

# Level and Trend of Child Health and Nutrition Status in Nepal: Evidence from Demographic and Health Survey (1996-2016)

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## ABSTRACT

**Background:** Child health and nutrition are key indicators of the country's socioeconomic development and quality of life. The purpose of the paper was to examine the level, trend, and socio-demographic differences of selected child health and nutrition indicators and to provide policy recommendations for improvement.

**Methods:** Desk review was conducted to compile secondary information on child health and nutrition status published in the Nepal Demographic and Health Survey reports prepared by Ministry of Health and Population from 1996 to 2016. Trend lines, bar diagram, and GIS maps were prepared to study and present the findings.

**Results:** A substantial decrease in under-five mortality, from 118 to 39 (67% point decline) and neonatal mortality, from 50 to 21 (58% point decline) deaths per 1000 live births, was noted between 1996 and 2016. Full immunization coverage decreased from 87% in 2011 to 78% in 2016. 36% of children under the age of five were stunted, 25% were underweight, and 10% were wasted in 2016. Boys were more likely to receive treatment for diarrhoea (72%), compared to girls (56%). The majority of the children (74%) had their acute respiratory infections managed at private medical centers. Child health and nutritional status differed by geographic regions, being better in Gandaki and Bagmati and poor in Karnali and Madesh. Overall health and nutrition status of children were better among educated, and wealthier families.

**Conclusions:** To further reduce childhood mortality and reach the targets for the Sustainable Development Goal, targeted interventions must be implemented to improve immunization coverage plus health and nutritional status among disadvantaged populations.

**Keywords:** Child health; child mortality; Nepal; nutritional status

## INTRODUCTION

The fundamental necessity of safeguarding and enhancing children's health cannot be overstated. Nepal has made significant advancements in recent decades in terms of children's health and mortality rates. To further enhance children's health, much work still needs to be done. One of the most crucial things for creating a better future for the Nepalese population is to invest in children.<sup>1</sup> Since 1996, the Nepal Demographic and Health Survey (NDHS) has been conducted every five years by the Ministry of Health and Population (MoHP) with technical and financial support from the United States Agency for International Development (USAID). The 2016 NDHS is the fifth round of this survey implemented in Nepal as part of worldwide DHS.<sup>2</sup> This article aims to present the trend in childhood mortality, health and

nutrition status, and related socio-economic differences in Nepal and to provide policy recommendations based on the NDHS data sets.

## METHODS

We conducted a desk review of secondary information published in Nepal Demographic and Health Survey (NDHS) reports prepared under the aegis of the Ministry of Health and Population (MoHP) from 1996 to 2016.<sup>2-6</sup> These surveys used national population census data as the basis for their sampling frames. Probability proportional to size sampling was used to recruit a nationally representative sample of respondents and also produce provincial and urban-rural estimates. These surveys used questionnaires for households, women, and men of reproductive age to collect information on

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demographic and health issues. The questionnaires were based on the standard Measure DHS questionnaire. The surveys obtained ethical approval from Nepal Health Research Council (NHRC) and ICF international review board. A response rate of more than 90% was achieved in all five surveys. Details of the survey design and methodology and data set can be obtained from the DHS website, dhsprogram.com.

The key indicators examined in this report are childhood immunization, childhood illnesses (diarrhoea, acute respiratory infection (ARI)/pneumonia) and related treatment-seeking behaviour, childhood malnutrition, infant and young feeding practices, micronutrient supplementation, breast-feeding and childhood mortality (neonatal, infant, child, and under-five mortality). The indicators examined are studied and presented in trend line and bar diagram using excel and the GIS maps using QGIS software.

## RESULTS

The results are presented here in four sections; childhood mortality, childhood immunization, childhood illness, and childhood nutrition status respectively.

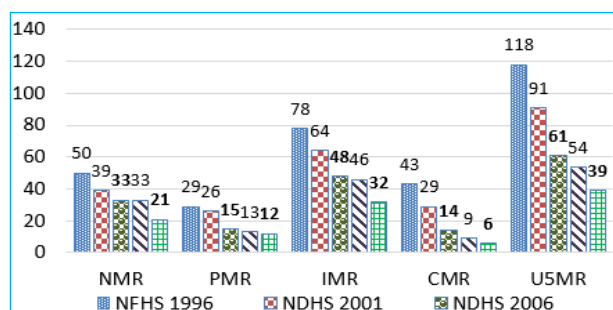


Figure 1. Childhood Mortality, Deaths/100,000 Live Births.

Over the twenty-year period between 1996 and 2016, all five childhood mortalities (neonatal, perinatal, infant, child, and under-five) have gradually decreased. Figure 1 indicates that the neonatal mortality rate (NMR) has decreased to 21 per 1000 Live Birth (LB) in 2016 from 50 per 1000 LB in 1996 (a 58% point reduction; Annual Rate of Reduction, ARR- 2.9%). Similarly, the under-five mortality rate (U5MR) decreased to 39 per 1000 LB in 2016 from 118 per 1000 LB in 1996 (a 67% point decrease; ARR-3.3%). This indicates that still, one in every 26 Nepali children dies before their fifth birthday. To achieve the Sustainable Development Goal (SDG) target by 2030, Nepal has to decrease the under-five mortality rate by 49% (at ARR of 3.5%) and the neonatal mortality rate by 43% (at ARR of 3.1%) from the 2016 level. U5MR

as well as the other four childhood mortality rates also vary across provinces. Therefore, it is a challenge for the Government of Nepal to remove the provincial-level disparity and to meet the SDG targets of neonatal and under-five mortality set at 12 and 25 per 1000 LB, respectively. This calls for an urgent need to accelerate the implementation of targeted interventions.<sup>7</sup>

Immunization is the most cost-effective and efficient way to control and eliminate the vaccine-preventable diseases that contribute to childhood illness and deaths.<sup>2</sup> All children in Nepal need to be vaccinated with the recommended number of doses of BCG, DPT-HepB-HIB, OPV, PCV, IPV-IM, and measles/rubella vaccine during the first year of life.<sup>8</sup> Over the last two decades, full immunization coverage in Nepal has increased from 43% in 1996 to 78% in 2016 (81.4% point increase; annual rate of increase, ARI-4%) however, the full immunization coverage has declined by almost 10% point (from 87% in 2011 to 78% in 2016) (Figure 2). Full immunization coverage also varied across provinces (highest in Gandaki-93%) and lowest in Madhesh (65%).<sup>2</sup> To meet the SDG target of full immunization (95% by 2030), Nepal has to increase the full immunization coverage by the annual rate of increase (ARI) of 1.5% during 2016-2030. Parental education can play an important role to achieve the target, because, full immunization coverage among children aged 12-23 months increased in Nepal with the mother's education (68% among uneducated mothers and 91% among mothers with SLC or higher education)<sup>2</sup>. Even after taking other indicators of the family's socioeconomic condition into account, lower maternal and father education are both risk factors for child health and mortality as documented in a global systematic review and meta-analysis.<sup>9</sup>

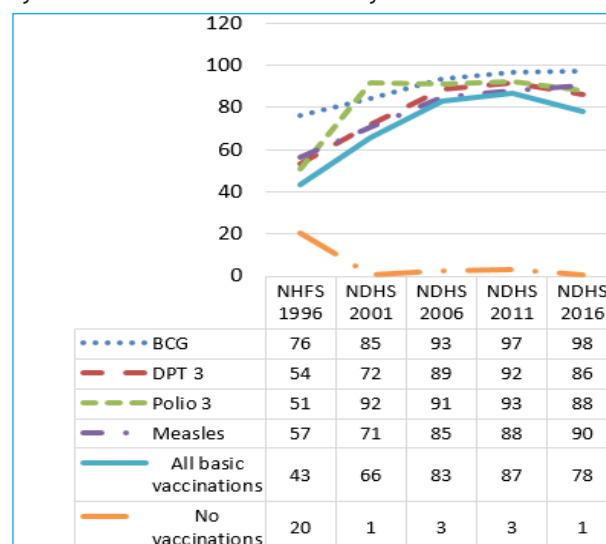


Figure 2. Trend in Vaccination Coverage Percent of Children Age 12-23 Months.

Nepal has experienced an impressive reduction in the prevalence of diarrhoea among under-five children (from 21.3% in 2001 to 7.7% in 2016 among males and from 19.5% to 7.5% among females)<sup>2-5</sup> but only 72% of male children and 56% of female children sought treatment from health facilities (Figure 3) and 16% children did not get any treatment (even oral rehydration solution, ORS). As diarrhoea is one of the major killers of under-5 mortality, appropriate intervention to timely bring the patient for treatment in a health facility using modern technology is very important for

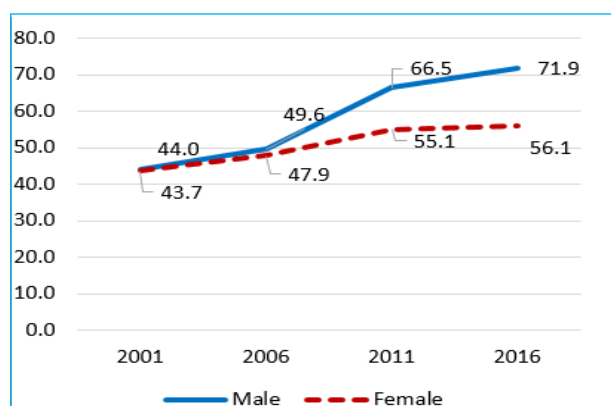


Figure 3. Percentage of under-5 children with diarrhoea who received treatment in health facility

The prevalence of ARI among children under-five in Nepal decreased from 5% in 2011 to 2% in 2016 (a 60% reduction), however, ARI and Pneumonia are still a major public health problem and a leading cause of death among these children.<sup>2-3</sup> In 2016, ARI prevalence is the highest among children aged 6-23 months (8%) and decreased with household wealth (3% among children living in a household with the bottom two wealth quintile and 1% in the highest wealth quintile) and varies across provinces and educational status of mothers.<sup>2</sup> Treatment for ARI was most commonly sought from a private medical store (74%) and only 23% were taken to government facilities. To further reduce the prevalence of ARI and Pneumonia, advocacy, particularly among poor, uneducated and hard-to-reach group is required to bring them to health facilities for early treatment.

Nutrition status is primarily determined by a child's growth in height and weight and is directly influenced by food intake and the occurrence of infections.<sup>10</sup> Weight-for-age is a composite index of weight-for-height and height-for-age. Both acute (wasting) and chronic (stunting) occur as an indicator of overall nutrition.<sup>2</sup> More than one-third (36%) of children under five-year age were stunted, one in every ten (10%) children were wasted and slightly more than a quarter (27%) of

children were underweight in 2016.<sup>2</sup> The prevalence of stunting substantially decreased from 57% in 1996 to 36% in 2016 (37% point decline; ARR-1.9%), similarly, the prevalence of underweight declined from 42% to 27% (36% decline; ARR-1.8%) during the same period, however, the prevalence of wasting remained same (around 10%) during 2001 to 2016 (Figure 4). Chronic malnutrition is most prevalent in Karnali province (55%), Lumbini province (39%), and Madhesh (37%) and it is lowest in Gandaki and Bagmati provinces (29%). Globally, inequalities within a nation have frequently been associated with inverse relationships between child mortality and socioeconomic level.<sup>11-13</sup> Children of uneducated mothers and those living in poorer households suffer more than educated and wealthier families. The average ARR of stunting and underweight over 20 year period between 1996 to 2016 were 1.9% and 1.8% respectively, which are much lower than the required 4.2% and 5.8% ARR respectively during 2016-2030. Therefore, Nepal is less likely to achieve the SDG target for reducing childhood stunting, underweight, and wasting in Nepal.

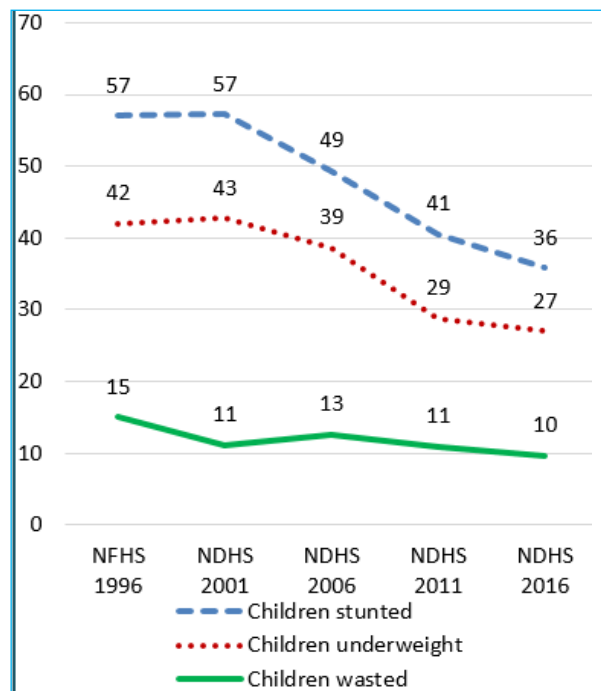


Figure 4. Trend of childhood nutrition Percent of children under age 5, based on the WHO Standard Reference Population, Source: NDHS.

Anaemia among children is a condition marked by a low level of haemoglobin in red blood cells. Iron is a key component of haemoglobin and iron deficiency is known to be responsible for half of all anaemia globally. Malaria, hookworm, chronic infection, blood disorder, and genetic condition are well-known causes

of anaemia.<sup>2</sup> Anaemia is a serious concern for children because it impairs their development with associated longterm health and economic consequence and leads to increased mortality.<sup>2</sup> The prevalence of anaemia among children 6-59 months is 53% with 26% mildly anaemic, 26% moderately anaemic and 1% severely anaemic in 2016 in Nepal (Figure 5). Prevalence of anaemia among children under age 5 declined by 2% point from 2006 to 2011. But it increased by 7% points (from 46% in 2011 to 53% in 2016). Over the past 5 years, the prevalence of mild and severe anaemia have been almost stagnant, while notable increase in moderate anaemia was observed (from 18% to 26%) (Figure 5). Prevalence of anaemia was higher in rural (56%) compared with urban (49%). Similarly, the prevalence of anaemia was highest in Madhesh province (59%) and Bagmati province had lowest anaemia prevalence (43%) in 2016. Focused interventions associated with quality education and poverty reduction activities are required to improve the childhood anaemia status in Nepal.

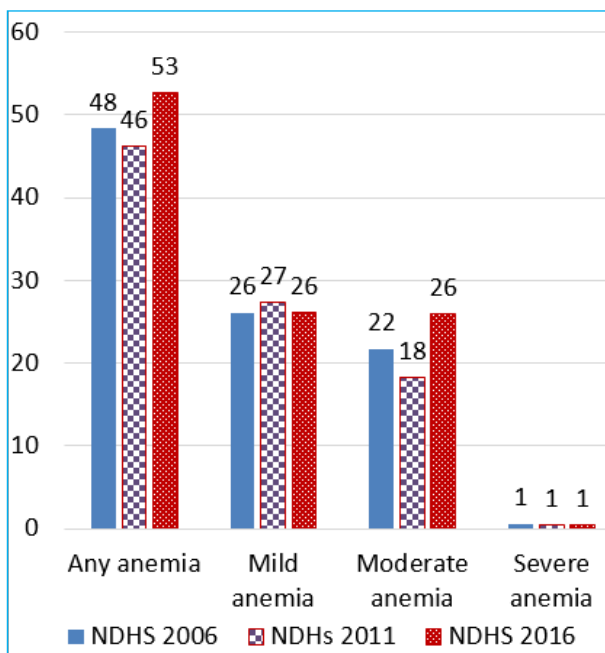


Figure 5. Trend of anaemia status among children  
Percent of children age 6-59 months with anaemia.

Source: NDHS

## DISCUSSION

Measures of infant and child health and mortality status are sensitive indices of the health and happiness of a population because they take into account a variety of individual, mother, household, community, and environmental factors.<sup>14-16</sup> This paper presents the trend of child health and nutrition status using NDHS

data. Specifically, childhood mortality, immunization, respiratory illness, diarrhoea and nutrition status as well as their differentials across the population are examined and policy recommendations to improve child health and nutrition status are provided. The evidence show that under-five and neonatal mortalities are decreasing at the annual rate of 3.3% and 2.9% respectively in Nepal. This rate of reduction should be increased to meet the SDG target.

Common causes of neonatal mortality are infection, birth asphyxia and prematurity and under-five mortality are respiratory infections, diarrhoea, malaria and birth complications. Therefore, it is essential to make sure that every pregnant mother and newborn get access to life-saving interventions in order to increase neonatal survival.<sup>17-19</sup>

Nepal has implemented a wide variety of facility- and community-based programs to address maternal, neonatal, and child health since 1990, including community-based Integrated Management of Childhood Illness, National Vitamin A program, and female community health volunteers program. Many of these programs have been integrated with regular public health programs.<sup>20</sup>

It is challenging to determine the impact of individual programs due to the range of ongoing activities and insufficient impact data.<sup>20</sup>

However, the presented data highlights the need to continue reducing childhood mortality and addressing nutritional factors especially across different socio-economic and geographical population groups in Nepal which are evidently suffering the most. To achieve this, it is crucial to strengthen and expand programs that have been proven effective, while also targeting hard-to-reach populations with customized interventions. Expanding birthing centres (BC) at strategic location of remote and hard-to-reach areas and making them function is very important to substantially increase institutional delivery. Implementation of well-known newborn interventions such as the application of chlorhexidine for cord care, resuscitation for newborns, management of newborn infection, use of antenatal corticosteroids and kangaroo mother care are needed to accelerate childhood mortality reduction. Reinforcing behaviour change communication through various channels to improve parenting skills for newborn care, particularly among the poor, uneducated, minority and hard-to-reach population are urgently required.<sup>21</sup>

Full immunization is key to child survival and missing

routine immunization can be life-threatening to infants and children. However, full immunization coverage is in declining trend in Nepal. To attain the SDG target, full immunization coverage has to be increased at the rate of 1.5% per year. Therefore, MoHP should implement innovative interventions to accelerate full immunization. Working closely with development partners and other government stakeholders to narrow the full immunization gaps, particularly among poor, marginalized and less educated groups in all geographical areas should be a key focus. Ensuring the availability of uninterrupted vaccines and motivated vaccinators supported by community awareness on the benefit of vaccination timing and place of vaccination and integrating immunization programs with other maternal and newborn programs can be a helpful strategy to increase full immunization and reduce disparity across socio-demographic groups.<sup>22</sup>

Despite decreasing trend of diarrhoea prevalence in Nepal, the treatment-seeking behaviour is not very impressive. The primary cause of death in children under the age of five is diarrhoea, which can be made worse by micronutrient deficiency. The severity of diarrhoea is lessened by vitamin A supplementation given every six months, but the overall morbidity linked to diarrhoea is unaffected.<sup>23</sup> It has been demonstrated that regular zinc supplementation lowers the prevalence and mortality of diarrhoea.<sup>23</sup> Exploring further to examine reasons for poor treatment of diarrhoea and developing a strategy towards achieving universal use of ORS for the treatment of diarrhoeal diseases is of utmost importance. The interventions related to the universal use of ORS should be focused on female, uneducated and poor households. Improving access to medicine (ORS, Zinc and antibiotics, etc.), food, and clean water as well as public education through health workers and community health volunteers (CHV) can save lives.

Treatment of ARI and pneumonia using antibiotics is the key strategy for preventing death due to respiratory diseases, but excessive use of antibiotics might have an adverse effect on the health of children.<sup>24</sup> Regulating the uncontrolled use of antibiotics to prevent children from developing antibiotic resistance requires the adoption of effective approaches. As a low birth weight, malnutrition, and lack of breast-feeding are important risk factors for childhood ARI and pneumonia, nutritional interventions such as early and exclusive breastfeeding, vaccination, access to clean water, good nutrition and limited exposure to air pollution should be implemented to reduce deaths from ARI and pneumonia.<sup>25</sup> A supply of trained health workers equipped with adequate

medicines and equipment within easy reach of poor and uneducated families are helpful to treat childhood ARI and pneumonia effectively.

The NDHS reports also show that the nutrition status of Nepalese children is poor. More than one-third of children under the age of five are stunted. Although the prevalence of stunting has been decreased at the annual rate of 1.9%, to meet the SDG target, the annual rate of reduction in stunting and underweight should be over 4.2% and 5.8% respectively. Residents of Karnali and Madhesh Province, poor, and uneducated families are more vulnerable to undernutrition. Exclusive breastfeeding, complementary feeding, micronutrient supplementations, adequate and balanced diet during pregnancy, and treatment of acute malnutrition are the potential nutrition-specific interventions that have a direct impact on the nutrition status of children.<sup>24</sup> Increasing the coverage of nutrition-specific interventions listed above across the population through both public and non-government (NGO) sectors can be immensely important to improve nutrition status.

Counselling mothers effectively to improve child feeding practices and disseminating messages about good child feeding practices on cell phones, radio and television help its promotion. Appropriate community-based interventions for children with severe acute malnutrition should be implemented. Calcium supplementation during pregnancy is documented to be helpful to prevent pre-eclampsia, eclampsia and gestational hypertension which in turn provides better maternal and foetal outcomes and should be a nationwide implementation. Implementing nutrition-specific interventions together with nutrition-sensitive interventions (such as food security, family planning, proper water, sanitation and hygiene, and women's empowerment), particularly for uneducated, poor and vulnerable children is helpful to substantially reduce stunting. Multi-sectoral collaboration, deployment of trained staff in the community, and effective communication for changing the behaviour of vulnerable people are key to improving the nutritional status of children.<sup>24</sup>

## CONCLUSIONS

Nepalese children are living healthier lives than ever before. Neonatal, infant and child mortality continues to decrease, child vaccination is slowly rising, and fewer children are malnourished. However, Nepal still lags behind its neighbours in South Asia in many of the key indicators. Greater effort is therefore required to meet the SDG target of child health and nutrition indicators. Targeted interventions must be made to improve

immunization coverage and nutritional status among disadvantaged populations.

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## CONFLICT OF INTEREST

The authors declare no conflict of interest

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