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## Integrated Child Development Services (ICDS): An Assessment

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ICDS was initiated in India in 1975, and has thus been operational for over 17 years. It happens to be the largest single programme in the area of child development anywhere in the world. It includes services not only to children, but also to pregnant and lactating women. In this communication, an attempt will be made to critically examine the experiences gained and to identify the major achievements and shortcomings of this National Programme during the years of its implementation.

The objectives of ICDS have been stated in a number of official documents and reports<sup>1</sup>. In the ultimate analysis, the central objective is the reduction in child mortality and the achievement of optimal physical, mental and psycho-social development of India's children. The programme, initially instituted in just 30 rural/tribal blocks and three urban slums, had expanded to cover 2,460 rural/tribal blocks and 236 urban slums by March 1992. Such expansion was undertaken in the light of feedback inputs received from periodic external evaluation and internal monitoring reports. These reports not only served to highlight the achievements and successes of the programme, but also its shortcomings and deficiencies, from time to time<sup>2</sup>.

### UNIQUE FEATURES

ICDS has some important and unique features which distinguish it from several other national programmes. These can be enumerated as follows:

● It is a holistic approach to child development involving the active participation of the mothers.

● It serves the most underprivileged communities of very backward and remote areas of the country.

● It delivers services at Anganwadis (AW: village centres) right at the doorsteps of the beneficiaries to ensure their maximum participation.

● It comprises three essential components, that is nutrition, primary health care and education, delivered as a composite package of services to children and mothers.

● It utilises local women as honorary village level workers for delivery of the package of services.

● It makes maximum use of the *existing* infrastructure of health, social welfare departments and voluntary organisations for the implementation, training, continued education, monitoring, motivation, supportive supervision, evaluation and research. Only minimal additional infrastructure had been created (Child Development Project Officers, Programme Officers and Mukhya Sevikas) specially for the ICDS. The existing departments and institutions which have been used in different tasks in ICDS include: (a) the health infrastructure of the states from the Director of Health Services down to the frontline Multipurpose Worker at the subcentres; (b) the faculty of medical colleges throughout the country; (c) Indian Council of Child Welfare and other voluntary organi-

sations; (d) National Institute of Public Cooperation and Child Development; (e) the faculty of Home Science colleges; and (f) eminent experts from the specialities of health, nutrition, social services, education and child development. Medical academia drawn from medical colleges in the country had been involved in this effort, working under the direction of the Central Technical Committee (CTC)<sup>3</sup>.

● It works through a team approach, and members of the team include administrators, professionals in service departments, academicians and voluntary workers.

● It has tried to promote the culture of voluntary work and output-related honoraia for social work.

● It has primarily used the national funding mechanism with very little bilateral and international financial assistance. It is a truly Indian programme, conceived, formulated and implemented for the country by the country.

### ACHIEVEMENTS

The achievements of ICDS have been significant as indicated by evaluation and research studies. Till March 1992, 784 evaluation and 140 research

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studies had been carried out by the faculty and students of the medical colleges, besides several investigations by the National Institute of Public Cooperation and Child Development (NIPCCD), Home Science colleges, programme evaluation organisations of the Planning Commission and a few voluntary organisations. The results of these studies have been published in journals, books and monographs<sup>4</sup>.

Some salient conclusions of these studies on the impact of ICDS can be summarised as follows:

#### Nutritional status of children

There is evidence of significant decline in 'severe' and 'moderate' malnutrition in children. The former had come down in 1990 to 6.6 per cent and the latter to 18.1 per cent from 20.5 per cent and 28.9 per cent respectively in 1976. As a result of this decline in 'severe' and 'moderate' protein-calorie undernutrition, the percentage of pre-school children belonging to the combined groups of 'Normal' and 'Grade-I nutrition' had increased from 50.6 per cent in 1976 to 75.3 per cent in 1990<sup>4,5</sup>.

Several aspects related to the decline in undernutrition have been examined. It has been noted that young children belonging to special groups, namely tribals, scheduled castes, scheduled tribes and backward communities, had all shown beneficial impact of ICDS on their nutritional status<sup>5</sup>. Special multicentric research studies at different intervals during the 17 years of ICDS had confirmed that the nutritional status of children in the ICDS project areas was significantly better than that of their counterparts in areas without the benefit of the ICDS scheme<sup>6,7</sup>. Thus a study by the National Institute of Nutrition had recorded better nutrition status of children attending ICDS Anganwadis as compared to children of the same village and similar socio-economic status not utilising the services of ICDS<sup>8</sup>.

There are multiple health and nutrition intervention factors in ICDS which could have contributed to the decline in protein-calorie malnutrition. Food supplementation providing 300 calories and 10-12 gm protein daily at the Anganwadi must have been a major contributory component<sup>1</sup>. Data show that the supplementary nutrition coverage to pre-school children in the ICDS areas had increased from 25.6 per cent in 1976 to 65.7 per cent in 1990<sup>4,5</sup>. While the supplementary nutrition coverage in ICDS project

areas ranged from 61.1 per cent to 76.3 per cent, the coverage of pre-school children with supplementary feeding amounted to no more than 17.9 to 31.5 per cent in those areas where ICDS was not operational.

#### Anaemia and vitamin A deficiency prophylaxis

Six-monthly megadose administrations of vitamin A and the prevention of anaemia through the distribution of iron and folic acid are the two important national nutrition intervention programmes now being implemented in the country. However, it is agreed on all counts that the implementation of these programmes has been generally far from satisfactory. In this context, the significant improvement in the coverage of children through both these programmes recorded in the ICDS areas<sup>4</sup> is noteworthy. Thus vitamin A distribution increased from 15.0 per cent in 1976 to 45.6 per cent in 1990<sup>5</sup>; and iron and folic acid distribution has increased from 17.3 per cent to 46.9 per cent<sup>5</sup>.

#### Immunisation coverage

Immunisation coverage of children also had significantly increased in the ICDS areas<sup>9,10</sup>. It will be recalled that despite efforts in the past, immunisation coverage of village children had remained well below the desired targets, and the Government had therefore to launch the Universal Immunisation Programme in 1985 over and above the already ongoing activity of EPI. The data on the immunisation of children in ICDS project areas, as assessed at periodic intervals, provide a generally encouraging picture.

Thus the immunisation coverage (BCG, DPT and polio — three doses) in 1990 in ICDS project samples, had increased to 69.0 per cent, 67.6 per cent and 67.7 per cent respectively from the baseline of 21 per cent (1976), 4.9 per cent (1976) and 13.7 per cent (1981) respectively<sup>5,11</sup>. In a recent study, data on immunisation in ICDS projects were compared with those on control children in non-ICDS areas. Significantly, a higher coverage for the BCG, DPT (three doses), polio (three doses) and complete immunisation, was observed for children of one to two years in ICDS projects. The success of immunisation in ICDS projects was noted for both sexes, and included underprivileged communities as well<sup>9</sup>. The AWW was found to be a very valuable functionary

for the promotion of the immunisation drive of the health and family welfare department, and the credit for the better success of the immunisation programme in the ICDS area must largely go to her.

#### Antenatal care

Mother-care through augmented antenatal, perinatal and post-natal services has always been an integral part of ICDS. The coverage of pregnant women by antenatal services had shown a significant improvement in ICDS projects, as compared to non-ICDS areas. An increase from a baseline of 19.5 per cent to 82.6 per cent has been noted in areas covered by those ICDS projects which had been operational for more than five years. Administration of tetanus toxoid (two doses) was also noted to be significantly higher in ICDS (68 per cent) compared to the control (non-ICDS — 40 per cent) group<sup>9,12</sup>. Individual investigators had also found better nutritional status as measured by weight gain and haemoglobin levels of pregnant women in the ICDS project<sup>13</sup>. A substantial decline in the proportion of low-birth-weight deliveries had also been reported<sup>14</sup>.

The preference for home delivery continues to be high in rural populations, but significantly more women utilised locally available trained persons for their delivery in ICDS projects as compared to the controls<sup>12</sup>.

It has been noted<sup>12</sup> that lactating women utilised the ICDS services for improving their nutritional status (through supplementary nutrition and iron folic acid tablets), accepting family welfare advice and enhancing their knowledge, attitude and practice for the better care of their children.

#### Health care of children

There has been evidence that management of diarrhoea, respiratory infections and other minor ailments at the village, and health centres had improved in ICDS areas<sup>4,15</sup>. Personal hygiene, and to a limited extent environmental hygiene, had also improved through ICDS health education activity<sup>16</sup>. ICDS apparently also had facilitated family planning programmes in some areas<sup>17</sup>.

#### Child mortality

A decade after ICDS was instituted, evaluation studies suggested that

decline in infant and early childhood mortality rates, observed in areas where ICDS was operational, was significantly greater than the decline reported in the national data of the Sample Registration Scheme<sup>4,18</sup>. Recent data confirmed these earlier findings and show lower neonatal, infant and early childhood mortality rates in ICDS-covered populations as compared to the overall national data<sup>19,20</sup>.

Studies carried out at the National Institute of Nutrition (NIN) suggest that psycho-social development of children attending the AW was better than of those who had not<sup>8</sup>. Further, school dropout rates were lower and the educational performance better in children who had attended the Anganwadi programme<sup>21</sup>.

### FACTORS POSSIBLY CONTRIBUTING TO SUCCESS

Innovative and cost-effective approaches to the training of the functionaries at various levels, continued education, monitoring, evaluation and research have been the important factors contributing to the success of ICDS. We will briefly discuss these below.

#### Training

Training for all the functionaries in the areas pertaining to health and nutrition components of ICDS, was organised through periodic courses conducted by the paediatric and community medicine faculty members of the medical colleges (honorary consultants) nearest to the ICDS projects. The existing infrastructure facilities of the medical colleges were utilised to conduct this training<sup>22</sup>. The curriculum and the strategy for training were periodically reviewed and revised by experts and consultants at national and regional meetings. The output and needs of the training programme were closely monitored by the CTC of ICDS.

The present strategy is to focus on short introductory, and periodic refresher courses, as these are cost-effective, cause minimum disruption in the activities of health and ICDS functionaries and are conducive to their maximal participation. The participation of the Programme Officers, CDPOs and Supervisors is encouraged in each of the three types of courses.

The training schedule is flexible and consultants are free to make changes in the topics and the contents of the

training course, depending upon local needs. So far, 1,761 training courses have been held and 4,315 functionaries have received training through honorary medical college consultants.

#### Evaluation and research

Evaluation and research studies which had generated data for assessment of ICDS were carried out by a number of honorary consultants from the faculties of medical colleges. The consultants have been able to conduct the studies periodically at very low cost because they were able to use the existing material and manpower resources of their own academic departments. Apart from being cost-effective from the point of view of the ICDS operation, this strategy has also served to enrich the field experience of the medical college faculties.

It may be legitimately claimed that few other national programmes had enlisted the active involvement and participation of the academia of the medical colleges to the extent that ICDS has done. Subjects related to ICDS operation formed the basis of a large number of MD/PhD theses and scientific publications from the country's medical colleges. It was through such a mutually rewarding cost-effective strategy of external evaluation that valuable hard data on the programme could be gathered. This strategy has benefitted the programme, on the one hand, and, on the other hand, has provided rich field experience to medical students, contributing to their orientation in favour of public health programmes. National health programmes and health research systems have several lessons to learn from this valuable ICDS experience.

The data from the monthly progress reports for the field were assembled by the CTC and monthly status reports were regularly furnished to the Department of Women and Child Development. The procedure of monthly monitoring of reports by CTC was initiated as far back as 1976, and has been continuously revised and improved in the light of accumulated experience. Thus the ICDS operation has, ever since its inception, enjoyed the benefit of a Technical Support and Monitoring System developed and provided by CTC. In this operation, the medical academia of the country and the Government Department of Women and Child Welfare and CTC had throughout functioned in close concert and coordination.

CTC meetings have been held regularly every quarter to review the training, evaluation and monitoring output, and to suggest appropriate steps to improve performance. New approaches for training, continued education, evaluation, research, monitoring, etc, are also discussed at these quarterly Central Technical Committee meetings.

### SHORTCOMINGS

It is to be expected that a programme of the scale of ICDS, covering an estimated population of 246 million, distributed over 2.5 lakh villages and 225 pockets of urban slums in 25 states and seven union territories, will encounter difficulties and shortcomings in management and implementation. The wide variations in the capabilities of programme implementation infrastructure, the relatively low priority to social-sector activities in National Development Programmes, and the large proportion of honorary workers on whom ICDS is dependent, but over whom it has no effective executive control, are factors which contributed to these shortcomings. The important shortcomings and remedial measures thereto that have been identified are mentioned below.

#### Lack of adequate decentralisation

Centralised planning of the programme had failed to fulfil the special needs of the difficult areas of north-eastern, eastern and mountain regions of the country. ICDS projects in these regions showed low coverage of beneficiaries and poor impact of the services. Strengthening of the infrastructure and special location-specific strategies for management were subsequently attempted but with limited success. The important lesson from this experience is that it is necessary to institute decentralised planning for special and difficult regions of the country and to adopt a flexible strategy which permits location-specific modifications.

#### Lack of adequate intrasectoral coordination

The nodal department for the administration of ICDS is the Department of Women and Child Development (Central Government). Generally, at the headquarters of the states it is the Social Welfare Department that is the nodal department. Health and Family Welfare is a key department whose programmes need to be coordinated with the activities of the ICDS, since health

personnel at the field levels are directly responsible for the delivery of health and nutrition services to the village community. Teamwork between the ICDS and the health staff, right from the village to the highest levels at the state headquarters is essential for success. Continuous efforts over the last few years have, no doubt, improved the coordination between the two departments; but this is still much below the desired level.

Conferences designed to promote supportive supervision, monitoring and motivation of functionaries at the sector (group of 20 villages), project headquarters (community health centre), district headquarters and divisional and state headquarters are conducted at regular intervals and are closely monitored by the Central Technical Committee of ICDS. The success rate for these "coordination conferences" is about 65 per cent.

Failure of team spirit has been often noted at places where senior officers have been unable to achieve adjustment and accommodation with their counterparts of other departments. A persuasive approach and moral pressure had been used to stimulate the coordination between the functionaries at each level. Political pressure had also been applied in some instances. A new experiment of a joint coordination committee composed of official and non-official persons has also been started in the State of Orissa.

#### **Failure to accord dignity and prestige to voluntary work**

ICDS activities are highly dependent on honorary functionaries who include approximately 3,57,279 AWWs, block advisors, and consultants. Unfortunately, the honorary functionaries, specially AWWs, are often unable to get adequate rewards for their voluntary work. Respect and appreciation are the two important rewards which must be offered to honorary workers. Failure to create the culture where honorary workers feel proud of their jobs has resulted in demands for change-over to paid jobs as per labour laws.

If, as a result of this, ICDS becomes yet another purely governmental bureaucratic operation conducted by regular salaried employees, it would lose its unique character. Every effort should be made to provide career opportunities to AWWs but it is not money but the social prestige that the AWW is

able to earn that will be her real reward; and this alone will give her real emotional satisfaction. This reward can come only if there is a change in the attitude of ICDS staff towards the AWW. The latter must be treated not as a low-paid subordinate in regular government employment, but as a respected honorary social worker from the community.

#### **Disparities in incentives for honorary work**

Advisors and consultants are drawn from medical colleges and health departments in order to ensure cost-effective and competent technical expertise for ICDS implementation. A very modest honorarium related to their work is paid to this group of voluntary workers. These honoraria do not measure up to the sumptuous remuneration that several bilateral and international programmes are able to offer to their consultants. National interest demands that a uniform system of financial assistance for honorary work in all national programmes is insisted upon, irrespective of whether the programme is funded by either national, bilateral or international sources.

#### **Deficiencies in management and supply logistics**

The supply of material for services at the AW is often interrupted, and is frequently of inferior quality. The logistics of supply of supplementary food can be cited as one example. There are indeed many difficulties in the matter of ensuring continuous supply of good-quality food at the AWWs which are often located in remote and difficult areas. Intensive efforts to solve this problem are required. The approach needed may vary in different situations. The Department of Food must take the overall responsibility in this regard and develop a proper system for decentralised management of timely and regular distribution of food supplements.

#### **Inadequate emphasis on antenatal care**

Utilisation of ICDS services by pregnant women, lactating mothers and children below the age of three years has been relatively low as compared to that by pre-school-age children. Since pregnant women and infants are the most vulnerable groups, efforts have to be made for their greater participation in AW activities. Since most pregnant women and mothers of infants are oc-

cupied with their family work, they are often unable to come to AWWs to avail of health and nutrition services. Home visits by AWWs to reach this group had been stimulated; but these have not been very successful. The AWW, being a part-time honorary functionary, is unable to find much time for repeated house visits. It has been suggested that at least one day a week may be specifically fixed for providing special services to pregnant, lactating mothers and infants. This suggestion is worth experimenting with, at least in some of the ICDS projects.

#### **Inadequate performance with respect to health/nutrition education**

Health/nutrition education activity has been generally unsatisfactory in ICDS. Indeed, most of our national health programmes are weak in this regard. The AWW is able to do this job only to a limited extent due to her preoccupation with other activities at the AW. Attempts to involve Mukhya Sevikas and evolve a regular health and nutrition education activity have not really been very successful.

CTC is now considering the creation of a new cadre of honorary workers, that is, Junior Consultants from the young faculty of medical and Home Science colleges and to give them the responsibility for promoting health and nutrition education through the existing infrastructure of ICDS and primary health centres. Here is an area where the services of competent non-governmental organisations in the country could be enlisted.

#### **Failure to promote effective community leadership and participation**

ICDS, despite its strong infrastructure of honorary workers, is still functioning as a "government scheme" and has not become a "peoples' programme". Adequate information dissemination and interaction of officers of the programme with the local community is minimal in ICDS. The CTC plans to promote this activity through the proposed cadre of honorary Junior Consultants and NGOs.

### **THE FUTURE**

The CTC has been improving its own operational structure in order to provide the best possible results. It has decided upon several changes in the

present system in the light of additional inputs for child developments that have been made available through the World Bank and UNICEF and new programmes such as "Child Survival" and "Safe Motherhood" that have been started. The approach here is to avoid duplication of activities, prevent wastage of time of functionaries and save unnecessary expenditure, by suitable alignment of these parallel efforts so that they converge to a common goal instead of functioning at crosspurposes.

To begin with, the CTC has introduced the subject of ICDS in all training programmes of medical and paramedical staff conducted through different new schemes. ICDS honorary consultants are actively involved in these training programmes. The CTC has changed its own thrust of training activity to the frontline workers through district, block and village level training programmes. Monitoring activity has also been modified by simplifying the monthly monitoring reports system from the Primary Health Centre. Duplication of writing work by AWWs has been reduced and will soon be eliminated. The CTC hopes to evolve a monitoring system which will enable the functionaries in the field to feel that they are working for "child development" rather than for a narrow isolated component of the operation.

The CTC also hopes to simulate efforts in the following directions:

- Establishment of a Federation of "Academic Associations and Voluntary Organisations for Child Development", including organisations such as Nutrition Foundation of India, Indian Academy of Paediatrics, Nutrition Society of India, Indian Association of Community Medicine, Public Health Association of India, Home Science Colleges Association and several voluntary organisations which, in one way or another, are contributing to child development activities. It may be useful for these organisations to share their experiences from time to time and evolve better approaches for their future activities.

- Development of effective "co-ordination groups" at the state level, so that new programmes and ICDS activities can be properly coordinated in specific operational areas.

- Introduction of a new programme of health/nutrition education, community participation, and information dissemination, through a system of honorary junior child development consultants drawn from the young faculty members

of Home Science and medical colleges and NGOs.

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ICDS has been a valuable experience and it has made important contributions to child development in India. In a democratic country, with wide variations with respect to needs, infrastructure and management, wide variations in performance levels ranging from successes at one end to failures at the other, are to be expected. Professionals, administrators, and politicians have obligations towards the children of the country and must continue to contribute to the effective implementation of ICDS. ICDS should also be able to absorb such additional inputs that may be made available by international and bilateral agencies in order to expand and improve the quality of the programme, which should eventually cover almost the entire country.

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## 1. Efficacy of Megadose of Vitamin A 2. Prevalence of Diabetes in Indians

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### 1. Efficacy of Megadose of Vitamin A: The Sudan-Harvard Study

The results of the Sudan-Harvard study recently published<sup>1</sup>, should serve, to some extent, to restore a proper perspective to the debate on "vitamin A and childhood mortality". The study highlights two important points:

- that massive doses of synthetic vitamin A do *not* bring about significant reduction in child mortality as is being claimed,

- that in some situations, massive doses of vitamin A may even fail to exert a significant beneficial effect on clinical hypovitaminosis A.

The former finding is in line with the observations reported by the National Institute of Nutrition, Hyderabad<sup>2</sup>. The latter observation, which is perhaps relatively more important, is in consonance with earlier findings of Pereira and Begum<sup>3</sup> from India. Apart from the possible reason for this finding, which were discussed in an earlier communication<sup>3</sup>, other possibilities also need consideration.

It is known that the transport of vitamin A to the target tissues is conditioned by the availability of carrier protein and zinc. The possibility of concurrent zinc deficiency in children with clinical hypovitaminosis A cannot be dismissed. There is suggestive evidence of salination and alkalinisation of soils and of depletion of micronutrients (especially zinc) in soil and, consequently, in foods<sup>5,6</sup>, in many hypovitaminosis A endemic areas where populations subsist predominantly on cereal-based diets. It is even possible that the exhibition of massive doses of vitamin A could, under these circumstances, aggravate zinc deficiency. However, this needs to be investigated.

These considerations point to the advisability of not playing around with single nutrients — and more especially with massive doses thereof, in populations which may be expected to suffer from multiple nutrient deficiencies. This caution may be particularly relevant with respect to hypovitaminosis A, in the

light of the growing knowledge of nutrient inter-relationships involved in vitamin A metabolism.

It will be a disservice to persuade developing countries, whose health systems are already under great strain because of scarcity of material and manpower resources, to resort to universal repeated administrations of massive doses of synthetic vitamin A to their children as a "short-cut" to better child-survival, on the basis of currently available questionable evidence.

The proposed expansion of the use of periodic synthetic vitamin A massive dosage administration, to cover infancy and children beyond three years of age, is wholly unnecessary and ill-advised. And keratomalacia is *not* a public health problem — at least in Asia.

Apart from the studies of West *et al*<sup>7</sup> in Nepal which showed increased risk of mortality from respiratory diseases in vitamin A supplemented children, some recent studies also indicate increased incidence of respiratory morbidity in vitamin A-supplemented groups of children<sup>8</sup>. Bhaskaram *et al*<sup>9</sup> had also earlier shown significant reduction in secretory IgA after administration of 100,000 or 200,000 IU vitamin A. It is regrettable that despite these evidences, attempts are being made to push supplementation vitamin A administration as part of the EPI in poor countries of the world. This would be clearly unethical in the light of available knowledge.

The results of "meta analysis" of data from published studies have been claimed to justify the conclusion that vitamin A megadoses bring down child mortality. The scientific validity of such meta analysis exercises may be questioned. The data for such meta analysis have been derived from studies of different designs and from different regions, and are of disparate quality, not all carrying the same weight. Moreover, since the majority of studies chosen for analysis were those gathered by more or less one and the same school, the analysis must be considered "loaded" even to start with.

It would be highly risky to propose far-reaching public health policies likely

to affect the lives of millions of children on the basis of exercises of such dubious validity. Children of developing countries are no expendable guinea pigs, even if they happen to be poor.

Even with respect to currently ongoing programmes of periodic massive vitamin A dose administration to children between the ages of one and three years in hyperendemic areas, it would be wise to progressively phase them out within a reasonable time-frame, while vigorous efforts towards the promotion of an adequate intake of locally available carotene-rich foods are mounted.

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### 2. Prevalence of Diabetes in Indians: Urban-Rural Difference

Urban migration and rising affluence often tend to induce changes in the traditional dietary patterns of populations. Prominent among such changes in Indian population groups are the following:

- Substitution of millets by rice or wheat, as the main staple;

- Substitution of undermilled rice by the more refined, highly-milled polished varieties; and

- Reduction of overall intake of complex carbohydrates (cereals) and increased intake of refined sugar and fat.

On the basis of available epidemiologic evidence, a recent WHO report<sup>1</sup> observes that such changes are "closely related to the emergence of a range of chronic diseases, including coronary heart disease, cerebrovascular disease, various cancers, diabetes mellitus, gall stones, dental caries, gastro-intestinal disorders and various bone and joint diseases". The causal significance, if any, of such an *association* between changing dietary patterns and the emergence of some of the above diseases, however, has yet to be clearly established. Most of these diseases are of multi-factorial origin; and dietary excesses and errors could be just *one* of the contributory factors.

While there is considerable epidemiological evidence that changes in habitual diets of populations induced by affluence could partly contribute to the increased prevalence of coronary heart disease, evidence in this regard with respect to diabetes is scarce.

The major questions that arise with respect to diabetes are:

- What is the nature of the scientific evidence that points to the conclusion that affluence arising as a part of developmental transition is, in fact, associated with an escalation of the prevalence of diabetes; and,

- In case the evidence of such an escalation does exist, what specifically, are the "ingredients" of development that contribute to such escalation? In particular, what is the role, if any, of changes in dietary pattern induced by affluence with respect to the prevalence of diabetes?

Answers to these questions are

obviously important for the institution of meaningful programmes of diabetes prevention and control.

**The study in South India:** In a recent study involving 900 urban and 1,038 rural subjects in South India, Ramachandran *et al*<sup>2</sup> found that the prevalence of non-insulin dependent diabetes mellitus (NIDDM), using WHO criteria and adjusted to the age of the population, was 8.25 per cent in the urban and 2.4 per cent in the rural populations. On the other hand, the age-adjusted prevalence of impaired glucose tolerance (IGT) was nearly similar in the urban and rural groups (8.7 per cent and 7.8 per cent respectively). The diagnosis of diabetes in the study was made if the "post-glucose" value (two hours after glucose administration) was  $\geq 11.1$  mM, and IGT was diagnosed if the "post-glucose" value was  $\geq 7.8$  mM but  $< 11.1$  mM.

The urban population investigated by Ramachandran *et al* was apparently more affluent than the rural; while the rural population was largely composed of agricultural labourers of the low-income group, the urban population included businessmen, traders, clerks, professionals and a small number of "manual labourers".

The authors argue that the high prevalence of IGT in both urban and rural populations, regardless of their socio-economic status, is possibly a genetic attribute of Indian populations and is indicative of the high risk of the development of overt diabetes. Affluence and urban environment had apparently contributed to the expression of this genetic trait resulting in a high prevalence rate in the urban group. Observations among Indian populations in Fiji<sup>3</sup> and Mauritius<sup>4</sup> and among migrant Indian populations in Southall (UK)<sup>5</sup> also point to a high prevalence of diabetes in Indians (Table).

Unfortunately Ramachandran *et al*'s paper does not deal in detail with

the actual composition of the diets of the urban and rural populations and diabetics. However, on the basis of such data as are available from national surveys, we may draw some inferences. As was mentioned earlier,

with increasing affluence there is a trend towards decrease in the intake of complex carbohydrates, accompanied by increased intake of free sugars. If millets are the staple cereal in the rural situation, urban migration often results in the substitution of millets by rice or wheat; in the case of populations that had earlier subsisted on rice, there is increasing preference for more polished and refined varieties of the cereal in place of the undermilled varieties.

The differences in fibre content as between a diet based on millets on the one hand, and one based on highly polished rice on the other hand, could be substantial<sup>6</sup>. Polishing is also known to remove important nutrients from the grain. As a result, differences with respect to nutritive value as between rural and urban diets largely based on staple cereals could be significant.

It may also be relevant to recall in this connection the results of a study carried out in India over three decades ago<sup>7</sup>, in which the response of the blood sugar levels to administration of different cereal diets containing identical amounts of carbohydrates was investigated. It was found that the rise in blood sugar levels following the administration of a millet meal (*ragi* — *Eeusine coracaia*) was significantly less than that following the administration of a rice meal.

**The obesity factor:** Bivariate analysis of the data of Ramachandran *et al*'s study, for the identification of association, if any, of body-mass index (BMI), subscapular triceps ratio (STR) and waist-to-hip ratio (WHR), with prevalence of diabetes, revealed interesting differences between the urban and rural groups. While this association was significant in the case of urban men and women, it was not so with rural men; in the case of rural women, only the association of BMI with diabetes prevalence was significant, while those with STR and WHR were not. We can only speculate on the reasons for this interesting difference. This finding could justify the reasoning that it is not obesity per se but the actual nature and composition of the diets that led to such obesity in the urban population, on the one hand, and the rural population, on the other, that may be important.

High caloric diets predominantly based on millets or unrefined undermilled rice could be less diabetogenic than isocaloric, high caloric diets based on polished rice and refined sugar even if

**Table: Age-adjusted prevalence (%) of NIDDM in Indian populations**

	Urban		Rural	
	Men	Women	Men	Women
Madras <sup>2</sup>	8.4	7.9	2.6	1.6
Fiji Indians <sup>3</sup>	14.4	12.6	13.7	13.2
Mauritian Hindus <sup>4</sup>	11.9	9.0	-	-
Southall Asians <sup>5</sup>	8.9 (Total)	-	-	-

both diets eventually result in the same order of obesity. However, in the present state of our knowledge and with the limited data available, this far-reaching inference must remain a speculation. Clearly we need more data. Unlike in the case of the South Indian subjects investigated by Ramachandran *et al*, available reports do not indicate a significant difference in rates of the prevalence of diabetes as between urban and rural Indians of Fiji (see table). This was possibly because rural Indians in Fiji, unlike rural Indians in India, "tend to consume foods similar to those of their urban counterparts — rice, wheaten *roti*, *chapattis*, highly spiced vegetables, meat or fish ..."

Unlike in the case of Indians in Fiji, there was marked rural-urban difference in the prevalence of diabetes as between rural and urban Melanesians of Fiji. "Rural Melanesians retain traditional food patterns, consuming kasava, taro, breadfruit, tropical fruits, meat and sea foods" — while in urban Melanesians "much of the food consumed is canned meat and fish, polished rice, flour, sugar and processed vegetables and fruits"<sup>3</sup>

It is reasonable to assume that the level of habitual daily physical activity of the rural subjects was significantly higher than that of the urban population. This is an important aspect that will possibly also need to be taken into account in explaining the observed urban-rural difference in diabetes prevalence in India. Zimmet *et al*<sup>3</sup> conclude that "factors other than obesity, such as differences in physical activity, diets, stress or other as yet undetermined factors" ... could contribute to the rural-urban difference in prevalence of diabetes among Melanesians in Fiji.

**Diabetes — a major health problem:** It seems certain that one-third of India's population will be urban by 2000 AD. While it may be rash and injudicious to extrapolate the data from Ramachandran *et al*'s limited study to the entire country, to arrive at an estimate of possible actual numbers of diabetics in urban India by 2000 AD, the study at least shows that given the prevailing trends, urban migration could imply a nearly four-fold increase in the magnitude of the prevalence of diabetes in the country. This could be reflected in the rising prevalence of coronary heart disease (CHD) as well, since diabetes is a major risk factor in CHD.

Diabetes could thus emerge as a leading public health problem by the

turn of the century. Meaningful prevention/control programmes will call for more information with respect to the precise nature of dietary excesses and errors contributing to the escalation of diabetes in the urban situation. Studies of the type reported by Ramachandran *et al* therefore need to be multiplied and intensified. Such studies should receive high priority in any future National Nutrition Research Agenda.

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## NUTRITION NEWS

**The International Conference on Nutrition (ICN):** ICN was an inter-governmental conference, which took place at the FAO headquarters in Rome between December 5 and 11, and was attended by government delegates from over 150 countries and a number of scientists. During the two years of preparation for the conference, eight regional meetings and two meetings of a specially designated Advisory Group of Experts had been held in order to finalise the Agenda. A preparatory meeting at the WHO Headquarters in Geneva in August had brought out a Draft Decla-

ration and a 'Plan of Action', which were discussed in-depth and finally adopted at the ICN in Rome.

The Declaration is largely a reaffirmation of the commitment of the participating governments to the early attainment of the goal of eradication of undernutrition/malnutrition, and the overall upliftment of the nutritional status of their populations. The 'Plan of Action' that was adopted outlines this major objective and the policy guidelines for its achievement, and indicates strategies and actions that could be pursued for this purpose.

The 'Plan of Action' adopted at the conference concludes with the following statement with which few would disagree: 'ICN should be viewed as a milestone in the continuing process to eliminate hunger and malnutrition, especially in the developing countries, and at the same time to prevent the increased incidence of diet-related non-communicable disease. The ICN preparatory process began in the countries and to be effective, its follow-up must now be firmly anchored in national commitment and efforts to protect and promote the nutritional well-being of all.'

In the ultimate analysis, the true test of the 'success' of the conference will lie in the follow-up action, especially at the country levels, which the conference is able to generate. The conference had made some recommendation for follow-up both at the national and international levels.

**The XXV Annual Meeting of Nutrition Society of India** was held at the National Institute of Nutrition, Hyderabad, on December 18 and 19, 1992. The highlights of the programme were the Gopalan Oration by Dr Michael C. Latham; the Srikantia Memorial Lecture by Dr B.S. Narasinga Rao; and two symposia, one on "Development programmes for women and children and their impact on nutrition", and the other on "Newer methodologies in nutrition research". Two "Young Scientists Awards Sessions" were organised where several papers on different aspects of 'Community' and 'Experimental' nutrition were presented.

**XIX Kamla Puri Sabharwal Memorial Lecture** on December 22, 1992 was given by Prof J.S. Bajaj, Member Planning Commission, on "Nutrition and Health: An Interactive Independence" at Lady Irwin College. Dr C. Gopalan presided.