

## Persisting Malnutrition in Chandigarh: Decadal Underweight Trends and Impact of ICDS Program

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Decline in malnutrition levels has been dismal since the 1990s. We ascertained decadal trend in childhood nutritional status between 1997 and 2007 in Chandigarh, India and assessed impact of Integrated Child Development Services (ICDS) on childhood undernutrition. A total of 803 under-five children, 547 children between 12-23 months age, and 218 women with an infant child were recruited for the study. Findings of present study were compared with another methodologically similar study (1997) from Chandigarh and Reproductive and Child Health Rapid Household Survey (1998) to draw decadal trends. Prevalence of underweight among under-five children remained almost stagnant in the last one decade from 51.6% (1997) to 50.4% (2007). There was insignificant difference ( $P=0.3$ ) in prevalence of underweight among children registered under ICDS program (52.1%) and those not registered (48.4%) in 2007. Other health and service provision indicators had mixed results in the past decade. Health services utilization was poorest in urban slums.

**Key words:** *Child health, Growth monitoring, ICDS, India, Malnutrition.*

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India is currently home to more than half of world's underweight children [1,2]. According to the WHO Global Database on Child Growth and Nutrition, the prevalence of malnutrition among under-five children in rural India fell from over 70% in the late 1970s to below 50% at the end of the 1990s, for both underweight and stunting measures [3].

However, the trend of decline in malnutrition levels has not been very encouraging since the 1990s. Recently, a strong Government commitment is voiced in its various policy documents and programs for child health and reducing undernutrition, in particular [4,5]. There is also a renewed impetus on universalizing the Integrated Child Development Services program (ICDS) in India. The present study was thus conducted to ascertain

decadal trend in childhood nutritional status between 1997 and 2007 in Chandigarh, India and to assess impact of ICDS program on childhood undernutrition.

### METHODS

Data for the present study were collected from April to August 2007 using a multistage stratified random sampling. A total of 45 *Anganwadi centres* (AWCs) in Chandigarh were selected, 15% each from urban (8), rural (16) and urban slum (21) centers. A sample size of 769 children under five years was estimated to ascertain underweight, assuming a prevalence of 5% severe under-weight (with worst acceptable result of 3.5%) at 5% significance level. Using systematic random sampling, 10% children registered ( $n=441$ ) and unregistered ( $n=365$ ) under ICDS program, respectively were selected.

All the selected children were weighed with the help of Salter weighing machine (Salter England Model No 235 6S), which had a range of 25 kg with an accuracy of 100 grams. Standard precautions were taken while weighing children [6]. Children were graded into different grades of malnutrition using the Indian Academy of Pediatrics (IAP) standards and the new WHO child growth standards of weight for age.

Coverage of routine immunization was evaluated by interviewing 547 mothers having children between the age group of 12 to 23 months. Data on reproductive and child health service delivery was obtained from 218 mothers of infant. All women with first order child delivered in a duration of <1 year from the date of survey were interviewed using a semi structured questionnaire to evaluate the coverage of provision of maternal and child health service, nutritional counseling and health education.

We adopted an ecological study design to determine trends. Findings on underweight among under-five year old children from present study was compared with results of a previous research with similar methodology conducted in Chandigarh in 1997, Base line study [7]. Determinants of childhood malnutrition were compared with those from Reproductive and Child Health- Rapid Household Survey (RCH-RHS) [8], and decennial Census surveys [9]. Underweight prevalence rates were compared between children by registration status under ICDS program, to elicit impact of ICDS program on nutritional status of children.

Data were analyzed using Epi Info statistical software version 3.2. Since the 1997 study used IAP classification to grade malnutrition, severity of underweight in the present study was graded according to IAP classification using the growth charts being used under ICDS program. Prevalence of malnutrition by WHO child growth standards has been published elsewhere [10]. Trend analysis using 1997 data on underweight and present study results was performed and statistical significance computed using chi-square test for trend at 5% significance level.

## RESULTS

Majority of children recruited in both the studies (present study, 43.5%; baseline study, 40.7%) were in 3-6 years age group. (55.2% and 55.9% males, respectively). A significantly higher proportion of children in the baseline study (68.9%) were registered under ICDS program compared to 54.7% children in present study ( $P < 0.001$ ). The findings of present study for maternal health service provision were compared with RCH- Rapid Household Survey (RCH-RHS), conducted in 1998. No significant difference was found among maternal characteristics according to sex of the child and maternal education.

Prevalence of underweight among under-five year old children remained almost stagnant in the last one decade from 51.6% (1997) to 50.4% (2007) (**Table I**). In the present study, prevalence of underweight among children registered under ICDS program (52.1%) and those not registered (48.4%) was not significant. However, proportion of fully

**TABLE I** DECADAL TREND OF NUTRITIONAL STATUS AMONG 0-6 YEAR CHILDREN, CHANDIGARH, 1997-2007

Weight for age	Number of children (%)							
	0-1 year		1-3 year		3-6 year		Overall	
	1997	2007	1997	2007	1997	2007	1997	2007
Normal	140 (58.8)	122 (72.2)	248 (47.3)	118 (41.4)	234 (44.6)	158 (45.3)	622 (48.4)	398 (49.6)
Grade 1	67 (28.1)	26 (15.4)	196 (37.4)	106 (37.2)	171 (32.6)	117 (33.5)	434 (33.7)	249 (31.0)
Grade 2	19 (7.9)	16 (9.5)	68 (12.9)	48 (16.8)	88 (16.8)	66 (18.9)	175 (13.6)	130 (16.2)
Grade 3	9 (3.8)	5 (3.0)	8 (1.5)	13 (4.6)	18 (3.4)	7 (2.0)	35 (2.7)	25 (3.1)
Grade 4	3 (1.3)	0	4 (0.8)	0	13 (2.5)	0	20 (1.6)	0
Total children	238	169	524	285	524	349	1286	803

immunized children was significantly higher ( $P<0.001$ ) among children enrolled under ICDS program (90.2%) as compared to non-enrolled (79.1%).

Stratified results for coverage of health care services according to geographic area (urban, rural and slum) revealed that coverage of all reproductive and child health services were significantly lower in urban slums ( $P<0.05$ ), except TT-2 coverage, fully immunized children and enrolment under ICDS program (**Table II**).

## DISCUSSION

We found that despite major strides made in economic progress reflected in per-capita income of Chandigarh (increased from Rs. 19,761 in 1994 to Rs. 60,105 in 2004), malnutrition continues to remain a public health problem, with half the children being underweight. This finding assumes significance when viewed in light of increasing unplanned urbanization, proliferation of urban slum population, and mixed progress in health services

provision. Moreover, ICDS program is not associated with better nutritional outcomes.

NFHS surveys also report similar findings for malnutrition [2,11-12]. Malnutrition levels have increased in neighboring state of Haryana from 35% to 42% between NFHS 1(1992-93) and NFHS 3 (2005-06), respectively. Punjab recorded a decline in underweight prevalence from 46% to 27% in the corresponding period. However, much of this progress was reported between 1992-93 to 1998-99, with underweight prevalence stagnating from 29% to 27% in 1998 and 2006, respectively.

Given the stagnating underweight prevalence in Chandigarh and at the National level, it becomes imperative to understand the context of the situation. An economic boom alone is not likely to yield the dividends. Moreover, the present study shows geographic inequities in service utilization for reproductive and child health. Urban slums have poorest process and impact indicators. Another study from Chandigarh also demonstrated an inequitable service provision in urban slums [13]. This is

**TABLE II** TRENDS IN DETERMINANTS OF CHILDHOOD NUTRITIONAL STATUS 1998-2007

Determinants	1998 <sup>#</sup>			2007 <sup>*</sup>			
	Urban	Rural	Total	Urban	Rural	Urban Slum	Total
Low birth weight	12.8	0	12.6	17.6	15.2	41	26.3
Exclusive breast feeding (4mo)	81.9	100	83.6	73	46.8	46.1	50.9
Exclusive breast feeding (6mo)	NE	NE	18.9	38	43.1	37.2	
Maternal health services							
ANC checkup ( $\geq 3$ )	79.3	7.1	73.3	96.4	91.2	53.8 <sup>†</sup>	74.7
TT injections (2)	72.9	42.8	70.4	97.3	100	97.0	98.2
IFA tablet consumption ( $\geq 100$ )	66.4	7.1	61.5	47.3	42.7	26.0 <sup>†</sup>	35.7
ANM visit	10.9	7.1	10.6	18.9	26.2	04.3 <sup>†</sup>	32.9
Breastfeeding counseling	68.5	57.1	67.6	83.8	65.8	55.9 <sup>†</sup>	63.8
Child health services							
Fully immunized	67	16.6	67	89	88.6	81.7	85.4
Birth weight recorded	70.3	14.3	65.7	94.6	83.5	60.8 <sup>†</sup>	74.8
Coverage under ICDS	NE	NE	NE	61.3	50.6	43.6	49.7
Diarrhoea cases treated with ORS	55.5	0	35.7	48.7	44.2	19.3 <sup>†</sup>	33.3

<sup>#</sup> Reproductive and Child Health Rapid household survey report findings (except literacy and income); <sup>\*</sup> Present study findings (except literacy and income); <sup>†</sup>  $P$ -value  $<0.05$  (urban, rural and slum difference; 2007); NE: not evaluated.

### WHAT THIS STUDY ADDS?

- No significant change was found in the prevalence of malnutrition in children in Chandigarh compared to a similar study done in 1997.

especially pertinent in view of rising growth of urban slums [14]. Together, these findings suggest that there is a need to re-orient the focus of ICDS program towards a meaningful process of growth monitoring that involves mothers and builds their capacity for child feeding. Secondly, services need to be strengthened in the urban slums for better outreach and effectiveness.

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