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Body Composition and BMI Criterion for Indians

A.V. Kurpad

There is a clear link between body weight, or more specifically high body mass index (BMI; kg/m^2) and the risk of morbidity and mortality[1]. A high BMI is associated with several abnormalities now collectively referred to as the metabolic syndrome[2], in which insulin resistance with excessive adiposity appears to be the central pathogenic factor. Adiposity is usually inferred from the BMI; however, this may not be sufficient to fully explore relations between body fat and alterations in human health. It would appear that the body composition, rather than body weight, determines the risk for diseases associated with ageing and other chronic diseases[1], as well as mortality[3]. The BMI cut-off point that identifies the proportion of people with a high risk of non-communicable diseases (NCD) is a desirable indicator, because it will provide policy makers with information to initiate prevention programs, and assess the effect of public health or clinical interventions[4].

BMI – DISEASE RELATIONSHIP AND ITS IMPLICATIONS

The inappropriate accumulation of body fat is intrinsic to the development of chronic disease when body weight increases. The definition of overweight and obesity uses BMI (25 kg/m^2 and 30 kg/m^2 for overweight and obesity respectively) as the criterion[1]. This has been adopted globally by public health, researchers, dieticians and clinicians. There are several questions that need to be answered in this context, however.

For instance, is there a continuum of increasing risk with increasing BMI, or is there a BMI cut off that determines the risk? The analysis of most BMI–disease relationship curves will show that it is difficult to decide on a single inflection in the relationship, that defines a cut-off; so the World Health Organisation (WHO) Expert Consultation on BMI acknowledged that a continuum exists[4]. The next question is: For what outcome should the BMI cut-off be used? For example, it is not entirely clear whether BMI is a reliable predictor of a mortality outcome[5]. Other than mortality, which is a unique and easily documented outcome, does the BMI cut-off apply to all other disease outcomes? A recent study of sick leave in a Belgian workforce suggested that BMI was not a determinant of days taken off sick, while waist circumference was[6] (Tables 1, 2). The question then is, does the BMI paradigm refer to excess adiposity alone or to the location of the fat as well? This was a concern for the WHO Expert Consultation, which suggested that action points based on BMI should be refined, where possible, with measures of central adiposity[4]. A detailed discussion of the issue of fat location is beyond the scope of this paper, but briefly, waist circumference has shown to be a reliable indicator of absenteeism due to sickness[6]. While some have shown the waist – hip ratio to be a better predictor of cardiovascular mortality[7] (Figure1), others have shown that the waist and hip have independent and opposite effects on risk for cardiovascular disease[8]. Finally, if adiposity is the *sine qua non* of the BMI-disease relationship, is it better to have body fat cut-offs? The body fat percentage varies with different races and ethnicities, as well as with age and circumstance (Table 3); risk evaluations have attempted to define cut-offs for the body fat in relation to the metabolic syndrome[9].

When these issues are viewed through a prism of differing genotypes, phenotypes and hazard exposures in Indian communities (Figure 2), the fundamental question still arises: "Is it important to have specific Indian BMI cut-offs?" In order to answer this question, we need to explore the body composition (specifically body fat) to BMI relationship in Indians.

BMI – BODY FAT RELATIONSHIP IN INDIANS

Within the cause – effect paradigm of high body fat and propensity for disease, and bearing in mind the evidence indicating the increase in prevalence of cardiovascular disease and diabetes in Indians, it is necessary to demonstrate that Indians have a higher body fat for specific BMI when compared to other groups. It

CONTENTS

TABLE 1: BMI and sick leave	
Men	**Age adjusted OR**
BMI < 25	1
BMI = 25 - 30	1.12 (1.01-1.25)*
BMI > 30	1.50 (1.30-1.73)*
Women	
BMI < 25	1
BMI = 25 - 30	1.16 (0.96-1.42)
BMI > 30	1.55 (1.25-2.09)*

Source: Belstress study, IJO, 2004

TABLE 2: Waist circumference and sick leave	
Men	**Age adjusted OR**
Waist < 94	1
Waist = 94 - 102	1.13 (1.01-1.26)*
Waist > 102	1.48 (1.31-1.67)*
Women	
Waist < 80	1
Waist = 80 – 88	1.20 (0.97-1.50)
Waist > 88	1.55 (1.25-1.91)*

Source: Belstress study, IJO, 2004

TABLE 3: Percent body fat at present BMI cut-offs for overweight and obesity in different groups

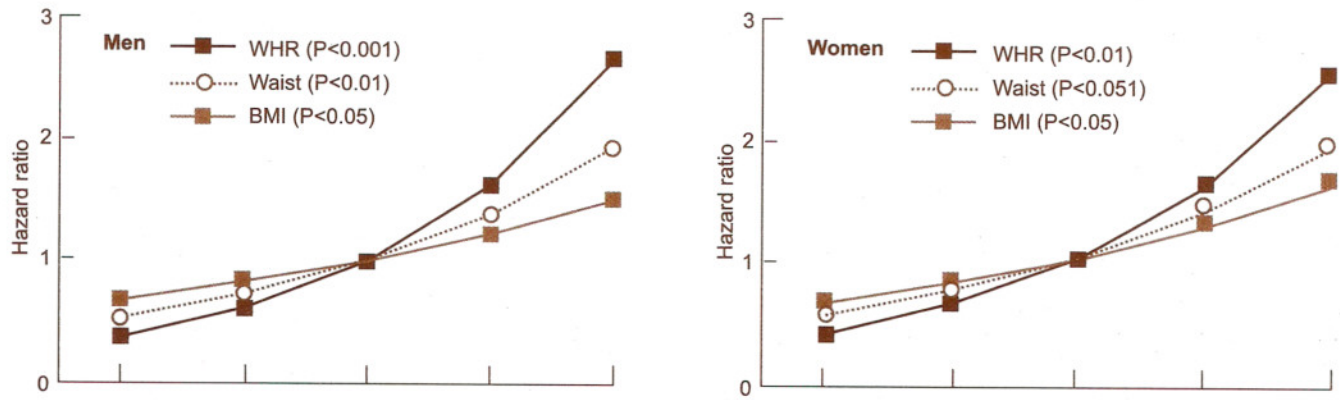
	Men					Women			
Group	**Ind.[28] Low SES**	**Ind.[26] Low / Mid SES**	**Sngpr[27]**	**White[9] (USA)**	**Black[9] (USA)**	**Ind.[28] Low SES**	**Sngpr[27]**	**White[9] (USA)**	**Black[9] (USA)**
	n=98	**n=141**	**n=163**	**n=2238**	**n=1211**	**n=89**	**n=160**	**n=2446**	**n=1417**
Method	UWW	DD	4-C	BIA	BIA	UWW	4-C	BIA	BIA
Overwt. 25 kg/m²	24	32	27	21	22	29	38	31	32
Obesity 30 kg/m²	32	43	33	29	28	36	44	37	37

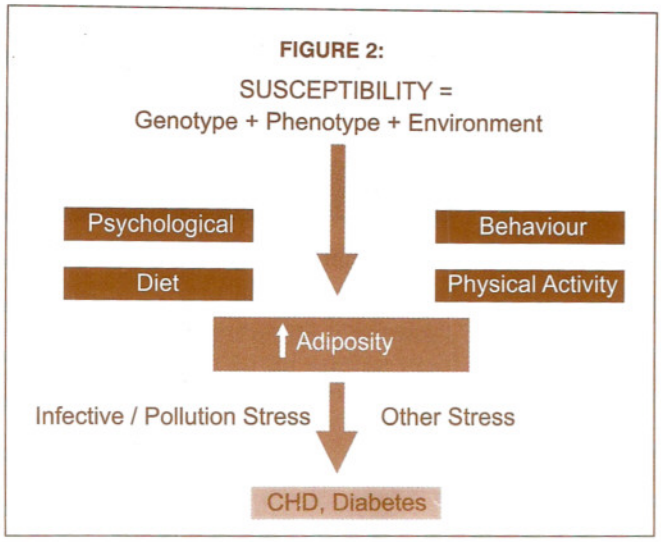
Superscripts are reference numbers.
DD = Deuterium Dilution. SES = Socioeconomic Status. 4-C = 4 Compartment Model.
Sngpr = Singapore. Ind. = Indian. UWW = Underwater Weighing.BIA = Bioelectrical Impedance.
Methods and Precisions of Measuring Body Fat Vary Across Groups.
BMI related to body fat % by logistic regression[12], multiple regression including age and sex[30], and linear regression[29, 31]. Where relevant, predictions of body fat at particular BMI's were for men or women aged 40 yrs

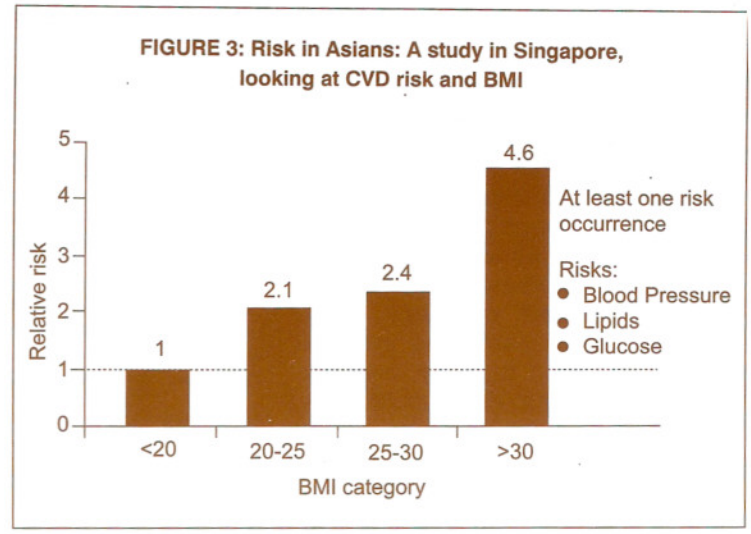
has been found that for a given BMI, Indians have more body fat than other ethnic groups, both within and outside Asia[10-14] (Figure 3). This is important, because measures of overall obesity and the location of body fat are strongly associated with insulin sensitivity in Indians[2,13].

This relative increase in adiposity in Indians has led to the suggestion that the BMI cut-off for non-communicable diseases should be reduced for Indians[11] and Asians[15] to about 23 kg/m² or lower. Recently a convened WHO Expert Committee concurred but stopped short of actually suggesting a new BMI cut-off for Indians, instead preferred to refer to it as a *public health action point* at a BMI of 23 kg/m² (Figure 4)[4]. This approach seems perfectly reasonable to define the burden of risk of chronic disease in a population, since reducing BMI cut-off values for overweight and obesity would immediately increase their prevalence rates and therefore, increase public and clinical awareness. However, is it ideal for the long-term prevention of disease? If the etiological framework of an increased slope of the BMI – body fat is correct, then the critical preventive measure would be one that *reduced the slope of this line,* rather than one that reduced the cut-off on the pre-existing line. Health professionals are enthusiastic advocates of weight loss, and at an individual level, this approach will be strengthened by the reduction of the BMI cut-off. Recent evidence suggests that body fat is more closely linked to physical activity than energy intake[16]. In effect, this means that the efforts of health professionals should be directed towards a weight management program that heavily emphasizes physical activity rather than diet control alone,

FIGURE 1: Cardiovascular disease deaths





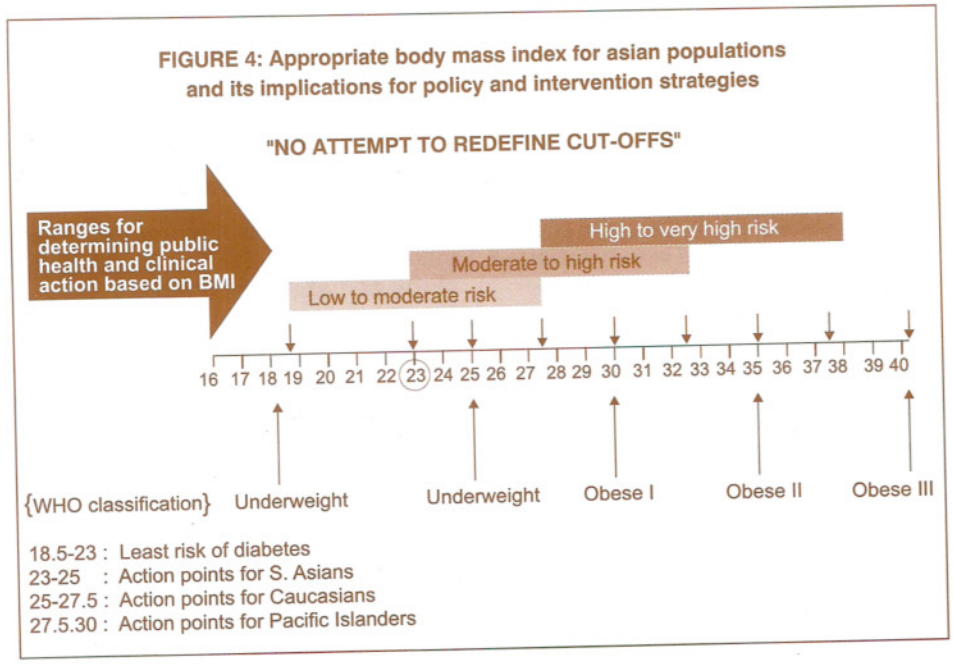


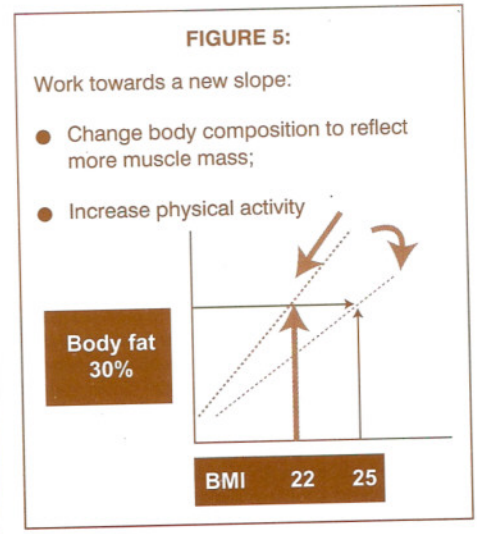
with the goal of the restoration of a physiologically favorable body composition balance (Figure 5). In this case the BMI cut-off becomes less relevant, but studies are required to assess if this is hypothesis is correct. This concept is also underlined by an analysis of all cause mortality rates in two epidemiological studies, which showed that weight loss in individuals who were not severely obese, was associated with increased mortality rates, while fat loss was associated with decreased mortality rates[17]. The absolute relevance of the BMI cut-off then needs to be considered with some skepticism.

SKELETAL MUSCLE: THE "OTHER" PART OF THE BODY COMPOSITION.

It is possible that body compositional factors other than the total body fat, or its location, may predispose to lowering of insulin sensitivity, particularly in populations with low levels of obesity. It has been speculated that the insulin resistance in Indians may be partly due physiological and structural alterations in muscle linked to a poor nutritional status[2]. In a simpler framework, a lower total body muscle mass, which has an independent effect on insulin sensitivity and glucose disposal, could also determine the risk for developing insulin resistance[18]. Studies on Indians and Asians have indicated that they have a relatively low muscle mass[19,20], which is compounded by chronic undernutrition[21]. In India, a nutritional and lifestyle transition resulting in high fat intakes[22], coupled with a low physical activity[23], would not only increase total body fat mass, but may also result in a relatively lower body muscle content. This could also explain the finding that Indian men with a normal BMI have lower insulin sensitivity when compared to Caucasian men, independent of their body fat content or location[24].

The important implication of the association of muscle is in terms of the BMI reduction aim of preventive health messages. Particularly in the context of transition societies, it is likely that weight changes in individuals or populations might mask an underlying or pre-existing low muscle mass, which would progress independently as aging occurred in the population[25]. It is therefore possible that the application of a lowered 'healthy' BMI cut-off of 23 kg/m² to individuals may lead to both fat and muscle loss, with potentially deleterious consequences for health[15]. It seems reasonable to propose that an ideal population endpoint would be the achievement of a lower body fat (and a higher muscle) content for a given BMI, rather than simply a lower BMI. This can





only be achieved through the recommendation of higher physical activity and exercise levels in the population. The emphasis on the body muscle to fat ratio represents a paradigm shift from the body fat and BMI relation that forms the current framework for defining BMI cut-offs. While the role of body fat and its location are very important in increasing the risk for NCD, the present paradigm would suggest that in normal to low BMI groups, attention to body composition, in particular to the muscle mass, as well as the reduction of central adiposity, is a useful addition to simply lowering the BMI cut-off for health.

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References

1. WHO. Obesity: Preventing and managing the global epidemic. Report of a WHO consultation. *WHO Technical Report Series 894*, Geneva, 2000.

2. Misra A., Vikram N.: Insulin resistance syndrome (metabolic syndrome) and Asian Indians. *Curr Sci* 2002, 83:1483- 1496.

3. Allison D.B., Zannoulli R., Faith M.S., Pietrobelli A., Van Itallie T.B., Pi-Sunyer F.X., Heymsfield S.B.: Weight loss increases and fat loss decreases all-cause mortality rate: results from two independent cohort studies. *Int J Obes* 1999, 23:603-611.

4. WHO Expert Consultation. Appropriate body mass index for Asian populations and its implication for policy and implementation strategies. *Lancet* 2004, 363:157-63.

5. Stevens J., Juhaeri, Cai J., Jones D.W.: The effect of decision rules on the choice of a body mass index cut-off for obesity: examples from African American and white women. *Am J Clin Nutr* 2002, 75:986-992.

6. Moreau M., Valente F., Mak R., Pelfrene E., de Smet P., De Backer G., Kornitzer, M.: Obesity, body fat distribution and incidence of sick leave in the Belgian workforce: the Belstress study. *Intl J Obes* 2004, 28:574–582.

7. Welborn T.A., Dhaliwal S.S., Bennett S.A.: Waist–hip ratio is the dominant risk factor predicting cardiovascular death in Australia. *Med J Aus* 2003, 179:580-585.

8. Seidell J.C., Perusse L., Despres J.P., Bouchard C.: Waist and hip circumferences have independent and opposite effects on cardiovascular disease risk factors: the Quebec Family Study. *Am J Clin Nutr* 2001, 74:315-321.

9. Zhu S., Wang Z., Shen W., Heymsfield S.B., Heshka S.: Percentage body fat ranges associated with metabolic syndrome risk: results based on the third National Health and Nutrition Examination Survey (1988– 1994). *Am J Clin Nutr* 2003;78: 228–35.

10. Misra A., Sharma R., Pandey R.M., Khanna N. (2001). Adverse profile of dietary nutrients, anthropometry and lipids in urban slum dwellers of northern India. *Eur J Clin Nutr* 55:727-734.

11. Dudeja V., Misra A., Pandey R.M., Devina G., Kumar G., Vikram N.K.: BMI does not accurately predict overweight in Asian Indians in northern India. *Br J Nutr* 2001, 86:105-112.

12. Deurenberg-Yap M., Chew S.K., Deurenberg P.: Elevated body fat percentage and cardiovascular risks at low body mass index levels among Singaporean Chinese, Malays and Indians. *Obes Rev* 2002, 3:209-15

13. Banerji M.A., Faridi N., Atluri R., Chaiken R.L., Lebovitz H.E.: Body composition, visceral fat, leptin, and insulin resistance in Asian Indian men. *J Clin Endocrinol Metab* 1999, 84:137-144

14. Chowdhury B., Lantz H., Sjostrom L. (1996). Computed tomography-determined body composition in relation to cardiovascular risk factors in Indian and matched Swedish males. *Metabolism* 45:634-644.

15. WHO/IASO/IOTF. Redefining obesity and its treatment. *The Asia-Pacific perspective.* 2000.

16. Yao M., McCrory M.A., Ma G., Tucker K.L., Gao S., Fuss P., Roberts S.B.: Relative influence of diet and physical activity on body composition in urban Chinese adults. *Am J Clin Nutr.* 2003, 77: 1409-16.

17. Allison D.B., Zannoulli R., Faith M.S., Pietrobelli A., Van Itallie T.B., Pi-Sunyer F.X., Heymsfield S.B. (1999). Weight loss increases and fat loss decreases all-cause mortality rate: results from two independent cohort studies. *Int J Obes* 23:603-611.

18. Poehlman E.T., Dvorak R.V., DeNino W.F., Brochu M., Ades P.A. (2000). Effects of resistance training and endurance training on insulin sensitivity in nonobese, young women: a controlled randomized trial. *J Clin Endocrinol Metab* 85:2463-2468.

19. Lee R.C., Wang Z., Heo M., Ross R., Janssen I., Heymsfield S.B. (2000). Total body skeletal muscle mass: development and cross validation of anthropometric prediction models. *Am J Clin Nutr* 72:796-803.

20. Song M.Y., Kim J., Horlick M., Wang J., Pierson Jr R.N., Moonseong H., Gallagher D. (2002). Prepubertal Asians have less limb skeletal muscle. *J Appl Physiol* 92: 2285-2291.

21. Kurpad A.V., Regan M.M., Raj T. Vasudevan J., Kuriyan R., Gnanou J., Young V.R.: Lysine requirement of chronically undernourished adult Indian subjects, measured by the 24h indicator amino acid oxidation and balance technique. *Am J Clin Nutr* 2003, 77: 101-108.

22. Ghafoorunissa (1998). Requirements of dietary fats to meet nutritional needs and prevent the risk of atherosclerosis. *In J Med Res* 108:191-202.

23. Borgonha S., Shetty P.S., Kurpad A.V.: Total energy expenditure and physical activity in chronically undernourished Indian males measured by the doubly labeled water method. *Ind J Med Res* 2000; 111: 24-32.

24. Chandalia M., Abate N., Garg A., Stray-Gunderson J., Grundy S.M.: Relationship between generalized and upper body obesity to insulin resistance in Asian Indian men. *J Clin Endocrinol Metab* 1999, 84:2329-2335.

25. Janssen I., Heymsfield S.B. (2000). Skeletal muscle mass and distribution in 468 men and women aged 18-88 yr. *J Appl Physiol* 89:81-88.

FOUNDATION NEWS

• Clinical Laboratory

NFI has acquired sophisticated laboratory equipment, which will enable setting up of a Clinical Laboratory within the institution. This facility will help both NFI and CRNSS to expand the scope of their work.

• Study Circle Meetings

29th July 2005: Dr M G Karmarkar (Senior Advisor, ICCIDD, Centre for Community Medicine, AIIMS): Iodised Double Fortified Salt – Is It Feasible?

25th August 2005: Ms Reva Nayyar (Secretary, Ministry of HRD, Department of Women and Child Development): Nutrition and National Development.

28th September 2005: Dr Rajeev Gupta (Consultant Physician Director Research, Monilek Hospital and Research Centre, Jaipur): Risk Factors for Coronary Heart Disease- Lessons from Jaipur.

• Foundation Day

On the occasion of NFI's Foundation Day, Dr Ashish Bose will deliver the C Ramachandran Memorial Lecture. Dr Samlee Plianbangchang (RD, WHO, SEARO) will inaugurate a two-day symposium on **"Nutrition in Developmental Transition"** on November 30th, 2005 at India International Centre, New Delhi. Over 60 leading scientists are expected to participate in the symposium, the proceedings of which will be published.

• NFI's Publications released

"Anaemia in Pregnancy: Interstate Differences" - The result of the study of 7 states of India;

"Combating Low Birth weight and Intra-Uterine Growth Retardation" – showing the effect of low birth weight in pregnancy and

"Towards National Nutrition Security" - Proceedings of the Silver Jubilee Symposium.

• Annual General Body Meeting

The Annual GBM was held on September 30th, 2005.

Integrated Child Development Services (ICDS)

Prema Ramachandran

ICDS is the largest, perhaps one of the most imaginative, progressive and ambitious programmes for human resource development to be attempted by any developing country. ICDS aims at improving growth and development during the critical intrauterine period, infancy and early childhood by providing an integrated package of the nutrition, health and education services right in the vicinity of their houses to both urban and rural population. The programme was initiated in 1975 as a Centrally Sponsored Programme. The Centre bears the cost of supporting the infrastructure to implement the programme and the states bear the cost of food supplements. Over the years, the country has built up a massive infrastructure for implementation of ICDS. The present communication reviews the implementation of the nutrition component of ICDS programme for preschool children in the context of ongoing socio-economic and lifestyle transition.

TIMES TRENDS IN INFANT FEEDING AND NUTRITION

In India, steps taken for the protection and promotion of the practice of breast-feeding have been effective and breast-feeding is almost universal. However, the message that exclusive breast-feeding up to six months and gradual introduction of semisolids after that, is critical for the prevention of under-nutrition in infancy has not been communicated effectively. Data from National Family Health Survey – 2 (NFHS-2) indicated that though breast-feeding was nearly universal and mean duration of lactation is over 2 years, exclusive breast-feeding among infants in the age group of 0-3 months is only 55.2%[1]. In spite of the emphasis on the need for timely introduction of complementary food only 33.5% of the infants in the age group of 6-9 months received breast milk and semi-solid food. As a result, there is a steep increase in under-nutrition between 6-24 months[1] (Figure 1).

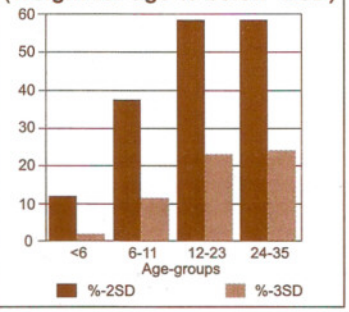
Studies carried out at the National Institute of Nutrition (NIN), Hyderabad have shown that by providing powered cereal and pulse oil seed mixtures, it was possible to improve complementary feeding and nutritional status of infants[2]. In an attempt to improve appropriate complementary feeding, a nationwide programme (*Pradhan Mantri Gramodaya Yojana* [PMGY] Prime Minister's rural development programme) for providing take-home weaning foods for one week to below poverty line (BPL) families, with infants between 7-12 months of age, was initiated in 2002-03[3]. Experience gained in the last three years indicates that making financial provisions does not result in an increase in the number of under-three children getting food supplements and improvement in timely introduction of complementary feeds. It would appear that supplies have to be regular and be backed up with adequate nutrition and health education in the anganwadi in order to achieve improvement in complementary feeding. Correction of faulty infant feeding and caring practices through nutrition and health education rather than providing supplements to BPL families might be the appropriate intervention for prevention of under-nutrition in early childhood. Infant and young children need only a tiny fraction of the food available at home to meet their nutrient needs. Data from studies in Karnataka[4] have shown that nutrition education can enable women from low-income group to meet all the requirements of infants and young children from food available at home. Strengthening the nutrition and health education component of ICDS can enable other states to replicate the results reported from Karnataka and achieve sustainable improvement in nutritional status of infants and young children. The Tenth Five-year Plan[5] has emphasized the importance of nutrition education and has set state specific goals for appropriate infant feeding practices. If these are achieved, it will be possible to achieve the Tenth Five-year Plan goals for reduction under-nutrition.

TIMES TRENDS IN YOUNG CHILD FEEDING AND NUTRITION

Surveys carried out by National Nutrition Monitoring Bureau (NNMB) have shown that over the last three decades there has not been any increase in the dietary intake of the preschool children[2]. Data on energy intake in preschool children, adolescents and adults from NNMB 2000 are shown in the Table[2]. Mean energy consumption, as percentage of Recommended Dietary Intake (RDI) is the least among the preschool children. This is in spite of the fact that RDI for preschool children forms a very small proportion (on an average 1300 Kcal/day) of the family's total intake of around 11000 Kcal/day (assuming a family size of 5).

Time trends in intra-familial distribution of food from NNMB are shown

FIGURE 1: Prevalence of undernutrition (Weight for age % below- 2SD)



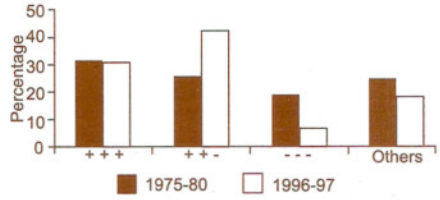
Source: NFHS-2, 1998-99

TABLE: Mean Energy Consumption- Children / Adolescents and Adults

Age Group	Males			Females		
	Kcals	RDI	%RDI	Kcals	RDI	%RDI
Pre-school	889	1357	65.5	897	1351	66.4
School Age	1464	1929	75.9	1409	1876	75.1
Adolescent	2065	2441	84.6	1670	1823	91.6
Adults	2226	2425	91.8	1923	1874	102.6

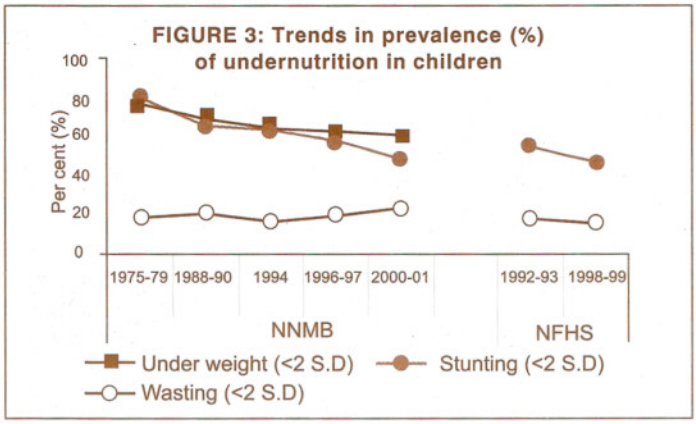
Source: NNMB, 2000.

Figure 2: Comparison of Energy Adequate Status of Preschool Children and Adults

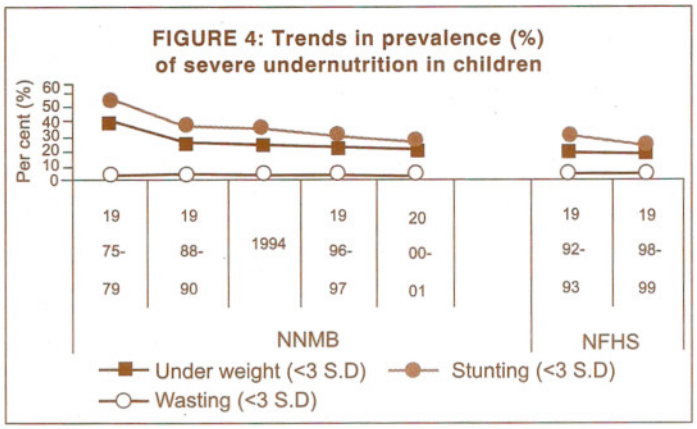


Dietary Intake	Adult Male	Adult Female	Preschool Children
+++	Adequate	Adequate	Adequate
++-	Adequate	Adequate	Inadequate
---	Inadequate	Inadequate	Inadequate

Source:NNMB, 1999



Source: NNMB, 2001

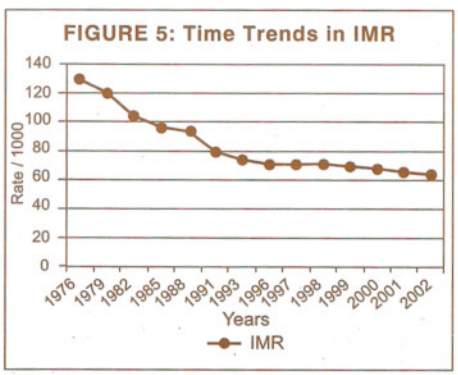


Source: NNMB, 2001

in Figure-2[6]. The proportion of families where both adults and preschool children have adequate food has remained at about 30% over the last 3 decades. The proportion of families with inadequate intake has come down substantially but the proportion of families where the pre-school children receive inadequate intake while adults have adequate intake has nearly doubled. It would, therefore, appear that economic deprivation or poverty is no longer the major factors responsible for inadequate dietary intake in preschool children. Lack of knowledge on child feeding, rearing and caring practices are major factors responsible for the low dietary intake in preschool children.

Time trends in nutritional status of preschool children from NNMB and NFHS are shown in Figures 3[7] & 4[7]. These cross-sectional data indicate that there has been a 50% reduction in under-nutrition in the last three decades. The magnitude of reduction might be higher because during this period there has been a steep fall in infant[8] (Figure 5) and under-five mortality and a number of severely undernourished children survived and contributed to an increase in the pool of under-nutrition. The reduction in infant mortality rate, under-five mortality and severe under-nutrition that the country has witnessed in the last three decades is mainly due to improved coverage and impact of ongoing health interventions. But it is a matter of concern that even now over 45% of the preschool children are under nourished[1].

Data reviewed so far indicate that currently under-nutrition in preschool children is mainly due to poor intra-familial distribution of food along with poor child feeding and caring. Therefore, nutrition education on feeding and caring for the preschool children in anganwadi is the appropriate intervention under ICDS to achieve sustainable improvement in dietary intake and nutritional status of preschool children. This should be coupled with screening of all preschool children at least once in three months for early detection of under-nutrition and providing appropriate health and nutrition care to children with varying grades of under-nutrition. If this strategy, suggested in the Tenth Five-Year Plan, is operationalised, it will be possible to achieve substantial reduction in under-nutrition.



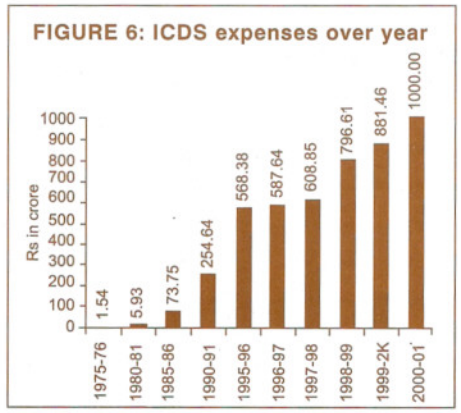
Source: SRS, 2003.

PROGRESS UNDER ICDS PROGRAMME

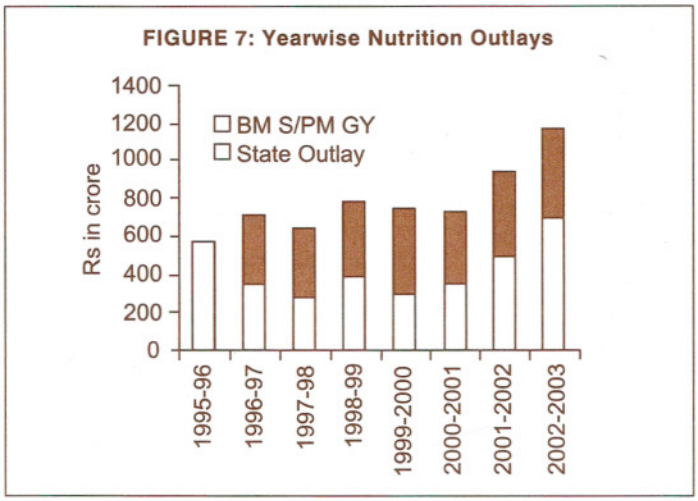
In 1975, the Department of Social Welfare initiated ICDS in 33 blocks. The initial geographic focus of ICDS was on drought-prone areas; blocks with a significant proportion of scheduled caste and scheduled tribe population, high level of under-nutrition and under-five mortality. Over the years, there has been a progressive increase in number of blocks covered under ICDS programme; in the nineties the number of blocks covered nearly doubled. Currently the programme covers almost all the blocks in the country.

Over the years there has been substantial increase in the central expenditure on the staff component of ICDS. The nineties witnessed more than two-fold increase in the central funding for ICDS; partly because of an increase in the number of anganwadi centers and partly due to an increment in emoluments of the personnel[5] (Figure 6). The Tenth Plan witnessed a near doubling of the outlays for ICDS because of the efforts to universalize ICDS and an increase in the honorarium paid to the anganwadi workers.

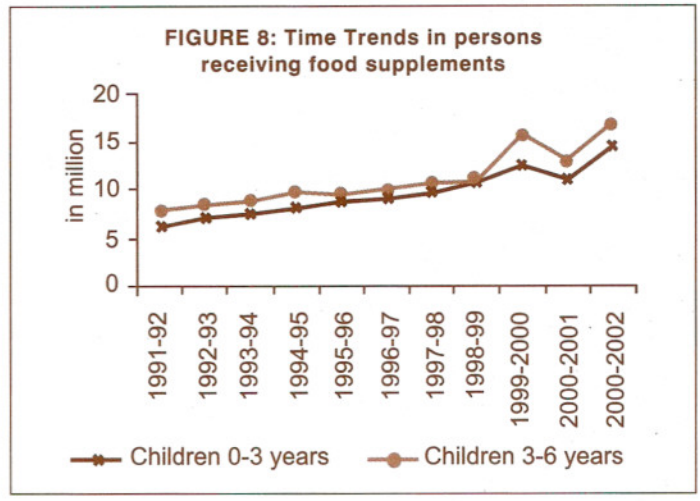
The outlay for food supplements for ICDS comes from the state budgets. Available information on plan outlays for ICDS during the late nineties indicate that there has not been any substantial increase on states own expenditure for providing additional food grains to increasing number of anganwadis established during the 9th Plan. Taking this into account the Centre provided additional central assistance (ACA) for Nutrition from 1996-97 onwards - initially under *Basic Minimum Services* (BMS) and later under Prime Minister Rural Development Programme. But during this period the states have not increased their outlays for food supplements[9]



Source: Planning Commission, 2002



Source: Planning Commission, 2003-04



Source: DWCD, 2002-03

(Figure 7). For the year 2005-06, the outlay for the Department of Woman and Child Development is over .Rs 3500 crores because the entire central funding including central contribution for food supplements has been routed through the budget for the Department.

Data on time trends in the number of preschool children receiving food supplement through anganwadi reported by the Department of Women and Child Development are shown in Figure 8[10]. **It is obvious that the increase in the number of children either in the 6-36 months age groups or 3-6 years age group receiving food supplements through ICDS during the nineties is not commensurate with the increase in the number of ICDS blocks.**

Data from NNMB surveys indicate that people are aware of the ICDS food supplementation programme. While they may not use it regularly to improve the nutritional status of their children, they do use it in times of food scarcity. Drought surveys carried out by NIN have shown that during drought (Figure 9), ICDS programme was fully utilized by the population to bridge the gaps in food supply, prevent reduction in dietary intake and deterioration in nutritional status of preschool children[11]. It would, thus, appear that the nutrition component of ICDS is well accepted by the population but it s functioning more as a social welfare programme rather than a nutrition programme.

EVALUATION OF ICDS

During the last two decades the nutritional component of ICDS programme has been evaluated by several agencies including Nutrition Foundation of India, National Institute for Public co-operation and Child Development, Government of India and World Bank[10]. Some of the major lacunae identified in these evaluations are:

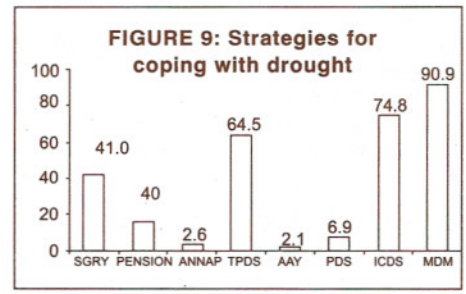
- The norms for funding of ICDS Programme are uniform. Currently it is envisaged that 102 individuals per anganwadi should receive food supplements. There is huge difference in the percentage of BPL families and birth rates not only between states but also between districts in the same state. Both these will modify the number of persons who require food supplements in the anganwadi;
- The most needy persons are not identified and food supplements are not given according to their need;
- Very few anganwadis attempt to screen all children, identify severely undernourished children and provide them with double rations as envisaged in ICDS guidelines;
- The food supply is erratic in many states. The quality and quantity of the food provided also varies;
- The preparations are not tasty and the food provided is monotonus;

Initially the emphasis was on providing cooked food through on the spot feeding in the anganwadi because it was believed that

- this would ensure that the targeted child would get food supplements, which would not be shared by other members of the family; and
- the anganwadi centres would provide practical nutrition education to women on cooking and feeding young children.

However, the on-the-spot feeding programme with hot cooked food has several disadvantages such as:

- children especially those in the age group of 6-36 months cannot consume the entire amount of food provided because of a smaller stomach capacity;
- in older children who do eat the food provided in the anganwadis, this acts mainly as a substitute, and not an addition, to the home food;
- the most needy segments, that is, children in the critical 6-36 month age group and women, who are not able to come to the anganwadis do not receive the food;
- providing food supplements only to the children from the BPL families or undernourished children is not possible as it may be difficult to feed one child and withhold food from the other in the same anganwadi;
- cooking food, feeding the children and cleaning the vessels and the anganwadi take up most of the time



Source: NNMB, 2002.

of the anganwadi workers and helpers, leaving them little time for other important activities such as growth monitoring, nutrition education and pre-school education;

- in any mass cooking and feeding programme, the monotony of the food provided and relatively poor quality of the preparations is a problem;
- cooking in poor hygienic conditions and keeping left-over food may result in bacterial contamination of food;
- under-nourished children, even those in the 3-6 year age group, if given double rations, cannot consume all the food in one sitting in the anganwadi.

ICDS IN THE TENTH PLAN PERIOD

Taking all these factors into account, the Tenth Plan envisaged that there will be a paradigm shift in the ICDS programme from untargeted food supplementation to screening of all the persons from vulnerable groups, identification of those with various grades of under-nutrition and appropriate management.

There will be focus on:

- strengthening the nutrition and health education component so that based on the requirement, there is an appropriate intra-familial distribution of food;
- weighing all children in the 0-72 month age group at least once in three months and identify those with chronic energy deficiency (CED);
- focusing health and nutrition intervention (by providing take-home supplements) to ensure that children in Grades III and IV undernutrition are in Grade II by the next quarter;
- looking for and treating health problems associated with severe under-nutrition;
- enhancing the quality and impact of ICDS substantially through training, supervision of the ICDS personnel and improved community ownership of the programme and
- concentrating on improvement of the quality of care and intersectoral coordination and strengthening nutrition action by the health sector.

CONCLUSION

In the changing socioeconomic scenario of the country under-nutrition, especially in preschool children, appears to be more due to poor infant and young child feeding and caring practices rather than poverty and lack of food at home. Nutrition and health education at anganwadi is critical for correcting the faulty feeding and caring practices and bringing about significant reduction in under-nutrition in the preschool children. Investment in nutrition and health education will pay better dividends in terms of sustainable improvement in dietary intake and nutritional status of preschool children. This should be coupled with screening of all children in 0-6 year age group for undernutrition and effective health and nutritional intervention for management of undernourished children.

There has been a long debate on the relative merits of on-the-spot feeding and take-home supplements. Food sharing appears to be inevitable in take-home supplements while substitution for home meal is the problem with on-the-spot feeding programmes. It is, thus, not possible to ensure that target child gets additional food by either of these approaches. Cost of food grains and pulses to provide 300 kcal of energy and 12 grams of protein is less than 50 paise; cooking cost for providing on-the-spot feeding ranges from Rs 1.50 to Rs. 3.00/child. It will be possible to cover larger number of children with the same fund allocation if take-home food grains are provided to the family. Take-home rations will make it possible to provide food supplementation only to undernourished children. If coupled with appropriate nutrition education, this would enable the undernourished children to consume all the food, that is, about 600kcal spread over two or more meals.

Currently the available food supplied under ICDS is shared between all the persons who come to the anganwadi. The Tenth Plan envisages that preschool children will be weighed; those who are having moderate or severe under-nutrition will be identified. Their families will be given appropriate health and nutrition education and the required take-home food supplement. If this strategy is fully implemented it might be possible to achieve 50% reduction in severe under-nutrition as envisaged in the Tenth Plan without massive increase in financial commitment.

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References

1. National Family Health Survey 1998-99, IIPS, Mumbai.

2. Report of the National Nutrition Monitoring Bureau, National Institute of Nutrition, Hyderabad, 2000.

3. Annual Plan. Planning Commission, Government of India 2002-03, New Delhi.

4. Kilaru A, Griffiths PL, Ganapathy S, Ghosh S. Community-based nutrition education for improving infant growth in rural Karnataka. Indian Pediatrics. pp 425; 42(5), 2005.

5. Tenth Five-Year Plan. Planning commission, Government of India, 2002.

6. Report of the NNMB, National Nutrition Monitoring Bureau, National Institute of Nutrition, Hyderabad, 1999.

7. Report of the NNMB, National Nutrition Monitoring Bureau, National Institute of Nutrition, Hyderabad, 2001.

8. Bulletin of Sample Registration System, 2003.

9. Annual Plan. Planning Commission, GOI, New Delhi 2003-04.

10. Annual Report. Department of Women and Child Development, GOI, New Delhi, 2002-03.

11. Report of the Drought Survey, National Nutrition Monitoring Bureau, National Institute of Nutrition, Hyderabad, 2002.

NUTRITION NEWS

• NSI Meeting

Thirty-Seventh Annual Conference of the Nutrition Society of India will be held at National Institute of Nutrition, Hyderabad during 18th and 19th November 2005.

Dr Shanti Ghosh will deliver Gopalan Oration on "For better health and Nutrition prioritise the young child. Dr Subhadra Seshadri will deliver Srikantia Memorial Lecture on "Iron Deficiency Anaemia and its consequences: A life cycle approach is critical for its control".

Two symposia will also be organized at the NSI meet:

i) Biotechnology for better Nutrition

ii) Nutrition Intervention Strategies – Role of stakeholders

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