Readers' Forum

Q.1. I would like to seek comments from the expert regarding tonic containing iron and zinc.

(*i*) Ascorbic acid (vitamin C) when administered along with oral iron, enhances absorption of iron; so, it is recommended that fruit juice or vitamin C be administered along with oral iron for better response.

(*ii*) If oral iron is taken with food, specially containing pulses rich in phytates, iron absorption is reduced. Thus iron is administered some time before food for better absorption.

(*iii*) Zinc administered along with oral iron results in reduced absorption of iron and vice versa. Many tonics containing iron and zinc with or without other vitamins are available in the market.

Yash Paul,
Jaipur (Rajasthan), India.

Reply

(*i*) Vitamin C whether naturally present in food or added in synthetic form, has an enormous effect on the absorption of nonheme iron from the diet. Vitamin C also enhances the absorption of iron fortificants that are soluble in gastric juice. However, these findings were obtained from studies that used ferrous sulfate as the iron fortificant, the form of iron that is frequently used in iron-containing pharmaceutical supplements. The effect of vitamin C on the absorption of iron derived from other iron fortificants, such as elemental iron powders and ferrous fumarate, has not been evaluated rigorously(1). As such a general statement of co administering vitamin C with all oral iron preparations for better response cannot be made.

(*ii*) Phytates markedly reduce iron absorption from diet and also bioavailability of iron from ferrous salt preparations. However, absorption of iron from iron amino acid chelates which are conjugates of the ferrous or ferric ion with amino-acids has been reported to be good in presence of phytates. Ferrous glycine sulphate (FGS) is the only salt of this group available in India. Absorption of iron polymaltose complex is also not affected by food or milk. Following intake of carbonyl iron preparations, iron absorption occurs slowly over 1 to 2 days. Hence, many newer iron preparations can be administered without consideration of the timing of feed(2).

(*iii*) Interaction between iron and zinc in 'tonics' has been a matter of considerable debate. In a recent study in Indonesia led by the Department of Public Health and Clinical Medicine at the University of Umea, Sweden, concludes that combined iron-zinc supplements may be less effective in preventing deficiencies of the minerals than individual supplementation(3). In view of paucity of data on interactions between various forms of iron and zinc salts, it is preferable to use iron and zinc preparations separately, for the present, for children needing both the nutrients.

Multiple micronutrient formulations have been a subject of international interest, as it is assumed that single micronutrient deficiencies are unlikely especially in malnourished

children. A novel strategy that is being developed is the use 'sprinkles' in which the micronutrients are encapsulated, or coated with lipids or other substances, to reduce adverse interactions among the nutrients. Sprinkles in sachets can be mixed with any food or liquid(4).

REFERENCES

1. Lynch SR, Stoltzfus RJ. Iron and Ascorbic Acid: Proposed Fortification Levels and Recommended Iron Compounds. J Nutr 2003; 133: 2978S-2984S.
2. Nagpal J, Choudhury P. Iron formulations in pediatric practice. Indian Pediatr 2004; 41: 807-815
3. Torbjörn Lind, Bo Lönnerdal, Hans Stenlund, Djauhar Ismail, Rosadi Seswandhana, Eva-Charlotte Ekström, *et al*. A community-based randomized controlled trial of iron and zinc supplementation in Indonesian infants: Interactions between iron and zinc. Am J Clin Nutr 2003; 77: 883- 890.
4. ACC/SCN. What works? A review of the efficacy and effectiveness of nutrition interventions, Allen LH and Gillespie SR. ACC/SCN: Geneva in collaboration with the Asian Development Bank, Manila, 2001; p. 39-40.

Expert contributing to the reply:
Dr. Panna Choudhury,
Consultant Pediatrician, Maulana Azad Medical College and Lok Nayak Hospital, New Delhi 110 002, India.

Q.2. I am putting following queries for clarification in relation to vaccine failure and vaccine associated paralytic poliomyelitis (VAPP) with OPV.

(*i*) Should the efficacy of OPV be evaluated to ascertain how effective it is?

(*ii*) How many VAPP cases is too many to merit concern or intervention?

(*iii*) Should the parents be told the truth if a child happens to develop VAPP?

Yash Paul,
Jaipur (Rajasthan), India.

Reply

(*i*) The efficacy of OPV has been evaluated many times in India over the past three decades and results published extensively. To summarise the data, the efficacy of three doses of OPV in India is about 70%, of five doses 90%, and of 10 doses 99% (1). The former two values were actually measured and the last one mathematically derived by extrapolation. Among a million children given ten doses, the unprotected 1% will amount to ten thousand children. Given the necessary circumstances they can continue the transmission of wild polioviruses. The poor vaccine efficacy of OPV has become common knowledge in recent years, on account of the publicity surrounding the difficulties facing polio eradication. One more new study to measure vaccine efficacy is not necessary, but if skeptics want to convince themselves, let them invest time, money and efforts to repeat a study.

(*ii*) Actually even one case of VAPP must merit our concern and preventive measures. That OPV causes VAPP was first published in 1964 by the Surgeon General of USA, and re-iterated in 1969 and 1982 by the WHO(2). The WHO recommended that any country choosing to use OPV must establish surveillance for VAPP(2). In 1978 the Government of India adopted the policy of the exclusive use of OPV knowing the risk of VAPP, but without ascertaining its incidence. The government officials had believed that VAPP was a very small price to pay to rapidly control wild virus polio that was occurring at the rate of over 500 cases per day. After one decade it became clear that polio had not been controlled

with the use of OPV. Subsequently, it also became clear that the incidence of VAPP was not small, after all, as pointed out earlier(3,4). In 1988 the Technology Mission (under the Rajiv Gandhi Government) organized a workshop to review the performance of OPV. The eminent scientist MGK Menon chaired the meeting. The backdrop was the WHO resolution for global eradication of polio. The Mission leaders (Sam Pitroda and Jairam Ramesh) attended the workshop along with scientists like Pushpa Bhargava, VI Mathan, (Late) AS Paintal and myself. The recommendation was for India to manufacture IPV so that both vaccines, OPV and IPV would be available for the polio eradication program. The goal was to ensure a steady and affordable source and supply of IPV in the national immunization programme. A public sector "Indian Vaccine Company Limited" was established and built in Gurgaon and the requisite scientific staff were trained in France. As the unit was getting ready for production of IPV, the ministry of health changed its mind and the government closed it down in 1999. Without a reliable and indigenous source of IPV, an intervention to prevent VAPP is not yet in sight.

(*iii*) It is the ethical duty of the pediatrician to inform parents if a child develops VAPP. However, without firm evidence we should not speak about it. Today we depend on the polio eradication initiative for the diagnosis of wild virus polio, but information about VAPP is not available on a timely or individualized basis. In my personal view, the responsibility of aetiological diagnosis of infectious diseases, including VAPP, should rest with us. Access to and effective use of laboratory diagnostic facilities is an integral part of the practice of modern medicine. I fail to comprehend how any medical college can fulfill its teaching and diagnostic functions, let alone research, without laboratory virology. Therefore, perhaps we must begin telling parents the truth about the deficiencies in our professional service. Against such a background of telling all truth, we must also speak of VAPP. What we must collectively do now is to accept the moral responsibility for VAPP and force the government to provide relief and rehabilitation and assist in their actualization. The nation cannot escape from this ethical and scientific requirement by pretending that India is a poor country.

REFERENCES

1. John TJ. Immunization against polioviruses in developing countries. Rev Med Virol 1993; 3: 149-160.
2. World Health Organisation Consultative Group. The relation between acute persisting spinal paralysis and poliomyelitis vaccine. Results of a ten-year enquiry. Bull WHO 1982; 60: 231-242.
3. John TJ. Oral polio vaccine: how safe is safe? Curr Sci 2000; 79 (6): 687-689.
4. John TJ. A developing country perspective on vaccine-associated paralytic poliomyelitis. Bull WHO 2004; 82: 53-57.

Expert contributing to above reply:
Dr. T. Jacob John,
439, Civil Supplies Godown Lane,
Kamalakshipuram, Vellore 632 004, T.N.,
India.