Nearly a third of full-term babies born in India are reported to be of low birth-weight (less than 2.5 kg). This figure has remained more or less stationary for the last few decades in spite of striking declines in neonatal and infant mortality, giving the impression that India has not made much progress with respect to the improvement of nutritional status of its women.

However, the validity of the present estimate of low birth-weight in the country as a whole needs to be carefully checked. This estimate is almost completely derived from births taking place in government-owned public hospitals, which cater to the poorest sections of the population. With the springing up of numerous nursing homes and private hospitals, presently, most deliveries of the relatively affluent middle class and well-to-do women (who together constitute two-thirds of the population) take place outside government hospitals. Therefore, the present estimate could be considered as reflecting the position with regard to the poorest section of India's population. Even so, a striking difference can be seen between different states of India, the incidence of low birth-weights in Kerala for example being as low as 5.7 per cent. Under the circumstances, comparison of low birth-weight incidence between different countries where the source of data may be different, may not be valid. Here is an area for further research.

**FACTORS CONTRIBUTING TO LOW BIRTH-WEIGHT**

Low birth-weight and poor pregnancy outcome are the result of a multiplicity of factors. Maternal pre-pregnancy weight and maternal weight gain during pregnancy are very important determinants. Poor antenatal care, anaemia, heavy physical work till late in pregnancy, smoking and poor diets are other important factors.

In most public health programmes in India so far, the emphasis has been on infants and children. While lip service had often been paid to mothers, not much was done towards improving the diets of mothers during pregnancy and antenatal care. Though emphasis had been placed on growth monitoring in children there were no parallel efforts at assessment of weight gains of women during pregnancy. This relative neglect of women during pregnancy now needs to be corrected.

Poor pre-pregnancy weights of mothers and poor nutritional status are but a reflection of the poor status of girls during childhood and adolescence. Little attention has been paid to the health and nutrition care of adolescent girls, with the result that many adolescent girls are anaemic even at the time of conception. Under this circumstance, current programmes of distribution of iron and folate tablets during the last 100 days of pregnancy are hardly adequate to correct the prevalent anaemia. Anaemia in pregnancy, especially severe anaemia, is an important determinant of poor pregnancy outcome. It is only recently that the shortsightedness of the policy of relative neglect of adolescent girls and mothers has been recognised.

National Nutrition Monitoring Bureau data now show that weights and heights of adolescent girls of today are better than what they were 15 years ago—a positive secular trend. The recent proposals by the Planning Commission and the Ministry of Health to intensify healthcare and antenatal care during adolescence with special focus and specific treatment of severe anaemia should yield results within the next few years. Diets, particularly of pregnant women, are deficient both in energy and (consequently) in several micronutrients as well. Energy intake ranges between 1,200 to 1,600 kcal in the poor groups. Any proposal for correction of dietary deficiency in pregnant women should take note of this fact. Poor energy intake, coupled with high energy expenditure—what with women having to perform heavy physical work till the last days of pregnancy—is a major factor. Under these circumstances, the logical approach towards correcting poor pregnancy outcome is to strive for all-round improvement in diets during pregnancy so as to ensure proper weight gain and better antenatal care.

**MULTIPLE MICRONUTRITION SUPPLEMENTATION**

In recent months, some international and bilateral groups have been proposing that health administrations of poor developing countries of South Asia and Africa be persuaded to adopt a blunderbuss polypharmacy approach of distribution of a capsule containing a cocktail of about 15-17 micronutrients, daily, to all pregnant women and adolescent girls. This is being claimed to be the instant public health solution to the problem of poor pregnancy outcome in these countries. A group of experts from the USA and Europe, in a meeting in July 1999 in the USA, is reported to have decided as follows:

"A supplement containing 15 micronutrients at levels based on the US/Canada RDAs should be promoted for use on a daily basis as soon as the woman is known to be pregnant, and followed through for a minimum of three months post-partum and if possible throughout breast-feeding. The same supplement is also to be promoted on once or twice weekly basis to all non-pregnant, non-lactating women and adolescents."

According to the proposal, this 'cocktail' is to be capsuled in Denmark and distributed by an international agency (fortunately not the WHO and certainly not the FAO) to 10 countries of South Asia (including India) and Africa. This proposal must indeed be music to the ears of the vitamin cartels! Strangely enough, now representative of any of the 10 developing countries who were the intended 'ostensible' beneficiaries of this approach was invited to this meeting! Apparently, though we are in the 21st century, 19th century mindsets still prevail in some quarters!!

We will, however, examine this proposal for multiple micronutrient supplementation now being promoted purely on its scientific merits. There have been some excellent reviews on
this subject in recent years⁵, which have been taken note of.

POINTS FOR CONSIDERATION

The following points need careful attention in this regard:

- Poor pregnancy outcome is the result of a multiplicity of factors and cannot be corrected by a narrow pharmaceutical short cut. It calls for overall improvement in antenatal care and dietary diversification. This task cannot be evaded and there are no magic bullets.

- Diets of pregnant women in poor income groups are deficient not only in micronutrients but in energy as well. What women require is food of good nutritive value, not just a capsule of arbitrarily selected synthetic nutrients. Foods provide, besides the vitamins which are envisaged to be supplied by the capsule, a whole range of bioactive phytochemicals (so called non-nutrients). Many more such non-nutrients in food are likely to be discovered in the future.

- The famous ATBC study in Finland⁷ had shown that while GLVs and fruits protect against epithelial cancers, a combination of α-tocopherol and β-carotene was found to actually aggravate the development of epithelial cancer.

- At present, there is a lack of clear knowledge and information on baseline micronutrient status or even of suitable outcome indices in poor Indian populations to whom these interventions are proposed to be targeted. What precisely are the micronutrient deficiencies in Indian women that have a bearing on their poor pregnancy outcome? If there are any specific micronutrient deficiencies responsible for poor pregnancy outcome, are these deficiencies such that they cannot be combated through dietary improvement, using locally available inexpensive foods? We have, presently, no answers to these questions.

- The assumption that the micronutrient requirements of populations in developing countries such as India are identical to those of America or Canada may be totally unwarranted. The suggested composition of the recommended multiple micronutrient supplement, based on the US/Canadian RDA, is very likely to be substantially in excess of the requirements of populations in developing countries, even though there may be individuals in the population who are likely to be in a depleted state in terms of a number of micronutrients. Since it is intended that the supplement is to be taken on a daily basis, a significant proportion of pregnant women will end up with intakes which are substantially in excess of their individual requirements. There is evidence that micronutrients given in high doses during pregnancy may be harmful to either the mother or the foetus – for example vitamin A and zinc.

- Complex interactions between micronutrients (for example, between zinc and copper, iron and zinc, and vitamin C and zinc) are known and are likely to be evident at higher doses. The specific nutrient-nutrient interactions in this mixture are unknown, especially in undernourished populations.

- The proposal is apparently based on the view that pregnant women in poor developing countries are unlikely to overcome their dietary deficiencies through improved food intake using locally available foods and, therefore, they have to depend on imported tablets and pills. This is clearly an unjustified and defeatist approach which will prove to be unsustainable in the long run and not conducive to promotion of self-reliance.

- There is currently no evidence based on well-conducted Randomised Controlled Trials (RCTs) in developing countries that justify the use of multiple micronutrient supplementation on grounds of efficacy, compliance and clearly defined explicit outcome measures. There is no convincing evidence drawn from RCTs to intervene on programmatic or pilot basis with respect to multiple micronutrients in pregnancy. Under the circumstances, any pilot study of the nature proposed
by the group at the US meeting would raise ethical issues, and commit governments to unnecessary expenditure on interventions which are not based on reliable scientific evidence. The proposal, as it stands, will no doubt save vitamin cartels from the need for expensive experimental studies and RCTs. It will, however, be wrong to use pregnant women of poor countries as human guinea pigs for their benefit.

All this is not to say that there are no micronutrient deficiencies involved in poor pregnancy outcomes. In all probability there are. But the way to overcome these deficiencies is not to resort to a fishing expedition— a hit or miss blunderbuss polypharmacy approach involving a few micronutrients which may be necessary, quite a few which may not be, and a few which may even be harmful. It is also possible that the proposed composition does not include quite a few other micronutrients, phytochemicals and antioxidants, which may, in fact, be useful.

For this reason, this proposal for multiple micronutrient supplementation as it now stands is unscientific, unethical and unsustainable. It is not surprising that under the circumstances the Indian Council of Medical Research (ICMR) Expert Group Committee meeting held on January 15-16, 2000 under the chairmanship of the Director General of ICMR, came to the unanimous conclusions indicated in the box above.

We are deeply appreciative of the contributions that the pharmaceutical industry is making towards the advancement of medical science, combating diseases and to national development. We also recognise that some major public health programmes such as goiter and iron deficiency and anaemia require the use of supplements. There is a vast legitimate scope for contributions from the pharmaceutical industry towards health promotion in developing countries. What we are emphasising here, however, is that:

- the specific multiple micronutrients responsible for poor pregnancy outcome in Indian women must first be scientifically established;
- the level at which these nutrients will be needed to correct these deficiencies must be carefully identified; and
- most importantly, it must be established that the micronutrient deficiencies so identified as requiring correction are such that the correction cannot be achieved through dietary diversification using locally available foods.

These requirements have to be satisfied before any pilot trials with multiple micronutrient supplements are attempted. A blunderbuss polypharmacy approach in the absence of such data will amount to exploitation of poor communities and will be putting an unnecessary strain on the already stretched resources of the health systems of poor countries. The fair name of the pharmaceutical industry should not be allowed to be sullied by overzealous promotion of untested pharmaceutical solutions to basic public health programmes of poor countries. ‘Supplements’ should not be promoted as ‘substitutes’ for food.

**THE CHALLENGE**

India is no barren desert. It is a country which can be rightly proud of its vast biodiversity. The challenge before Indian scientists is to investigate how best the vast array of foods which are available right at their own doorsteps and which are rich in several micronutrients, could be used optimally in judicious combinations in order to combat micronutrient defi-
A MEANINGFUL AGENDA

A meaningful agenda for research on micronutrients in pregnant Indian women must include the following:

- Assessing present micronutrient status of Indian women.
- Investigating the effect of pregnancy on micronutrient status, and relationship of micronutrient deficiency to actual pregnancy outcome and low birth-weight. (This information is, at present, extremely scanty.)
- Defining micronutrient requirements in pregnancy under Indian conditions.
- Updating information on the content of micronutrients, bioactive phytochemicals and antioxidants in locally available low-cost foods using modern analytical procedures; and identifying optimal ways of using these foods singly or in combination for combating micronutrient malnutrition.

There is vast scope for Indo-US cooperation with a research agenda as proposed above. Such meaningful cooperation could prove far more rewarding from the point of view of nutritional upliftment of poor populations and would make far greater contributions towards the advancement of nutritional science, than would be the case if the cooperation is limited to the distribution of an arbitrary list of multivitamin tablets at arbitrary levels.

Excerpts from the keynote address at the Indo-US Workshop on Health and Nutrition in Women, Infants and Children, held at Hyderabad, on February 10-12, 2000. The Workshop was attended by about 100 participants including 20 distinguished scientists from the USA.

REFERENCES


FOUNDBATION NEWS

- Study Circle Lecture
Dr Subash C. Arya, on ‘Global Warming: Its Possible Health Implications’, on February 23.

- Annual General Body Meeting of the Foundation was held on March 29, 2000.

- President’s Engagements
Delivered the inaugural address on ‘Food and Nutrition Update: Challenges Ahead’ on January 14 to mark 40 years of completion of Foods and Nutrition Department of Lady Irwin College, New Delhi.

Keynote Address at the Regional workshop on ‘Nutrition and National Development’ on February 15, in Chennai.


- Fund Raising
The Foundation is grateful to Prof I. Beghin for his generous contribution to the corpus fund.

NUTRITION NEWS

The VI Annual Conference of the Indian Society for Parenteral and Enteral Nutrition was held on March 14-15 at the India Habitat Centre, New Delhi. Attended by eminent national and international scientists, it highlighted the latest developments in the field of enteral and parenteral nutrition and identified possible ways of providing nutrition support in a cost-effective manner in the Indian setting.

Edited by Ms Bani Tamber for the Nutrition Foundation of India, C-13 Qutub Institutional Area, New Delhi 110 016.
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