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Nutritional Status of India's Children

Has it Improved in Recent Years?

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During the years that have elapsed since her Independence, India has registered impressive progress in many fields of national activity — agriculture, industry and technology. How have these remarkable developments been reflected in the health and nutritional status of her children? Since Human Resources Development is fortunately now being emphasised as the ultimate goal of the national development process, at the highest levels of the Government, this question acquires relevance.

Child Mortality

Infant and child mortality rates are conventional indices of child-health status. Since by and large, high infant and child mortality goes hand in hand with high prevalence of undernutrition, mortality trends are useful indicators.

The overall infant mortality rate (IMR) for the country declined from about 160 in 1945 to 146 in 1960 and to 120 in 1981. Child death rate (one to four years) declined from 26 in 1960 to 17 in 1981. These figures apparently reflect some improvement; but, in order to assess the adequacy and significance of such improvement, we must take a look at corresponding figures from some of the developing countries in our neighbourhood (Table 1). Viewed in this context, our performance thus far with respect to reduction in infant and child mortality, in the country as a whole, may not merit wild jubilation. Mortality trends from a few States certainly reveal some bright spots (e.g. Kerala and Punjab); but these are swamped by the depressing picture presented by the populous Hindi heartland. Clearly, if we have to achieve levels of IMR and child mortality consistent with our proclaimed goal of "Health For All by 2000 A.D.", we have to do a lot better in the next 15 years than we have done during the last 40 years.

Child Nutrition

The outstanding manifestations of undernutrition in children are: (1) retardation of growth and development; and (2) specific nutritional deficiency signs. Of the latter, protein-calorie malnutrition, vitamin A deficiency (nutritional blindness), iron-deficiency anaemia, and goitre are the most important and widespread. We may now briefly examine such evidences as are available, to identify trends, if any, with respect to the order and severity of these manifestations over the last few decades.

Table 1: Infant and Child Mortality Rates

Indicators	India	Sri Lanka	Thailand
IMR			
1960	146	70	100
1981	120	43	50
Child Mortality			
1960	26	7	13
1981	17	3	4

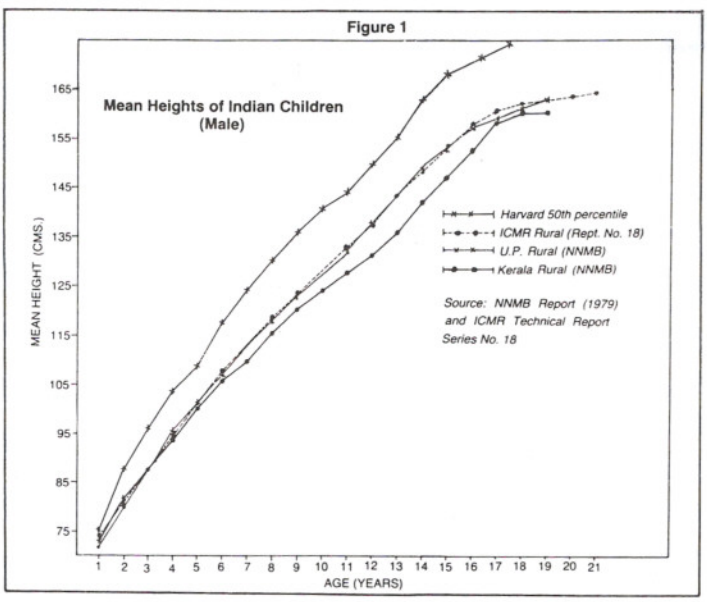
Growth and development: The two major national studies that provide valuable data on growth and development of children in the country, at two points of time separated by nearly 20 years, are: (1) the ICMR study on "Growth and physical development of Indian infants and children (Technical report no 18), which started in 1956-57 and (2) the National Nutrition Monitoring Bureau (NNMB) "Report for the year 1979". Both these studies have been carried out under the leadership of the National Institute of Nutrition by competent teams using standardised methodology, and may therefore be considered as perhaps the most authentic and representative data available. The sampling designs adopted in the two studies were not identical. The first study covered a total of 1,27,866 children between the ages of one and 21 years drawn from 11 states of the country; the distribution of the subjects as between urban and rural areas was in the ratio of 5:3. On the other hand, the NNMB studies, the major part of which covered the rural population, provide data on children between birth to 19 years, over a six year period (1974-79) drawn from 10 States of the country.

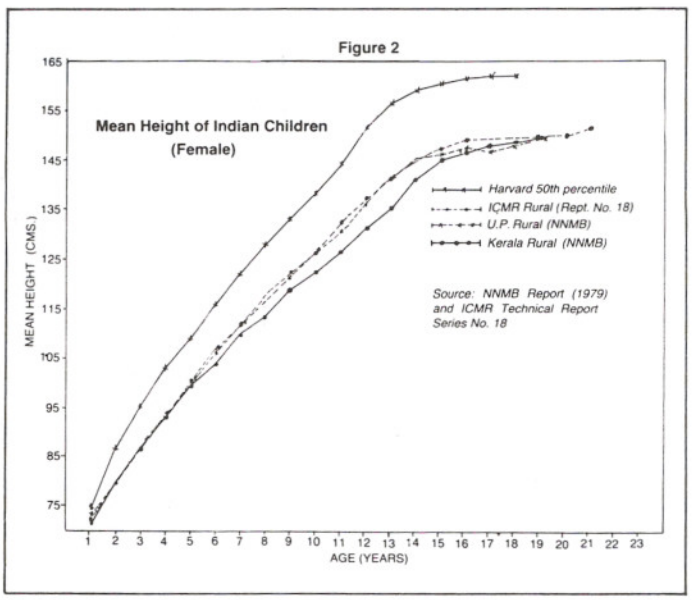
NNMB has also collected valuable data on children from urban areas belonging to different socio-economic groups (NNMB Report on Urban Population — 1984). Despite differences with respect to coverage and sampling design, considering the large number of populations covered by both studies, it is reasonable to assume that they had both largely succeeded in capturing representative samples of rural and urban populations of the country. Comparison of the rural NNMB data with the data on rural children gathered in the earlier study and comparison of the NNMB data on the poor of urban slums with those of

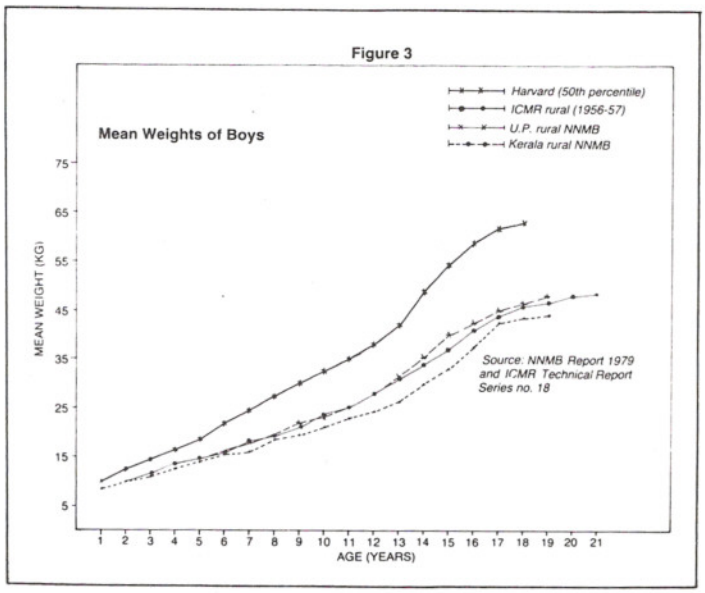
the urban poor in the earlier study, could therefore be considered justifiable. In Figures 1, 2, 3 and 4, such comparison has been attempted.

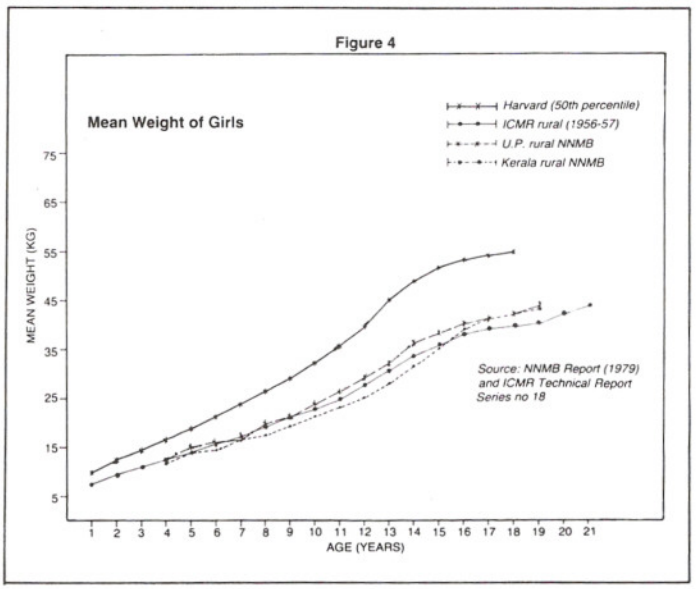
In Figures 1 and 2, the data on heights of rural male and female children obtained in the ICMR study starting in 1956-57 have been compared with those of Kerala and Uttar Pradesh in the NNMB report of 1980. Since NNMB unlike the earlier ICMR study has published its data for the rural population for each State covered by it separately (and not for all States collectively) data on two States (Kerala and U.P.) alone are included in the figures but the data from other States covered in the NNMB studies are either similar to the U.P. data or lie between the U.P. and Kerala data. It will be seen that the years that had elapsed between the two studies have made practically no difference whatever to the growth status of poor children who continue to exhibit the same order of growth retardation (see standard in the figure for comparison). In Figures 3 and 4 it will be noticed that there is little difference with respect to weight for age of children between the two studies. Poor Indian children whose weights for age roughly corresponded to 75 percent to 80 percent of the Harvard scale in the first study continued to exhibit the same degree of growth retardation in the second study as well. In Table 2, data for heights of boys and girls of the so-called class VI (the poorest income group which included urban slum children) in the earlier ICMR study have been compared with those of boys and girls of urban slums of the more recent NNMB study. It will be seen that the growth status of urban slum children of today is, if anything, worse than that of the poorest children in the country some years ago. Comparison of the heights of poor Indian children in 1957 (K.S. Rao *et. al. WHO Bulletin 20. 603. 1959*) and in 1978 (NNMB) had also shown that the latter were certainly no better (perhaps slightly worse off) than their counterparts twenty years ago (C. Gopalan: *'Nutrition and Health Care'. Nutrition Foundation of India Special Publication Series 1, 1984. p.13*).

In all developed countries of the world during their transitional stage of development among poor communities (and indeed even among affluent sections of our own country) there has been a continuous and steady trend towards increase in heights and weights of children in successive generations (secular trend). With improvement of socio-economic conditions and removal of dietary constraints which inhibit growth









and development, the genetic potential for growth finds increasing expression in successive generations. The secular trend ceases once the genetic potential has found such full expression. This has happened in all countries of Europe and North America. It has also happened and is happening among children of affluent sections in India. However, as our data show the poor children have apparently remained where they were. Debates on 'poverty line' and how it has (or has not) moved up or down become irrelevant in the light of this direct evidence.

Recent intensive studies carried out under the auspices of the Nutrition Foundation of India among tribal populations, rural communities and urban slums in Madhya Pradesh and West Bengal (to be published) indicate that the nutritional status of children in some parts of the country may indeed be actually even worse than what is indicated by the NNMB data.

Prevalence of 'severe malnutrition' in children:

According to the conventional (widely used) Gomez's classification, children with weight for age less than 60 percent of the standard are considered 'severely malnourished'. Applying this criterion, NNMB had computed that the percentage of 'severely malnourished children' between 1969 and 1975 ranged from 18.0 to 21.8 percent. Figures from 1976 onwards show a 'lower percentage' (8.5 percent or less). The abrupt "decline" in the percentage of severely malnourished from 21.8 percent in 1975 to 8.5 percent in 1976 and onwards was unfortunately *not* due to a spectacular improvement in the nutritional status of children but due to the fact that NNMB suddenly decided to switch over to a lower standard of normalcy for the computation of severity of malnutrition. The new NNMB standard chosen by NNMB on the basis of limited studies among children in and around Hyderabad is significantly lower than the conventional international standard (50th percentile of Harvard standard). The 'decline' in 'severe malnutrition', under the circumstances must be considered as a resultant spurious artefact. However, with the same new standard, the NNMB data show decline in the prevalence of 'severe malnutrition' from 1976 onwards without corresponding significant change in the growth status of the children. This could mean a reduction in the "tip of the iceberg" — an impact of nutrition intervention and relief programme directed to the severely malnourished children. However, a judgement as to whether even this is a true reduction must wait. The NNMB studies are designed as five-year cycles, the survey of a given region being completed in five annual instalments, villages surveyed in successive years not being the same. For this reason, comparison of data between five-year cycles will alone be really valid.

Table 2: Comparison of Mean Heights and Weights of Children in Two Studies

Age (yrs.)	Weights (kg.)				Heights (cms.)			
	Boys		Girls		Boys		Girls	
	1	2	1	2	1	2	1	2
4	13.0	12.5	12.4	12.0	94.5	92.6	93.0	91.1
7	17.6	16.5	17.2	16.4	113.3	109.1	111.8	104.8
13	31.1	27.0	31.2	29.6	143.4	137.6	141.9	138.6

1. ICMR (1956-57) Class VI Group
2. NNMB Urban Slum Study 1984.

Recent ongoing studies under the auspices of the Nutrition Foundation of India in Madhya Pradesh and West Bengal (referred to earlier) among poor communities wherein the conventional standard has been employed, reveal a much higher incidence of 'severe malnutrition' in all locations under study.

Goitre: Earlier estimates had indicated that the population exposed to goitre in the country may be about 120 million. The emergence of new goitre endemic areas in recent years (e.g. Delhi was goitre-free 20 years ago and is now declared an endemic goitre region) suggests that the real figure may well exceed 170 million. By 2000 A.D., the total population in the country that would need protection from goitre may exceed 200 million. On the basis of the somewhat low prevalence of frank cretinism and deaf-mutism in children in goitre-endemic regions, we had earlier concluded that only less than one to two percent of children of goitrous mothers were vulnerable. Recent studies, however, indicate that learning disabilities and forms of mental retardation less spectacular than frank cretinism are far more widespread than we had imagined. Currently we have far more children afflicted with the effects of goitre in the country, not only in absolute terms (to be expected because of the population increase) but in relative terms as well (because of the emergence of new goitre-endemic areas).

The technology for the prevention and control of goitre (iodation of common salt) is well-known and within our competence and resources. The National Goitre Control Programme was in fact initiated in the Second Five Year Plan. The 'sad story' highlighting the shocking inefficiency with which the programme had been implemented all these years was highlighted in an earlier issue of this Bulletin (C. Gopalan: *The National Goitre Programme — A Sad Story, Bull. NFI 2.3. 1981*). Detailed recommendations for revamping the programme were also made by the Foundation (*National Goitre Control Programme — Scientific Report 1, 1983, Nutrition Foundation of India*). It is now being claimed that the Programme has been since activised. Figures set out in Table 3, based on the latest available official figures, will indicate the present trend.

We have to regretfully conclude that we have failed to make a significant dent on the goitre problem during the last 30 years.

Nutritional blindness: Keratomalacia, arising primarily from vitamin A deficiency and potentiated by protein-calorie malnutrition, has been the major cause of nutritional blindness in children, usually between one and three years of age. We have at no time had an accurate estimate of the prevalence (or incidence) of keratomalacia in the country, though the fairly large numbers of cases of the disease seen in the hospitals of the country — especially in the southern and eastern parts indicate that the disease is a major health problem in the country. Unfortunately since our hospitals, and for that matter our health services in general, reach less than 15 percent of our total population and since proper records are maintained only in a few hospitals in the country

*Table 3: Extracts from Results of the Central Goitre Survey Team **

Place	Baseline Survey		Commencement of salt supply	Resurvey	
	Year	Prevalence %		Year	Prevalence %
Himachal Pradesh					
Sirmor	1959	35.8	1963	1981	28.7
Mandi	1959	20.9	1963	1981	34.5
Punjab					
Ropoor	1969	9.3	1964	1982	45.8
Bihar					
Champaran (East & West)	1960	40.3	1964	1979	64.5 (East) 51.2 (West)
West Bengal					
Darjeeling	1963	34.5	1967	1976	35.58
Arunachal Pradesh	1960	38.0	1965	1982	26.8

**Only such centres for which fairly recent figures are available have been included.*

Table 4 : Some New Goitre Endemic Areas

	Year of survey	% Incidence
Maharashtra		
Jalna	1983	35
Aurangabad	1973	35
Amravati	1983	46.16
Wardha	1983	54.92
Buldhana	1984	49.53
Satara	1985	29.29
Gujarat		
Bharuch	1977	31.7
Valsad	1983	36.59
Kerala		
Ernakulam	1984	44.47
Mizoram	1978	68.6
Sikkim	1976	37.82

even estimates of hospital prevalence are unreliable.

Field surveys do not bring out the true incidence of keratomalacia because of the acuteness and short duration of the disease and also because, as a study by the National Institute of Nutrition showed, a high percentage of poor children becoming blind from keratomalacia die soon after, probably from neglect. Under the circumstances, the prevalence of bitot spots, the less serious ocular manifestation of vitamin A deficiency seen in older children in the community, has been taken to be a rough measure of the magnitude of the vitamin A deficiency problem (and therefore indirectly of the keratomalacia problem) in the community. The NNMB data do not show evidence of any progressive decline in the prevalence of bitot spots. Cases of keratomalacia continue to be seen in teaching hospitals with distressing regularity though, as pointed out earlier, reliable statistics as to their numbers are either not available or forthcoming.

The National Institute of Nutrition had developed a simple technology for the control of nutritional blindness through the supply of just one teaspoonful (200000 IU) of vitamin A to children under three years once in six months. This programme was included in the Fourth Five Year Plan and adequate budgetary provision for the supply of vitamin A had been made. The programme has been 'in operation' since 1970. An evaluation of the results of the programme (Vijayaraghavan, K. and Pralhad Rao, N. *Nutr. Rep. Int. 25. 3. 1982*) showed that in two-thirds of Primary Health Centres, there was evidence of some reduction in the prevalence of bitot spots. The authors list various factors responsible for "programme ineffectiveness". The statistical basis underlying this evaluation exercise has however been challenged (K. Ramachandran, personal communication). Convincing evidence that in experimental (research) situations where vitamin A had been administered with unfailing regularity to children under three years by teams of workers specially appointed for the purpose, the incidence of keratomalacia shows a decline, has been provided by other studies of the National Institute of Nutrition (Vijayaraghavan, K. *et. al. Lancet. July 21, 1984).* We may, therefore, conclude that while we have a simple and effective technology for the prevention and control of nutritional blindness, we have no convincing evidence that that technology has been effectively applied to make a significant dent on the problem of nutritional blindness

Iron-deficiency anaemia: It is now well recognised that iron-deficiency anaemia is very much a problem of children as well, and not just of women in the reproductive age period. A multicentric study carried out under the auspices of the Indian Council of Medical Research in 1965 (*Report of Working Party 1977 ICMR Tech. Rep. No. 26*) showed that as many as 62.8 percent of children between one and three years of age and 44.0 percent between three and five years had haemoglobin level less than 10.8 g percent. The results of a collaborative study carried out in 1982 under the auspices of ICMR (Report of Working Group — *Am. Journ. Clin. Nutr. 1442. 1982)* are also available (Table 5).

*Table 5: Percentage Prevalence of Anaemia in Children**

	1982		
	1-5 yrs.	6-14 yrs.	
		Boys	Girls
Calcutta	96.3	97.7	98.7
Hyderabad	66.3	52.9	63.8
New Delhi	60.9	61.5	65.7

**Report of ICMR Working Group, Am. Journ. Clin.Nutr. 1442. 1982.*

The data in the two studies are not strictly comparable, but the reasonable conclusion that appears justifiable is that the problem continues to be widespread.

Maternal nutritional status: No discussion of the nutritional status of children can ignore the important factor of maternal nutrition which determines the course of intra-uterine development of the foetus, the birth weight of the infant, the lactation performance of the mother and the further growth and development of the infant. Earlier reports have shown that nearly a third of infants in the country are of low birth weight (less than 2.5 kg.), largely attributable to poor maternal stature, and undernutrition. An ongoing study of the ICMR, according to preliminary reports, has failed to show any significant decline in this proportion of low birth weight infants. Such low birth weight infants tend to grow along a substandard growth/development trajectory to end up as stunted adults. It had been pointed out in an earlier issue of this Bulletin (Gopalan C.: *Maternal Health, Fertil-*

ity Control and Child Nutrition 6.1. 1985 Bull N 7) that NNMB studies between 1975-1979 had shown that 12 percent to 25 percent of our women between 20 to 30 years of age in different States of the country have heights less than 145 cms. and 15 percent to 29 percent weights less than 38 kg. — values considered to be indicative of pregnancy risks including low birth weights of offspring.In addition to the effect of such poor stature arising from malnutrition in their own childhood, many of them also currently subsist on inadequate dietaries and are anaemic. A recent report covering different parts of the country (*Report of Working Group Am. Jour. Clin. Nut. 1442. 1982*) indicates continued high prevalence of such anaemias in women. There is apparently no evidence of significant improvement in maternal nutritional status over the last few decades.

Emerging problems: While on the one hand we have thus made no major advances with respect to solving the old nutrition problems "of the past", new problems have emerged. The nutritional problems of children in our urban slums are gathering in magnitude; increasing unhygienic use of commercial baby foods in urban and peri urban areas by the poor who have neither the resources to buy these foods in adequate amounts nor to use them hygienically is contributing to the aggravation of the problem of child undernutrition. The salutary practice of breast-feeding is being steadily eroded to the detriment of the infant and child.

In sum, it will be reasonable to conclude that there is no evidence of significant improvement in the nutritional status of children of poor communities in the country over the last few decades.

Concluding comments: During the last three decades, we have had a highly successful Green Revolution in the country; unfortunately, the health/nutrition revolution has hardly begun. What is worse, the enormity of the unfinished tasks in the health and nutrition fields has, as yet, not been adequately appreciated. The endless (diversionary) debates on the 'poverty line' and the tiresome search for alibis and fig leaves have tended to obscure the fact that (1) by whatever reckoning, the problem of undernutrition in our children and women is massive, and continues to progressively erode the quality of our human resources, and (2) despite the fact that our Constitution specifically lays down nutritional upliftment of the people as a national objective in one of its Articles, six Five Year Plans have failed to make a significant dent on the problem.

What makes this failure even more pointed is the fact that our development programmes of the last few decades have actually greatly enhanced our *potential* ability and national capacity to combat undernutrition. We produce enough food for our growing population. No child in the country now need starve.

During the last few decades, Indian scientists have made valuable contributions towards better understanding of the nutritional problems facing the country, and even more importantly towards their solution. Thus, elucidation of the precise nature of the protein-calorie malnutrition problem and the explosion of the prevailing myth that its solution lay in the distribution of expensive protein-concentrates; the development of a simple practical procedure for combating nutritional blindness; and the development of the technology for fortification of common salt with iron were pioneering contributions of Indian scientists to the world of nutrition science. Unfortunately, these contributions have found better application and recognition outside the country than within.

If the new concern for "Human Resources Development" is not to end up as an unfulfilled slogan, it must soon be given positive content and direction. Much of the emphasis in recent proclamations on the subject has been on education and employment generation — undoubtedly the two areas of the highest importance. Investments in education and employment generation programmes cannot yield expected results in a situation in which the learning ability of children, and productivity, physical stamina and employability of considerable sections of our population are impaired through chronic undernutrition. Specific time-bound actions for bringing about sustained and durable improvement of the nutritional status of children and women, must now become the cornerstone of any meaningful future programme for "Human Resources Development".

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FOUNDATION NEWS

Project Advisory Committee Meetings: Advisory Committees of the Foundation connected with the following three projects met on November 26, 1985 at the World University Centre, Madras:

- Project on "Survey of Adequacy, Utilisation and Impact of Health Inputs Provided to Anganwadi Workers in ICDS".
- Project on investigation of the possibility of improving lactation performance of poor anaemic mothers, and growth/development of their offspring through an intensive programme of iron supplementation.
- Project on investigation of growth and development of well-to-do (normal) Indian girls during adolescence.

The Advisory Committee on the Project "Multicentric Study on Physical Growth Characteristics of Affluent Group Pre-school Children" met on December 22, 1985 at New Delhi.

Scientific Report-4 "Infant-feeding Practices with Special Reference to the Use of Commercial Infant Foods": Limited number of free copies of this report are available and will be supplied on request.

NUTRITION NEWS

The 18th Annual Meeting of the Nutrition Society of India was held on November 27 and 28, 1985 at the World University Centre, Madras, under the chairmanship of Dr. S. Varadarajan, President of the Society. Over 300 delegates from various parts of the country participated. Dr. K.T. Achaya delivered the Gopalan Oration on "Role of Fats in Indian Nutrition". The Institute of Child Health, Madras, (Director Dr. B.R. Santhanakrishnan; Professor of Clinical Nutrition of the Institute, Dr. S. Gnanasundaram, was responsible for the successful organisation of the meeting.