

African children talk faster with iron



Darrell Mast

A Pemba Island girl chews on the seed pod of a breadfruit. After breastmilk, animal products are the key source of easily absorbed iron in the diet, but are expensive. Cereals, a primary foodstuff in developing countries, suppress absorption.

The first trial in Africa of the effect of dietary iron supplements on child development has shown that they speed language learning in under-three-year-olds — and to a lesser extent improve motor skills.

Rebecca Stoltzfus of Johns Hopkins University School of Public Health, lead author of the study (*BMJ* 2001; 323: 1389), which was undertaken in Pemba Island in the Zanzibar archipelago, told the *Bulletin* that while the supplements had little effect on the high levels of anaemia (a reduction in haemoglobin) in the children, “we did correct iron deficiency, and that makes the impact on child development even more interesting”.

The issue is that intense and year-round transmission of malaria in Pemba, as in most of sub-Saharan Africa, also contributes to anaemia in young children — along with other causes apart from iron-deficient diets. But, says Stoltzfus, “our results indicate that even in situations where iron alone can’t correct anaemia, it can have significant benefit for development.”

“Biologically it makes some sense” said Stoltzfus, as there’s “very strong evidence” in animals that the level of

iron in the body can affect nerve development. Two key nervous processes are affected by iron. One is myelination, the development of the sheaths that help nerve signals travel rapidly. “That process continues after birth in humans” said Stoltzfus, “and iron is involved in the enzyme systems that build the sheaths.” The other process affected by iron is in the dopamine system of neurotransmission across the synapses or junctions between cells. “That’s been well described in animals” Stoltzfus said. Moreover “a group in Chile has documented that iron-deficient children transmit auditory signals and process them less rapidly, consistent with inferior myelination of those nerves”.

In Pemba, iron supplements also improved motor skills, as this theory would imply — as such skills are also a matter of nerves — but here the benefit was very dependent on the severity of the children’s anaemia. With the language skills, all children benefited, but in motor skills only children with initial haemoglobin below 9 g/l improved. “But in Pemba half the kids are down there so it’s a significant number” said Stoltzfus.

The most controversial point in the study may be the actual measure of the improvement of language skills, based on a questionnaire to parents.

“We used this measure because it was simple and could be managed by field workers not trained as psychologists” said Stoltzfus. “Jane Kvalsvig, Director of the Child Development Programme at the University of Natal in South Africa, developed a scale based on parental reports. So we said let’s try it. And our feeling about the scale was that it probably was not a highly sensitive instrument — we were measuring gross and global milestones that would be noticed by parents. So if there were subtle influences on the brain that didn’t manifest in gross milestones we wouldn’t have detected them. So the fact that we did see changes was quite striking.”

According to Bruno de Benoist, responsible for micronutrients at WHO, “The problem is to develop specific psychometric tests that can be applied to

these cultures and populations. It’s a huge limitation. But if their tests are acceptable it is a very significant result, to show an improvement of intellectual performance.”

“In terms of numbers of people affected,” said de Benoist, “iron is the most important micronutrient deficiency (followed by vitamin A and iodine). And while we have a lot of data on anaemia, we have a lot less on iron itself for the simple reason that it is very difficult to measure. So the more results we have the better we will understand the effects of iron deficiency.”

“Say we know now that iron deficiency affects cognitive development,” said de Benoist. “But to what extent? And what kind of prevention and treatment can we give the child? And what is the magnitude of the cognitive effects of iron deficiency in the population as a whole? That’s very important, because there are many other causes of poor cognitive development.”

Stoltzfus and her colleagues will now aim to confirm their findings. “I think that our study is provocative: it was a well-done, well-organized randomized clinical trial with all the things that we look for in proving causality — statistical significance, good design and all of that” she claimed. “But we ourselves would like to replicate and extend the results. So we are studying again in Pemba, with a larger group and choosing just the younger children, where the effect was seen, and doing a parallel study in rural Nepal, where malaria is less but iron deficiency is high.” ■

Robert Walgate, *Bulletin*

Indian women impose unofficial drinking fines

In the tribal hamlets of Dahanu, around 100 km from Mumbai, in the state of Maharashtra in western India, demonstrations are often angry. But in October 2001, when 400 women, supported by many young boys and girls, demonstrated in front of the office of the local revenue officer, there was a difference

— they were happy, pleased with the government's proposed ban on black jaggery, a waste residue of sugarcane molasses generally used as cattle feed.

Why the support? Because in these rural areas black jaggery is the cheapest form of sugar available for the brewing and distillation of the local country liquor — a scourge which (with other forms of alcohol) is destroying families in India.

The women's banners read: "We will no longer tolerate beating, we will no longer distil alcohol".

Says Brian Lobo, a social activist working in the area: "The fact is that the government just intended to prevent tax losses from the smuggling of black jaggery into Dahanu from neighbouring Uttar Pradesh." But the women saw the ban as a way to halt their menfolk's alcohol abuse. "For the past month there's been a major social movement for freedom from alcohol", says Lobo.

Adding to a history of women fighting against alcohol abuse, growing since the 1990s, this recent outcry was also taken up in around 100 villages of Uttaranchal, a young state in the Himalayan foothills of north India. In December, the villagers organized raids to smash illicit breweries, and even slapped an unofficial fine of Rs 500 (US\$ 10) on anyone found drinking liquor. Those who refuse to pay the fine are being socially boycotted.

The individual consumption of alcohol has risen phenomenally in India over the last decade. One study in Karnataka showed that while per capita alcohol consumption rose 114% from 1988–98, the actual number of consumers only rose 14%. The average alcohol user was consuming around 20 bottles of whisky (each of 750 ml) in 1998–99, more than double the nine bottles consumed in 1988–89, says one of the authors of this study, Vivek Benegal, assistant professor of psychiatry, National Institute of Mental Health and Neurosciences (NIMHANS) in Bangalore.

People who drink heavily develop health problems long before they are identified as chronic alcoholics, says Benegal. On average they need to visit clinics frequently for eleven years before

seeking treatment for an advanced condition of alcohol dependence at a de-addiction facility, he says.

According to Vikram Patel of the Sangath Centre in Goa "Recent community studies have reported that up to 6% of the adult population suffers from alcohol dependence ... Despite this evidence, alcohol ... remains outside the public health policy-making agenda."

Although most abusers are men, the number of women taking to drinking alcohol is also on the rise. According to Dr Shekhar Saxena, coordinator in the mental health and substance dependence department of WHO, research studies have shown that a high 95% of Indian women (and 55–60% of men) are total abstainers. However, the de-addiction centre at NIMHANS notes a fourfold increase in the number of women registering their alcohol-related problems over the last ten years, and warns that this is only the "tip of the iceberg".

According to Saxena, heavy drinkers in developing countries suffer particularly severe health effects because of poor nutritional status, the presence of other illnesses or infections, harmful impurities in (often illicitly made) liquor and frequent association of heavy drinking with multiple substance abuse, including tobacco chewing and smoking.

In 1998, the Karnataka budget imposed a 30% increase in taxes on beer — but added nothing to the taxes on spirits. But it seems Indian women are prepared to impose a kind of tax where others are not. With the events in Dahanu, Uttaranchal and elsewhere, national newspapers are claiming that "a new anti-liquor revolution" is now gathering force in India, with a virtual declaration of war against liquor, and the creation of "people's prohibition." ■

Rupa Chinai, *Mumbai, India*

A long road to community control

"Alcohol companies have become very active in India in recent years," adds Dr Shekhar Saxena, coordinator in the mental health and substance dependence department of WHO.

"Legally, no alcohol can be advertised either in print or in the electronic media in India, but under the same brand name companies sell mineral water or playing cards or glasses, and of course the name catches on. And billboards advertising alcohol are put on cricket grounds, and of course TV covers the match, ball by ball, showing the adverts in the background. And there are plenty of satellite channels carrying advertising from outside.

"Also taxes have not kept pace with inflation — real taxes, especially on beer, have gone down. The total amount of spirits consumed is much greater than beer, but beer is the fastest growing — especially among young people.

"Two or three states tried complete prohibition. But it didn't work. The state of Haryana, adjacent to Delhi, banned alcohol for 18 months, starting in 1996, but there was a great deal of illegal production and smuggling from "wet" states next door. And the state economy collapsed without the alcohol taxes! So they had to repeal the ban.

"Community movements could play a great role, but unfortunately the experience of the last few years in India is not very encouraging. Over time, other community interests and a lack of political will seem to get in the way. Strong pressure from alcohol producers also hampers progress.

"But all communities have built-in defences against social problems, and the more traditional the problem, the better the defences are. If a new threat comes up the community takes time in adjusting to that threat.

"For example there are elaborate rules about consuming opium in India. It's been a traditional drug for hundreds of years. Communities don't suffer much harm from opium as they have elaborate defence mechanisms. They have rules about who can consume opium, and to what extent, etc. But as soon as opium gets converted to heroin, which is a much stronger drug, the community defences fail completely because society is not prepared for that kind of threat.

"To some extent it's the same story with alcohol. It's not new to India — but the kinds of alcohol products are new. The strong spirits, which came with the British Raj, were a new threat. And the kind of drinking patterns we have now are new, and society is not good at looking after them. Hopefully after a period of time society will come to equilibrium over how much damage is acceptable at what price. In the meantime, any action to support the community responses and to restrict the influence of alcohol producers will help."