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| **ANALYSIS - CLINICAL, ANTHROPOMETRIC & BIO-CHEMICAL SURVEY** |
| Dr. Sandhya Ahuja |
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| **NHSRC** |
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**Introduction**

Clinical, Anthropometric and Bio-chemical Survey (CAB Survey) is an added component to Annual Health Survey to supplement the district specific information on nutritional status, prevalence of life style disorders like diabetes, hypertension and anemia in Empowered Action Group States (Bihar, Chhattisgarh, Jharkhand, Madhya Pradesh, Odisha, Rajasthan, Uttarakhand & Uttar Pradesh) and Assam.

CAB survey is conducted in year 2014 in 284 districts; total 1.65 million population and 0.34 million households were covered under the survey. CAB survey aims to contribute to rapid improvement in health and nutritional indices in these States by making available good quality data at district level and enabling these states to bridge gap between poor and good performing districts.

The survey provides information on following indicators:

Nutritional indicators:

* For children under 5 years: Stunting (Height for age), Wasting (Weight for height), Under Weight (Weight for age) and under nourished (BMI for age)
* For children in the age 5 to 18 years: Under nourished (BMI for age)
* For persons 18 years & above: BMI indicators (<18.5, ≥ 25 and ≥ 30) are provided separately for male, female and rural also.

Anemia (measured by Hemoglobin level):

* For children: data is provided for age group 6-59 months, 5-9 years, and 10-17 years.
* For adults: data is provided for age group 18-59 years and 60 & above. Data is also provided separately for male and female.

Lifestyle disorder:

* Indicators for Blood sugar and Hypertension level are provided for person age 18 & above only.
* Blood sugar is provided in the range ≥110, ≥130 and ≥150 mg/dl.
* Hypertension is provided in three separate categories of Systolic & Diastolic measurements viz. above normal (>140/90 mm of Hg), moderately high (>160/100 mm of Hg), and very high (>180/110 mm of Hg).
* Data on Iodine content in household salt (more than 15 ppm%) is provided.

This report analyzes nutritional Status of children under five years of age.

**Analysis for Nutritional Indicators under 5 years age**

**STUNTING:** Stunting (low height for age) reflects a process of failure to reach linear growth potential as a result of sustained poor dietary intake or repeated infections or combination of both. Development of stunting is gradual and cumulative process and has irreversible consequences (long term morbidity and mortality).  The indicator for stunting is low height-for-age, is calculated by comparing the height of a child against the WHO international growth reference for a child of the same age. The cut-off point of below -2 SD and below -3SD classify stunting as moderate and severe undernutrition. Moderate stunting defined as height for age between -3SD and -2SD. Severe stunting is defined as height for age below -3SD.

Among high focus states, Prevalence of Stunting (below -2SD) among children under 5 years of age ranges from 34.7% in Chhattisgarh to 62% in Uttar Pradesh. All of the AHS states have prevalence of stunting more than 30%. States having more than half of the children under 5 years age with stunted growth are Jharkhand (50.5%), Madhya Pradesh (51.5%), Bihar (52%) and Uttar Pradesh (62%).

Prevalence of stunting (below -3SD) among children under five years of age reflects severe under-nutrition and failure to grow. Among high focus states, Prevalence of stunting (below -3SD) range from 17.4% in Assam to 35.6% in Uttar Pradesh. One out of every five children have severe stunted growth in the state of Chhattisgarh (20%), Uttarakhand (20%), Rajasthan (24.4%), Bihar (25.3%), Jharkhand (28.5%), Madhya Pradesh (32.4%) and Uttar Pradesh (35.6%).

**Comparing Stunting indicator across NFHS 3 (2005-06), CAB (2014) and NFHS 4 (2015-16) Data** (\*NFHS 4 data is available for only 3 high focus states as on 12.2.2016)

Comparing to NFHS 3 survey data, the stunting indicator has not shown much improvement in CAB survey. In Bihar, comparing to NFHS 3 data (55.6%), CAB survey shows decline of 3.6 points (52%) whereas NFHS 4 survey data shows decline of 7 points (48.3%) in stunting. In Madhya Pradesh, CAB survey shows 51.5% of children suffering from stunted growth, which is more, compared to 50% prevalence noted in NFHS 3 survey, whereas NFHS 4 survey shows 42% prevalence (decline of 8 points compared to NFHS 3 survey). In Uttarakhand, CAB survey shows 4 points decline (40.2%) in stunting compared to NFHS 3 survey figures (44.4%) whereas NFHS 4 survey shows 11 points decline (33.5%).

**WASTING:** Wasting (low weight for height) reflects acute malnutrition, developed as a result of recent rapid weight loss or failure to gain weight. It is associated with acute starvation, severe disease and chronic un-favorable conditions. It is reversible with re-feeding and has high mortality rate. The indicator for Wasting is measured by low weight for height compared to the WHO international growth reference. The cut-off point of below -2 SD and below -3SD classify wasting as moderate and severe malnutrition. Moderate wasting is defined as weight for height between -3SD and -2SD. Severe wasting / malnutrition is defined as weight for height below -3SD.

Among high focus states, prevalence of wasting (below -2SD) in children under five years age, ranges from 14.7% in Uttarakhand to 32.4% in Chhattisgarh. Almost one out of three children suffers from severe wasting /acute malnutrition in Chhattisgarh state.

Among high focus states, Prevalence of moderate wasting (between -2 SD and -3 SD) in children under five years age, ranges from 8.9% in Uttarakhand to 20.9% in Chhattisgarh.

Prevalence of severe wasting (below -3SD) among children under five years age ranges from 5.8% in Uttar Pradesh and Uttarakhand to 11.5% in Chhattisgarh. Nearly, one in ten children suffers from severe wasting in the state of Assam, Rajasthan and Chhattisgarh.

**Comparing Wasting indicator across NFHS 3 (2005-06), CAB (2014) and NFHS 4 (2015-16) Data** (\*NFHS 4 data is available for only 3 high focus states as on 12.2.2016)

Comparing the NFHS 3 survey data report for wasting indicator, CAB survey report has shown improvement, i.e., decline in the prevalence of wasting. In Bihar, CAB survey has shown 8 point decline (19.2%) compared to NFHS 3 survey figures (27.1%) whereas, NFHS 4 survey shows that 20.8% of children have wasting.

In Madhya Pradesh, CAB survey shows decline of 8 points (17.3%) compared to NFHS 3 survey figures (25.8%), but NFHS 4 survey figures shows wasting to be doubled (35%) compared to that of CAB survey (17.3%).

In Uttarakhand, compared to NFHS 3 survey data (18.8%), CAB survey records 4 points decline (14.7%) whereas NFHS 4 survey data reports 5 points increase in wasting (19.5%) compared to CAB survey figures (14.7%) (Refer Graph Wasting (below -2SD)).

In Bihar, CAB survey shows moderate wasting in children to be 11% (approximately 8 points decline compared to NFHS 3 survey figures (18.8%) whereas NFHS 4 survey data shows increase in moderate wasting (13.8%) compared to CAB survey and 5 points decline compared to NFHS 3 survey data.

In Madhya Pradesh, CAB survey shows moderate wasting in children to be 9% (4 points decline compared to NFHS 3 survey figures (13.2%) whereas NFHS 4 survey data shows more than three times increase in moderate wasting (25.8%) compared to CAB survey (9%) and approximately doubled to that of NFHS 3 survey data (13.2%).

In Uttarakhand, CAB survey reports moderate wasting to be 8.9% (4 points decline compared to NFHS 3 survey figures (13.5%) whereas NFHS 4 survey data shows increase in the moderate wasting category (10.5%).

In Bihar, CAB survey report severe wasting in children to be 8.1%, which is similar to NFHS 3 survey data (8.3%) showing that the condition has not improved over the time period. Whereas, NFHS 4 survey data shows 1 point decline (7%) compared to CAB survey figures and NFHS 3 survey figures.

In Madhya Pradesh, CAB survey reports that 8.3% of children under five years of age suffers from severe wasting (decline of 4.3 points compared to NFHS 3survey data) whereas NFHS 4 survey report shows 1 point increase (9.2%) compared to CAB survey figures.

On the other hand, Prevalence of severe stunting in children under five years of age, in Uttarakhand has increased over the years (5.3% as per NFHS 3survey (2005-06); 5.8% as per CAB survey (2014) and 9% as per NFHS 4 survey (2015-16)).

**UNDERWEIGHT:** Underweight (low weight for age) reflects body mass relative to chronological age. It is influenced by both wasting (low weight for height) and stunting (low height for age). The Underweight indicator is measured as weight of age less than -2SD of the WHO Child Growth Standard median. It represents individual or population long term nutritional experience.

Among high focus states, prevalence of underweight children under five years age (weight for age below -2SD) ranges from 28% in Uttarakhand to 45.7% in Jharkhand. Almost two out of five children suffer from underweight in state of Chhattisgarh (39.4%), Bihar (40.3%), Madhya Pradesh(40.6%), Uttar Pradesh (44.9%) and Jharkhand (45.7%).

If we analyze the prevalence of underweight (weight for age below -3SD, reflecting severe underweight), it range from 8.7% in Uttarakhand to 18.8% in Chhattisgarh. Severe underweight poses threat to health and economy which needs to be tackled at the earliest.

**Moderate underweighed children** comprise those having weight for age between -2SD and -3SD of the WHO Child Growth Standard median. It ranges from 19.3% in Uttarakhand to 27.4% in Jharkhand. About one in four children is moderately underweight in states of Madhya Pradesh (24.1%), Bihar (24.5%), Odisha (24.5%), Uttar Pradesh (27.2%) and Jharkhand (27.4%). Jharkhand has high percentage of children both in moderate and severely underweighed category.

**Comparing Underweight indicator across NFHS 3 (2005-06), CAB (2014) and NFHS 4 (2015-16) Data** (\*NFHS 4 data is available for only 3 high focus states as on 12.2.2016)

In Bihar, CAB survey reports 40.3% children are underweight, approximately 16 points decline from the figure reported in NFHS 3 survey (55.9%) whereas, NFHS 4 survey reports that 43.9% children are underweight (12 points decline compared to NFHS 3 survey, but 3.5 points increase is reported compared to CAB survey figures).

In Madhya Pradesh, CAB survey reports 40.6% children under five years are underweight, (there is 20 points decline from the figures reported in NFHS 3 survey (60%)) whereas NFHS 4 survey reports that 42.8% of children are underweight (17 points decline compared to NFHS 3 survey, whereas 2 points increase is reported compared to CAB survey figures).

In Uttarakhand, prevalence of underweight in children under five years of age is showing gradual decline over the years (38% as per NFHS 3survey (2005-06); 28% as per CAB survey (2014) and 26.6% as per NFHS 4 survey (2015-16)).

**UNDERNOURISHED:** Undernourished (Low Body Mass Index for age) indicator is measured as Body Mass Index for age below -2SD of the WHO Child Growth Standard median. Under-nutrition can lead to poor mental development and growth, if the nutritional imbalance is not checked in early years of life.

Among the high focus states, prevalence of undernourishment in children under five year of age range from 13.8% in Uttarakhand to 33.5% in Chhattisgarh. One in every five children is undernourished in state of Bihar (20.7%), Assam (22.3%), Jharkhand (22.5%), Rajasthan (22.7%) and Chhattisgarh (33.5%).

Analyzing the undernourished indicator (BMI for age below -3SD), prevalence of severe undernourishment in children under five year of age, range from 6.7% in Uttarakhand to 15.9% in Chhattisgarh. One in ten children is severely undernourished in states of Rajasthan (12.2%), Jharkhand (12.4%), Madhya Pradesh (12.4%), Bihar (12.8%), Assam (13.2%) and Chhattisgarh (15.9%).

**OVERNOURISHED:** Over-nourished (High Body Mass Index for age) indicator is measured as Body Mass Index for age above 2SD of the WHO Child Growth Standard reference. Rapid economic development and urbanization has led to nutrition transition (seen through change in eating habits and sedentary lifestyle). Coexistence of undernutrion and overnutrition in children poses dual burden, another challenge that has to be managed to prevent nutrition related chronic diseases. Obesity in childhood is associated with higher probability of obesity in adulthood, posing the overnourished and obese population at risk of non-communicable diseases such as diabetes, cardio-vascular diseases.

Among the high focus states, prevalence of over-nourishment in children under five year of age range from 3.1% in Bihar to 11.5% in Madhya Pradesh. The percentage of overnourished children is high in itself, although the rates are less compared to those of wasting and stunting in respective states.

Percentage of over-nourished children (BMI above 3SD) under five year of age that poses severe health risk, range from 1.9% in Bihar to 5.9% in Uttarakhand.

**CONCLUSION:**

The Clinical, Anthropometric and Biochemical (CAB) Survey provided the figures to analyze our health systems progress in catering to the nutritional deficiencies and disorders in the high focus states. The data is seen in light of achievement – progress made over span of 10 years compared with National Health Family Survey 2005-06.

CAB data shows the high prevalence of wasting, stunting, underweight in children under five years age along with double burden of under-nourishment and over-nourishment. CAB figures can be taken as baseline to plan and implement interventions to strengthen the nutrition deprived children under five years of age, as the physical and psychological development take place in these years. To prevent such an economic loss to the country, steps needs to be taken urgently to tackle malnutrition.