POLICY AND PROGRAMME IMPLICATIONS OF CHANGES IN PREVALENCE OF ANAEMIA IN PRE-SCHOOL CHILDREN

Back ground information

India recognized that anaemia in pre-school children was a major public health problem. Research studies in India had documented that poor iron stores in infants born to anaemic mothers, poor dietary intake of iron and folate, and poor bio-availability of iron from Indian dietaries were the major factors responsible for the high prevalence of anemia; infections like malaria in endemic areas aggravate pre-existing anemia. Intervention programmes to address the major factors responsible for anaemia were initiated in the Seventies of the last century.

By the 1990s most of the primary health care institutions in urban and rural areas were functional and it was expected that the coverage under IFA supplementation in pre-school children would improve. In order to monitor progress, surveys of the coverage and impact of IFA supplementation were incorporated as a part of all the national health and nutrition surveys. Data on these two aspects are now available from [NFHS 2 (1998-99), 3 (2005-06), and 4 (2015), NNMB micro-nutrient survey (2003), DLHS 2 (2002-04), 4 (2013-14) and Clinical and Anthropometric and Biochemical (CAB) Component of the Annual Health Survey (AHS 2014-15). All these surveys showed that the coverage under IFA supplementation in pre-school children continues to be very low - in many states below 10%. Erratic availability and distribution of iron-folic acid syrup as well as paediatric iron-folic acid tablets continue to be the major factors responsible for the low coverage.

The past four decades have seen the following:

- some improvement in socio-economic status, household food security and dietary intakes;
- steady, if slow, reduction in under-nutrition rates in pre-school children; and,
- improvement in access to health care and reduction in malaria and hook worm infestation.

It is important to find out whether there has been any improvement in Hb levels and reduction in the prevalence of anaemia in pre-school children in the last two decades, so that appropriate modifications can be made in the ongoing intervention programmes for combating anaemia.

Materials and methods

Hb estimation was done using Hemocue method in NFHS 2, 3 & 4 and cyanmetheamoglobin method in DLHS 2, 4 & AHS CAB. There have been several publications indicating that the two methods give different readings of Hb levels. Therefore the trends of changes in Hb were calculated separately for the NFHS series and the AHS/DLHS series.

Data on the prevalence of anaemia in pre-school children in India and different states were tabulated from the reports of the NFHS 2, 3 and 4. Raw data from NFHS 2, 3 and 4 were obtained from Demographic and Health Survey Programme ICF International. The mean Hb levels in under-three children in NFHS 2, under-three and under-five children in NFHS 3, and under-five children in NFHS 4 were computed and compared. Frequency distributions of Hb in under-three children in NFHS 2 and 3 and under-five children in NFHS 3 & 4 were computed and compared.

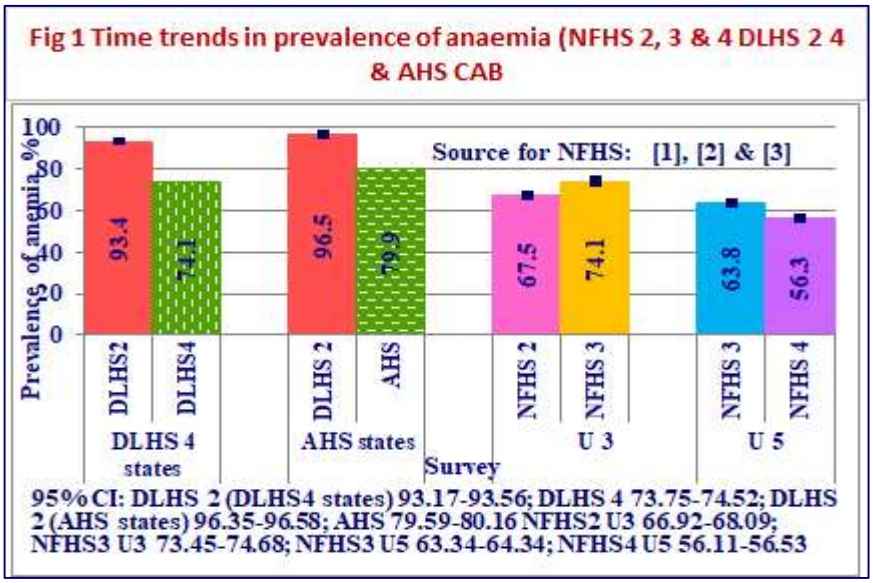
DLHS 2 covered all the states and UTs; AHS CAB covered 9 poorly performing states (AHS states), while DLHS 4 covered 21 states &UTs (DLHS 4 states). The raw data of DLHS 2, 4 and AHS CAB were analyzed. The prevalence of anaemia and the mean Hb levels in pre-school children in DLHS 2 and 4 and AHS

CAB were computed. The means and frequency distributions of Hb and prevalence of anaemia in pre-school children in DLHS 2 were compared with the respective values for pre-school children in DLHS 4 and AHS CAB in the respective states.

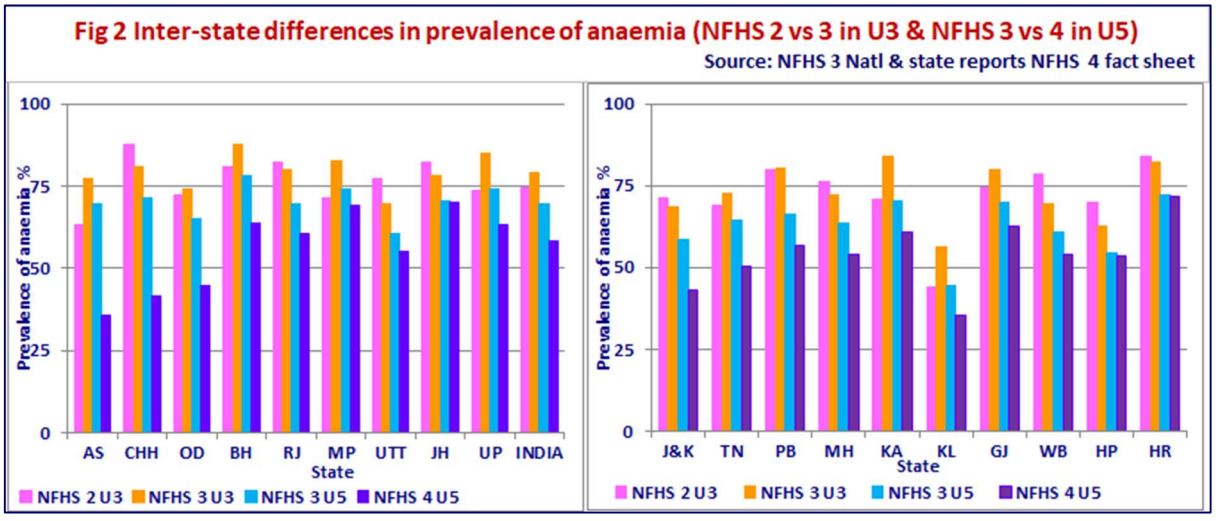
Results

Table 1 Number of children surveyed				
Survey	Age of children surveyed	Total No of children	Blood sample taken	Valid Hb
DLHS 2	6-71 months	313646	195193	173684
NFHS 2	6-35 months	28662	27268	27261
NFHS 3	6-59 months	48084	35851	35844
NFHS 4	6-59 months	259627	209496	209295
DLHS 4	6-59 months	71707	48896	44494
AHS CAB	6-59 months	148307	75324	73278

The age group and number of pre-school children surveyed, blood samples collected and valid Hb results available in different surveys are shown in Table 1.

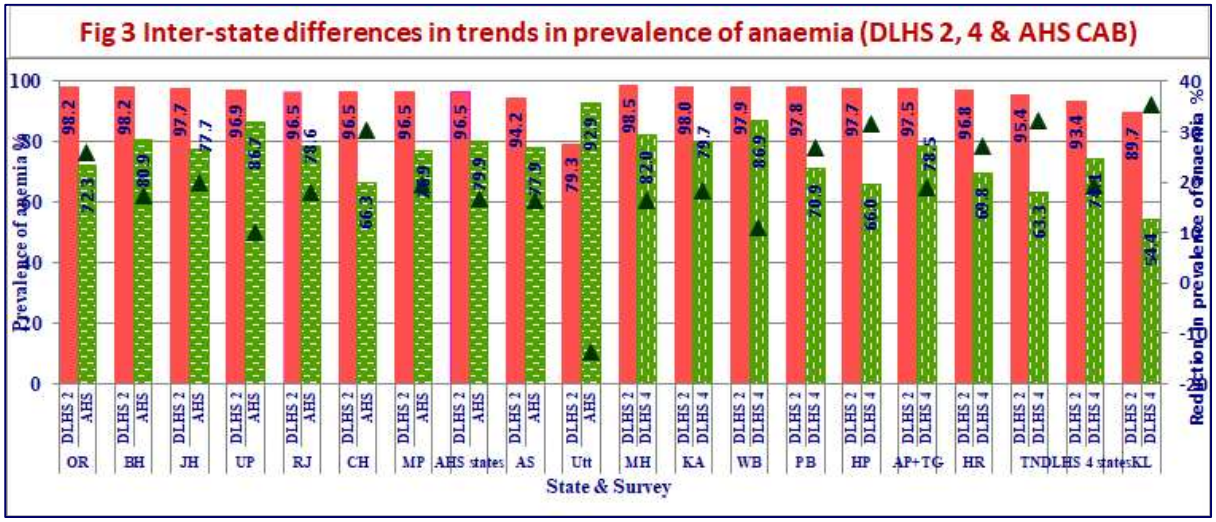


The prevalence of anaemia at national level in pre-school children was high in NFHS 2, 3 and 4 (Fig 1). There was a 5% increase in the prevalence of anaemia in the 6-35 months age group in NFHS 3 as compared to NFHS 2. There was a 10% reduction in the prevalence of anaemia in under-five children in NFHS 4 as compared to NFHS 3. There were substantial



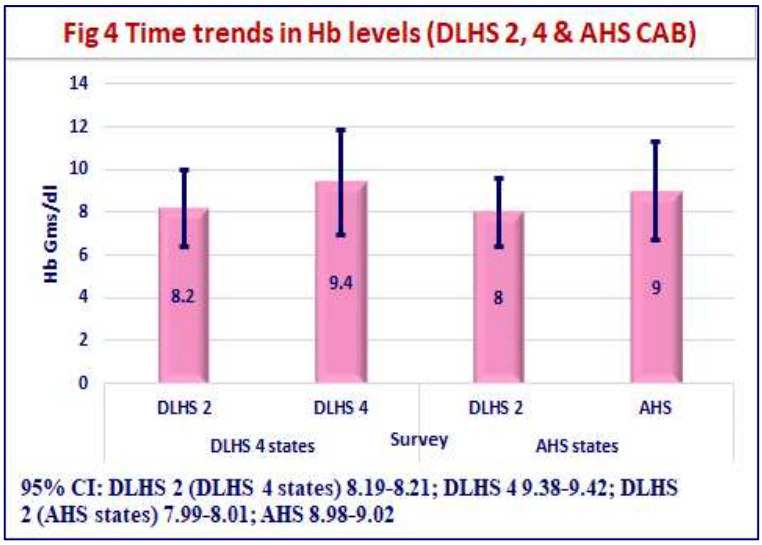
inter-state differences in the prevalence of anaemia in all the three surveys (Fig 2). The prevalence of anaemia in the Southern and Western states was lower as compared to the Central and Northern

states both in under-three and under-five children across all the three surveys. The prevalence of anaemia in under-three children was higher in NFHS 3 as compared to NFHS 2 in most but not all states. The prevalence of anaemia in under-five children was lower in NFHS 4 as compared to NFHS 3 in all the states though the magnitude of reduction varied between states.



The data of prevalence of anaemia in under-five children in DLHS 4 states in DLHS 2 and 4 and prevalence of anaemia in AHS CAB states in DLHS 2 and AHS CAB are shown in Fig 1. The prevalence rates in under-five children in AHS CAB states were higher as compared to those in the DLHS 4 states. There was a 20 % reduction in the prevalence in DLHS 4 states and a 15% reduction in AHS CAB states as compared to DLHS 2 data.

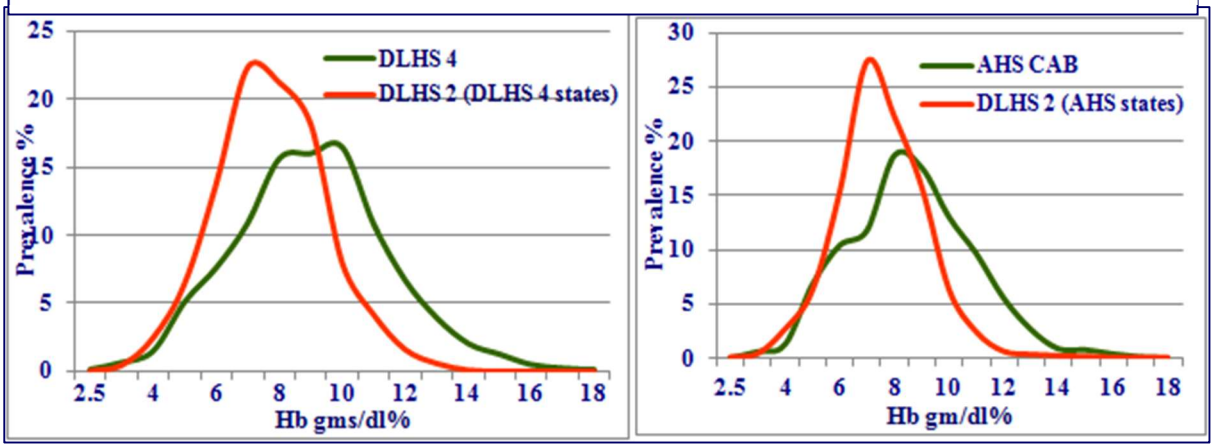
Trends in inter-state differences in the prevalence of anaemia in under-five children in DLHS 2 versus AHS CAB and DLHS 4 states are shown in Fig 3. There were substantial inter-state differences in the prevalence rates in all the three surveys. The prevalence rates were lower in DLHS 4 states as compared to AHS CAB states at both the time points (Fig 3). In all states except Uttarakhand the prevalence of anaemia was lower in DLHS 4 and AHS CAB.



The mean Hb values in DLHS 4 and AHS CAB states are shown in Fig 5. The levels in DLHS 4 states were higher as compared to AHS CAB states in both time periods. As compared to Hb levels in DLHS 2, there was an improvement in mean Hb of about 1.3 g/dL in the DLHS 4 states and 1g/dL AHS CAB states.

The frequency distribution of Hb in under-five children in DLHS 2 was compared with those of Hb distribution in DLHS 4 states and AHS states respectively. There was a clear shift to the right in the frequency distribution of Hb both in DLHS 4 states and AHS states (Fig 5).

Fig 5 Frequency distribution of Hb in DLHS 2 and 4 and DLHS 2 and AHS CAB



Policy and programme implications

NFHS 2, 3, and 4, DLHS 2, 4 and AHS CAB survey have undertaken Hb estimations at various time points between 1999 and 2015. Data from the NFHS surveys suggest that the prevalence of anaemia was only about 75% even in 1998-99, and that it had declined to 55% in 2015. The reason for the higher prevalence of anaemia as per NFHS 3 data is not clear. This might at least in part be due to the problems in the method (Hemocue) used for Hb estimation.

DLHS 2, and both DLHS 4 and AHS CAB (in their respective states) had shown a much higher prevalence of anaemia in 2002-04; the years between 2002 and 2015 have shown (a) substantial reduction in the prevalence of anaemia, (b) increase in mean Hb, and (c) a shift to the right in frequency distribution of Hb. It is reassuring to note that, despite continued poor coverage under the IFA supplementation programme, there has been an improvement in Hb status of pre-school children. Over the last four decades there has been substantial improvement in per-capita income and reduction in poverty and improvement in household food security; access to health care for malaria and hook worm infestation has improved and there has been a slow but steady decline in under-nutrition rates. It is possible that the observed reduction in anaemia might be part of the overall improvement in nutrition and health status of pre-school children.

Policy and programme implications

Data from all the surveys clearly show that, despite the evident improvements, the prevalence of anaemia in pre-school children continues to be unacceptably high. The major factor responsible for this is the low dietary intake of iron and folic acid. Efforts have to be made to ensure sustained increase in the intake iron-folate-rich vegetables. ICDS envisages that there should be at least 50 gms of micro-nutrient-rich vegetables in the hot cooked meal. This however is seldom implemented. DWCD has mandated that iron-fortified iodised salt should be used in cooking the meal. This is also not universally practised. Coverage under the anganwadi based weekly IFA supplementation has been very low. Given this context, it would appear that advocacy for wide-spread use of iron-fortified iodised salt is likely to be the most sustainable method of increasing the iron intake of preschool children. Effective implementation of a comprehensive package of interventions consisting of dietary diversity, use of DFS, and weekly IFA supplementation as recommended in the NIPI guidelines is urgently needed to achieve rapid and sustained reduction in anaemia.