**Factors associated with co-occurrence of stunting, wasting and anemia among 6-59 months children in Nepal: Secondary analysis of Nepal Demographic and Health Survey 2011-2022**

**Background:**

**Study Aim:**

**Methods:**

*Data source:*

We analyzed Nepal Health Demographic Survey (NDHS), 2011, 2016 and 2022 datasets in this study. NDHS is the nationally representative survey implemented by New ERA under the aegis of the Ministry of Health and Population (MoHP) with the technical support of ICF International. NDHS was funded by the US Agency for International Development (USAID).

*Ethical approval:*

We requested the DHS program for permission to use NDHS 2011, NDHS 2016 and NDHS 2022 datasets which was granted access to download and use them from https://www.dhsprogram.com. NHDS obtained ethical approval from the institutional review board of ICF International, United States of America and the ethical review board of Nepal Health Research Council.

*Study setting:*

Nepal is a landlocked country located in Southeast Asia with an area of 147, 516 km2. Nepal has seven administrative provinces, within which lies 753 municipalities (metropolitan cities: 6, sub-metropolitan cities: 11, urban municipalities: 276, rural municipalities: 460). Nepal has three ecological belt-Mountain, Hill and Terai. Based on Census 2021, the total population of Nepal was 29164578 of which 14911027 (51.1 %) were females and 14253551 (48.9 %) were males. The human development index (HDI) of rural and urban parts of Nepal were 0.647 and 0.561 respectively with an overall HDI of Nepal to be 0.587.

*Sample and sampling:*

*Measures*

*Dependent variables*

*Stunting:* Children whose height-for-age z score is below minus two standard deviations (–2 SD) from the median of the reference population were stunted.

*Wasting:* Children whose weight-for-height z score is below minus two standard deviations (–2 SD) from the median of the reference population were wasted.

*Anemia:* The children are considered to have anemia if the altitude-adjusted hemoglobin level is <11.0 gm/deciliter.

*Co-occurrence of stunting and anemia (CSA):* A child is considered to have CSWA if he/she has stunting, and anemia

*Co-occurrence of wasting and anemia (CWA):* A child is considered to have CSWA if he/she has wasting, and anemia

*Co-occurrence of wasting and stunting (CSW*): A child is considered to have CSWA if he/she stunting and wasting.

*Co-occurrence of stunting, wasting and Anemia (CSWA):* A child is considered to have CSWA if he/she has all stunting, wasting and anemia

*Exposure variables:*

|  |  |
| --- | --- |
| *Variables* | *Definition* |
| *Household factors* |  |
| *Food insecurity* |  |
| *Wealth Quintile* |  |
| *Maternal Factors* |  |
| *Mother’s education status* |  |
| *Mother’s nutritional status* |  |
| *Mother’s participation in decision making* |  |

*Potential confounding variables*

*Adjusting factors:* Place of residence (rural/urban), ecological belt (hill/mountain/ terai), Age of child (in months), Sex of child (male/female), Birth weight of child (in kg), Minimum dietary diversity (Yes/No)

*Statistical analyses*

**Potential challenges and strategies to handle them:**

**References:**