

**CLINICAL,**  
**ANTHROPOMETRIC**  
**& BIO-CHEMICAL**  
**(CAB)-2014**

## **Introduction**

To supplement the information provided by Annual Health Survey (AHS), a biomarker component has been introduced in AHS to collect data on nutritional status, life style diseases like diabetes & hypertension and anemia in Empowered Action Group (EAG) States & Assam. This component, namely Clinical, Anthropometric and Bio-chemical (CAB) survey, is conducted in 2014 on a sub-sample of AHS in all EAG States namely Bihar, Chhattisgarh, Jharkhand, Madhya Pradesh, Odisha, Rajasthan, Uttarakhand & Uttar Pradesh and Assam. The survey has collected information on nutritional status of women, children (1 month and above) and men, prevalence of anemia among women, children (6 month and above) and men, prevalence of hypertension and abnormal fasting blood glucose among women and men 18 years and above and utilization of iodized salt in households.

### **AHS- an overview**

2. AHS was conceived in 2005 to yield core vital and health indicators at the district level on a continuous basis. Ministry of Health and Family Welfare (MoHFW) has entrusted the responsibility to conduct the survey to Office of the Registrar General, India (ORGI) considering its expertise in handling large scale demographic surveys.

3. The survey became operational in 2010 in all the 284 districts of the 8 EAG States viz. Bihar, Chhattisgarh, Jharkhand, Madhya Pradesh, Odisha, Rajasthan, Uttarakhand & Uttar Pradesh and Assam. Three rounds of the survey have been completed in the years 2010-11, 2011-12 and 2012-13 and the results of all the rounds containing 161 vital and health indicators have been published in the form of district level bulletins and factsheets.

### **Genesis**

4. In a meeting held under the chairmanship of the then Secretary (Health & Family Welfare), it was suggested that the component of CAB tests should be included under AHS, in order to obtain data on nutritional status and information on prevalence of certain lifestyle disorders like diabetes and hypertension at the district level. The Steering Committee, constituted for AHS, set up a Technical Advisory Group (TAG) under the chairmanship of Dr. N.S. Sastry, former DG, National Sample Survey Office (NSSO) with representatives from MoHFW, Directorate General of Health Services (DGHS), ORGI, NSSO and International Institute for Population Sciences (IIPS) as members, to decide the technical aspects of the survey including its methodology, design and coverage. A sub-group was then constituted under the TAG to suggest the biomarker tests to be conducted under the CAB component and the methodology thereof. The sub-group, held a series of meetings with different stake holders i.e. National Institute of Health & Family Welfare (NIHFW), Nutrition Foundation of India (NFI), National Institute of Nutrition (NIN), MoHFW, Indian Council of Medical Research (ICMR) before

finalizing biomarker tests and their methodology. An Institutional Ethics Committee (IEC) for the CAB component was also constituted under the chairmanship of Dr. Shiv Lal, former Special DG, DGHS, to ensure adherence of proper ethical guidelines while conducting the CAB tests. The committee approved the methodology, content and protocols for conduct of the CAB tests.

### **Objective**

5. CAB is designed to provide district specific information on magnitude of under- and over-nutrition, hypertension and high fasting glucose in all the districts in 9 AHS States with poor nutrition and health indices. Based on these data, district specific programme implementation plans can be drawn up, funded and implemented. By using this data as the baseline, assessment of progress in implementation and impact of these interventions can be made. This would enable midcourse corrections by identifying the factors responsible for poor performance. Thus, CAB survey aims to contribute immensely to rapid improvement in health and nutritional indices in these States by making available district data, enabling these States to bridge the gap between poor and good performing districts and by demonstrating good quality assessment of health and nutritional status in community setting.

### **Partner institutes, Service providers and other stakeholders**

6. NIHFW has been the nodal agency for technical guidance, training, accuracy testing of equipments and hemoglobin testing. At the State level, the training and hemoglobin testing have been carried out by NFI, NIN and other institutions of ICMR namely Regional Medical Research Centre(RMRC) in Assam, RMRC in Bhubaneswar ,RMRC for Tribals in Jabalpur and Desert Medical Research Centre(DMRC) in Jodhpur . For supplying equipments and consumables, M/s HLL life care Limited (Formerly Hindustan Latex Limited) has been appointed by MoHFW. NIHFW and NFI have also provided inputs for the Instruction/ training manual prepared by ORGI.

### **Quality control mechanism**

7. An elaborate quality control mechanism was put in place to ensure best possible data. Intensive training, supply of detailed instruction manual explaining each step of data collection, accuracy testing of measurements are some of these methods adopted for quality control. Other measures taken include immediate replacement of faulty equipments, selection of most suitable and experienced persons like ANM and lab technicians for field work and regular field visit by officials of ORGI. There are protocols prescribed for usage of equipments and consumables in the field .Appointment of a doctor as health consultant for every four districts was another important step to ensure data quality by supervising field activities, checking the accuracy of equipments and undertaking duplicate assessments. As regards quality checking, 10% duplicate measurements were taken for quality checking and 10% households were again

checked by Medical Consultants and readings had been taken. Monthly exchange of blood sample between labs were also arranged to ensure quality assurance among institutions for Hb estimation. In order to assure quality of survey, constant monitoring and supervision of the field activities were done by ORGI/Directorate of Census Office (DCO) officials. Imparting standardized training to the field teams and medical consultants was another step to ensure quality.

### **Training**

8. Intensive training has been provided to the field survey teams, medical consultants and field investigators. For the field survey teams, a skill-intensive training in batches consisting of 12-15 members was imparted by NIHFW, NFI and ICMR regional institutes in a phased manner. The field investigators were trained for skill upgradation and they were taught about quality control measures to ensure accuracy of measurements. The medical consultants were specifically trained by NIHFW and NFI for the purpose.

### **Coverage of the survey**

9. CAB has been conducted in 2014 on a subsample of 12 sample units per district on an average, in all the 284 districts except for two districts of Uttarakhand namely Chamoli and Rudraprayag where only 6 units could be surveyed ( 2 and 4 respectively) due to administrative reasons. All eligible members of alternate household in the selected sample units were surveyed. The total population and households thus covered are 1.65 million and 0.34 million respectively. Similar to AHS, the field work has been outsourced and supervision is done by ORGI.

### **Field work strategy**

10. The strategy adopted for AHS is replicated in CAB. The field work has been outsourced to seven selected Survey Agencies on the pattern of Annual Health Survey (AHS). In the States, the co-ordination, supervision and monitoring of CAB is carried out by the dedicated staffs posted at various levels in the respective Directorates of Census Operations (DCOs). The AHS division of ORGI has managed the overall co-ordination, supervision and monitoring across the 9 AHS states.

### **Sample design**

11. AHS sample design is applied to CAB tests as CAB is conducted on a sub sample of 12 Primary Sample Units (PSUs) in each district among the total AHS sample. The sample design adopted is a uni-stage stratified simple random sample without replacement except in case of larger villages in rural areas (population more than or equal to 2000 as per 2001 Census),

wherein a two stage stratified sampling has been applied. The sample units are Census Enumeration Blocks (CEBs) in urban areas and villages in rural areas. In rural areas the villages have been divided into two strata. Stratum I comprises villages with population less than 2000 and Stratum II contains villages with population 2000 or more. Smaller villages with population less than 200 were excluded from the sampling frame in such a manner that the total population of villages so excluded did not exceed 2 per cent of the total population of the district. In case of Stratum I, the entire village is the sample unit. In case of Stratum II, the village has been divided into mutually exclusive(non-overlapping) and geographically contiguous units comprising group of EBs called segments of more or less equal size and population not exceeding 2000 in any case. One segment from the frame of segments thus prepared was selected in a random manner to represent the selected village at the second stage of sampling.

### **Methodology for selection of PSUs for CAB survey**

12. The 12 PSUs in each district are distributed in Rural/Urban in the same proportion that roughly exists among the total PSUs selected for AHS in the respective district. The proportionate numbers for Rural/Urban is rounded off to the nearest integer. In some districts, it turned out that no Urban Units could be selected after following the above methodology. Hence, in order to give representation to urban population if available at least two urban PSUs have been selected in each district. The sub-sample of PSUs within a district is selected by Simple Random Sampling (SRS) and within a PSU, the first household is selected randomly and then alternate households are selected for the survey. The selection of PSUs through SRS was proposed as they are only sub-sample of AHS Sample and at the time of selection of AHS Samples, precautions regarding representation of each type of sampling unit had already been taken care of.

### **Sample size**

13. The fasting blood sugar prevalence level has been taken as the decisive indicator for estimation of sample size at the district level. The prevalence of blood sugar among the population in the age 18 years and above is considered as 4 % across districts while estimating the sample size. The permissible level of error has been taken as 10 percentage relative standard error (prse) at the district level.

### **Survey Tools**

14. All households selected for CAB test have been given a Survey Information Sheet explaining the purpose of CAB and possible benefits to the individual/National health programmes etc. Before conducting various tests in a household, the consent is taken from persons participating in various tests in a Consent Form and the consent of child is taken in the

Child Assent Form prepared for the purpose. To record the measurements/results, Form 1 (CAB Tests Schedule) and Form 2 (Hemoglobin Tests Schedule) were administered. All tests other than Hb estimation test yield 'on-the-spot' results and they are recorded in Form1. For Hb estimation, the blood samples are tested in the laboratory and the results have been recorded after lab testing. Other particulars to be entered in Form 1 include salt intake by the household, weight and length/height results, BP and blood sugar measurements, details of breast feeding practices and supplementary feeding for children, acute illness of children etc. Form 2 is filled in duplicate with Hb Values taken from a particular PSU.

15. Results of duplicate samples are reported in a separate Form. Two Forms i.e. Form 7(Data quality check of measurements by field investigator) and Form 8(Data quality check of measurements by Medical consultant) are used for data quality check. The field investigator takes duplicate measurements in 10% of the persons surveyed per day and the medical consultant in 10% of the households surveyed and fill data in Form 7 and Form 8 respectively.

16. After the test in a household, a Household Health Card containing the ready results of the tests conducted are given to the household. In addition to this, all pregnant and lactating women and women with children below 3 years of age are given a Mother and Child Protection Card (MCPC), jointly developed by MOHFW and Ministry of Woman and Child Development. The MCPC aims to record the details of ante-natal, natal and post-natal care, immunization, development of child etc. The card also provides standard growth charts for monitoring growth of child from birth till 3 years of age.

#### **Instruments used and data collected**

17. Various equipments are used to take measurements and to collect data. Height is measured using Wall Mounted Statute Meter. Infantometer is used to measure the length for the children up to the age two years. Similarly, weight is recorded with the help of a Digital Weighing Scale. Automated Digital BP monitor is used to take blood pressure and Hb pipette for blood samples. Hb level is measured with the help of colorimeter in designated labs and Iodine content in household salt is measured using Salt testing kit.

18. The survey collected data directly from the participants on the clinical components like morbidity episodes and BP measurements, anthropometric parameters like measurement of weight and length/height and collected biochemical samples like blood for Hb and fasting glucose and salt for iodine estimation. On the spot information on health status is provided to the participants during the survey.

## **Data processing**

19. Tables and sample characteristics have been generated using SPSS package. Against all indicators, Percentage Relative Standard Error (PRSE) and Confidence Interval (CI) have been indicated to give an idea of the accuracy of the estimates. CI has been generated using logit transformation method through SPSS application.

## **Data available in CAB**

20. Stunting (Height for age), Wasting (Weight for height), Under Weight (Weight for age) and under nourished (BMI for age) are the four major indicators available for measuring malnutrition level in children under 5 years. For children in the age 5 to 18 years, undernourishment is provided and for persons 18 years and above, BMI indicators ( $<18.5$ ,  $\geq 25$  and  $\geq 30$ ) are provided separately for male female and rural also.

21. Anemia, measured by Hemoglobin level, is available for sex wise children, women and men. For children, the data is available for age 6-59 months, 5-9 years, and 10-17 years. Adult anemia is categorized for age 18-59 years and 60 and above.

22. Blood sugar and Hypertension level are provided for person age 18 and above only. Blood sugar is provided in the range  $\geq 110$ ,  $\geq 130$  and  $\geq 150$  mg/dl and Hypertension 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) is provided.

23. Measured by the content of salt available in household, iodine content in salt is estimated and this data is also provided.

## **Data dissemination**

24. CAB data is disseminated in a single phase in the form of factsheets containing 40 indicators of nutritional status, anemia and other life style diseases.

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