census of 1991 AD, the maternal mortality rate was relatively high, 515 per lakh live births. In the 2001 census, it slightly increased to 539 per lakh live birth. In the 2006 census, its rate decreased to 281 per lakh live births. It further dropped to 229 per lakh in 2011 AD. In the latest census of 2021, it decreased 151 per lakh live births. This kind of positive change in maternal mortality is seen due to increasing awareness of late marriage, improved maternal health care services including antenatal and postnatal care, regular check-ups, and a growing trend of giving births in hospitals rather than homes.

### Discussion

This study explored notable progress in decreasing mortality in Nepal over the six decades, including crude death rate (CDR), infant mortality rate (IMR), child mortality rate (CMR), and under-



five mortality rate (U5MR). Data explored that crude death rate decreased from 22 per thousand live births in 1961 AD to 8 per thousand live births in 2022 AD (Central Bureau of Statistics, 2021). Similarly, the infant mortality rate (IMR) is also decreasing from 172 per thousand live births in 1961 AD to 28 per thousand live births in 2022 AD, reflecting positive progress in maternal and child health care facilities, expanded immunization programs (Nepal Ministry of Health and Population, 2023). However, in Nepal mortality is differential by place of residence including rural urban areas, provinces, due to the unequal socio-economic status, health care facilities, consumptions of nutritious foods (Nepal Ministry of Health and Population, 2023). Provincial differences like, Gandaki province has 23 per thousand live birth and Bagmati province indicates 24 per thousand live birth which is the lowest under-Five mortality rate. However, under five mortality rate is Sudurpachhim province, which has the highest 49 per thousand live births and Karnali province has a 46-under-five mortality rate.

The trends of mortality, especially infant, child and under- five mortality is decreasing in Nepal due to improvements of health services, access to health care services and improvement in antenatal and postnatal care, increasing female education (Karki et al., 2025; Sharma et al., 2024). However, still high due to barrier of geographical distribution, socio economic inequality, rection on women autonomy compared to developed countries due to low level of female education, early marriage, patriarchal norms traditional beliefs unequal health facilities poverty, and deep-rooted culture (Adhikari, 2022; Karkee, 2012; Karki et al., 2025; Khatri & Karkee, 2018; World Health Organization, 2025). So, Nepali women and children are still facing a higher risk of mortality. Even today, led by international guidelines and agreements, guidelines led by the World Health Organization (WHO), World Trade Organization (WTO), and Food and Agriculture (FAO) play a central in reducing communicable diseases and decreasing the mortality risks through global health policies (Aginam, 2002).

### Conclusion and Implications

This analysis of mortality trends clearly demonstrates that Nepal has achieved remarkable progress, particularly in neonatal, infant, child, under-five, and maternal mortality rates. These improvements are closely link to advancement in health services and medical technology, increased education of females, expand immunization programs, increasing public awareness, appropriate age at marriage, and first births, improved antenatal and post-natal care, preference for small family's size, and improved nutrition and raising socio-economic conditions. contributed significant decline.

However, the study also demonstrates clear differentials in mortality by level of female education, place of residence, and province. The findings reflects that women and children in geographically remote areas continue to face a higher risk of mortality due to limited access of health services, low level of female education, and traditional values and socio-cultural norms.

Furthermore, infectious diseases have declined, by international law which is the important tool for decreasing mortality. The growing burden of non-communicable diseases such as cardiovascular conditions, diabetes, and cancers reflects Nepal's ongoing epidemiological transition. This situation reflects that now Nepal is facing dual challenges of communicable and non-communicable diseases and causes of their mortality. So, it is necessary to reinforce health care facilities with equitable access to health care services and empower females through education and decision-making.

Therefore, Nepal needs to address preventive health care serveries. Awareness programs, including daily exercise, lifestyle changes, regular health checkups, and immunization, are essential to reduce premature deaths. This study carries important information for policymakers' planners for future planning and also improvement in equitable health facilities and also improvement in maternal health care services, including prenatal and postnatal services.

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