

& HEALTH ENVIRONMENT

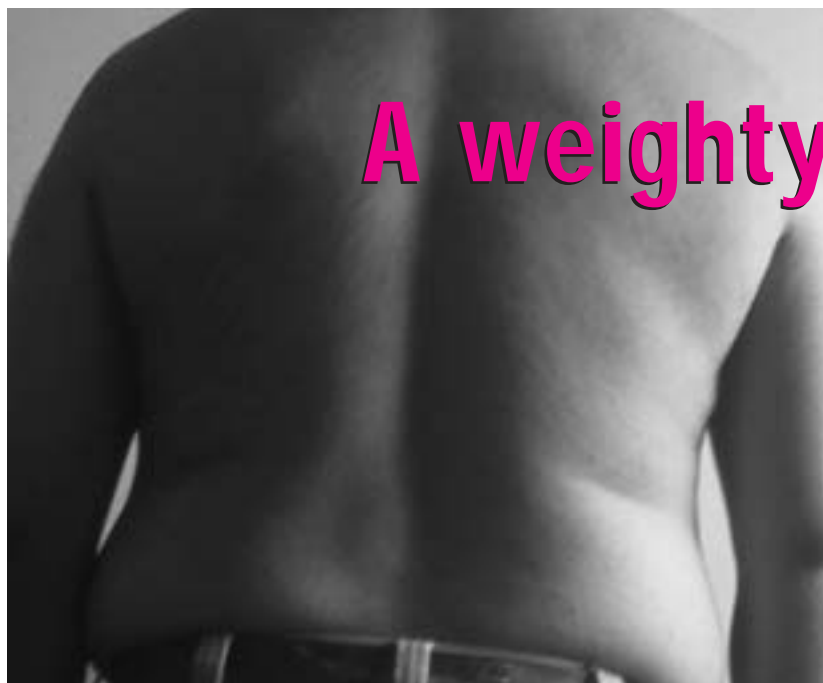
NEWSLETTER FROM THE CENTRE FOR SCIENCE AND ENVIRONMENT



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LEAD STORY

LIFESTYLE DISEASES



A weighty crisis

Obesity is fast growing into a very large problem in India. Since it can lead to a host of other diseases like diabetes and cardiovascular ailments, it is time to combat it on a war footing

There is a growing concern in India over obesity that is fast becoming a household name and phenomenon. It results from over-consumption of food rich in fats and changing lifestyle. As the Indian economy is growing, India's middle class is accumulating fat around the middle at an alarming rate. Indians are

wolfing down high-calorie and fat-rich *kachauris*, *samosas*, burgers, pizzas, ice creams and sugar-laden aerated drinks at a pace faster than ever before. Their sedentary lifestyle also contributes significantly to weight gain. Globally, more than one billion adults are overweight and of these, 300 million are obese.¹ Clinically, obesity is defined in terms of body mass index (BMI) as the ratio between weight (in kilogrammes (kg) and height (in metres)). According to the Centre for Disease Control and Prevention, USA, an individual is overweight if his/her BMI is at least 25 kg per square metre (kg/m²) and obese if it is at least 30 kg/m² (see Box: *Redefining obesity*).² Obesity tends to persist when it appears at certain crucial developmental stages like the gestational stage, the age group of five to seven years and the adolescence.³ Obesity

per se is not a serious health problem, but it is a prime precursor of many non-communicable diseases (NCDs) like diabetes, hypertension, cardiovascular diseases (CVDs), gall bladder ailments, cancer, psycho-social problems, breathlessness, sleep disorders, asthma, arthritis, weak bones and reproductive hormone abnormalities.

Governments of several developing countries like India claim that obesity and NCDs aren't a problem. But the fact is NCDs are increasing in these countries at a rapid pace (see Table: *Prime cause of mortality*). Even statistics corroborate this. Of the 16.6 million people who died of CVDs in 2001, around 80 per cent were from low- and middle-income countries. It is being feared that by 2010, CVDs would be the leading cause of death in developing countries. India, China, Indonesia, Pakistan and Brazil are

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Redefining obesity

For an early intervention and right medical treatment, obesity criteria for the Asians need to be redefined

Although research points to the fact that obesity is directly related to diabetes, interestingly, diabetic cases were reported more in thin people than in people with high fat content in the body. "Hence, measuring the fat content or body mass index (BMI) is what really counts in defining obesity", says Anoop Misra, professor, department of medicine, All India Institute of Medical Sciences, New Delhi. Asians, in particular, have a higher propensity for diabetes and heart attacks, as they have higher body fat at lower BMI. Based on this fact, World Health Organization (WHO) suggested a lower limit for waist circumference, since Asians with lower waist circumference have been found to have high BMI. But instead of giving separate obesity criteria for Asians and Caucasians, it suggested putting lower BMI as a public action health point: between 23 and 27.5 kilograms per square metre (kg/m²) as overweight and greater than 27.5 kg/m² as obese. But Misra insists that WHO should have separate criteria for Asian population. He says, "Fifteen per cent of India's diagnosed population doesn't get medical advice and doesn't even know whether they are obese or overweight. With the new definition of the criteria to measure obesity, 15 per cent more of Indians will fall under the gamut of obesity or being overweight."

Source: Sarita Bahl 2004, Wanted an Asian measure of obesity, in *Down To Earth*, Vol 8, No 8, pp 44-45.

among the top 10 countries affected by diabetes. About 19.4 million Indians were reported to be suffering from diabetes in 1995 and this number rose to 31.5 million by 2000.⁴

In India, comprehensive programmes for preventing NCDs are either non-existent or functioning at a very low level. Although many pilot studies have been initiated, these have not impacted the policy and programme development in any way. "Programmes for the prevention and control of NCDs need to adopt a 'life span' approach

that, in turn, should attempt to reduce risk at any stage of life through appropriate public health interventions," says K Srinath Reddy, professor, department of cardiology, All India Institute of Medical Sciences (AIIMS), Delhi.⁵

Who is responsible?

"Market forces control the kind of food we eat, which is not good," says Reddy. The diversification of soft drink companies into salted food like chips is not by chance. "This is a way of increasing sales of soft drinks, as salt and oils produce thirst", he says. Even fast food chains serving Western food such as burgers and pizzas are growing by leaps and bounds. Also, unhealthy food tastes good while healthy food does not. Richard Mattes, professor of food and nutrition at University of Purdue, USA, has proved that humans can taste fat like they can taste sugar and salt.⁶ This is in contrast to the general belief of nutritionists and other scientists that fat only provides texture to food, and that pure fat in itself doesn't have any taste.⁷

How are fast food giants targeting India?

A Confederation of Indian Food Trade and Industry (CIFTI) document shows the growth in the major industries, which reflects a shift in the eating habits of Indians (see Graph: *Changing food habits*).

With the implementation of the World Trade Organization rules, India had to open itself to foreign investment and multinational companies like Coke and Pepsi, which entered the market and, being established brand names,

managed to get a favourable response. Currently, some of their popular and best-selling items in the Indian market are breads, biscuits, chocolates, soft drinks and instant noodles. Their marketing gimmicks including selling the stuff at a lower price or giving free gifts with the products, have given a considerable fillip to the sales of their products (see Box: *Hooked Fast*).

What is happening in Asia

Asian countries are marked by the increasing number of overweight and obese. South Asians have at least three to five per cent higher body fat when compared to Caucasians.⁸

China

The current obesity rate in China is below five per cent, but it should be noted that the obesity prevalence rate is 20 per cent in some of its cities.⁹ In 1997, 15.4 per cent of the Chinese population was overweight.¹⁰ The incidence of obesity-related NCDs has increased over the past few years. Experts blame it on mechanisation of the country as well as government policies. According to Tsung O Cheng, professor of medicine, George Washington University, Washington, DC, "Any foreigner who visited China in the 1970s and 1980s could not help being impressed by the phenomenal number of bicycle riders. Bicycling was not only a necessary means of transportation but also a very healthy form of exercise. With a rapid increase in automobiles, people no longer derive the health benefit of cycling."¹¹ He also opines that the single child policy in

Prime cause of mortality

Number of deaths due to communicable and non-communicable diseases

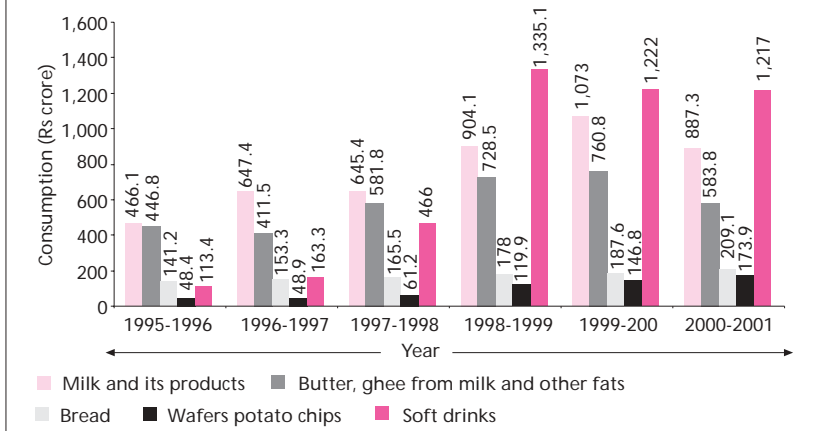
| Country | Communicable diseases | Non-communicable diseases |
|-----------------------|-----------------------|---------------------------|
| Africa | 7,779 | 2,252 |
| USA | 875 | 4,543 |
| Eastern Mediterranean | 1,746 | 2,030 |
| Europe | 567 | 8,112 |
| Southeast Asia | 5,730 | 7,423 |
| West Pacific | 1,701 | 9,000 |

Note: All figures multiplied by 1,000.

Source: Robert Beaglehole 2003, WHO. Presentation based on World Health Report 2003.

Changing food habits

Sales of potato chips and cold drinks have gone up three times between 1995 and 2001



Parma Dasgupta 2004, director, Confederation of Indian Food Trade and Industry (CIFTI), New Delhi, personal communication.

China is also to be largely blamed for the huge rise in obesity.¹² A single child in the family generally has two doting parents, four grandparents and eight great grandparents who express their love by pampering and overfeeding him/her. Thus, this over-fed child grows into an obese adult, who is at the risk of contracting various NCDs in the later stages of life.

India

India is also faced with a similar kind of obesity and NCD epidemic, but the reasons here are slightly different. The unique body composition and metabolism of Indians and Asians makes them more prone to high deposition of fats and its consequences.¹³ In 1997, seven to nine per cent of the Indian urbanites were reported to be obese. In the capital city of Delhi itself, nearly a third of the men and more than half of the women belonging to what could be termed as the 'upper middle class' are currently overweight.¹⁴ Indians belonging to the middle class are adding inches to their fat layers, which can cut short their lives by 20-30 years. A major share of the problem is in cities since it is the urban children who are lured by the advertisements selling junk food. Even schools are endorsing these junk food items by selling these in their canteens (see Box: *Slowfood it*). "Nearly 15 per cent of children in Bangalore are obese", says Kamini Rao, medical director,

Adolescence Clinic, Bangalore, who conducted a study on 1,000 children in the age group 11-18 years. She points out that nearly 80 per cent of these kids belong to the upper socio-economic strata. Irregular food habits coupled with insufficient playing grounds was also cited as a main reason behind the growing obesity epidemic.¹⁵ Umesh Kapil, a leading nutritionist in AIIMS, in a Delhi survey of well-to-do schools found that about 27 per cent of school children were overweight and seven per cent obese.¹⁶ He believes that the main factor responsible for the rising prevalence of this disease is the lack of physical exercise.

Health impacts of obesity

Obesity substantially increases the risk of morbidity from hypertension; type 2 diabetes; coronary heart disease; stroke; gall bladder disease; osteoarthritis; sleep disorders and respiratory problems; and endometrial, breast, prostate, and colon cancers. Higher body weight is also associated with an increase in all-cause mortality.

Diabetes

Presently, almost 12 per cent of the Indian urban adults (approximately 280 million) above 20 years suffer from diabetes. The first reliable data on the prevalence of diabetes in India came from the Indian Council of Medical Research, New Delhi, in the 1970s. Currently, the country bears 17 per

cent of the global burden of diabetes.¹⁷

Anoop Misra, professor, AIIMS, studied the relationship between obesity and diabetes among 2,000 school and college students of New Delhi. His study revealed that almost one-fourth of the obese children were insulin resistant — a stage that can lead to diabetes. "Nearly 43 per cent had sub-clinical inflammation that is a future indicator of diabetes and heart disease," he says.¹⁸

C Yagnik, researcher at the King Edward Memorial Hospital and Research Centre, Pune, investigated the aspects of body size of rural and urban Indians in relation to their metabolic and endocrine characteristics.¹⁹ It is being estimated that by 2015, diabetic population will be the highest in India, with maximum patients being under the age of 40 years.²⁰ Indians tend to be diabetic at a very young age of 45, after which the life expectancy is, on an average, eight years only.²¹ The early onset of diabetes is mainly due to the changing food habits. A couple of years ago,

Hooked fast

Indians are heavily into fast-food items

While Indians are fast catching up with high-calorie fast-food diet, the fast-food giant McDonald has switched to selling fresh fruit in its British outlets and has also introduced fruit juice with less sugar for children and low-calorie, low-fat pasta salad in its menu in developed countries. But Indians are catching up on the high-calorie fast-food diet very fast. "McDonald's is now planning to introduce its eateries in Hyderabad, Chennai, Bangalore and parts of eastern India. In two years, we will have 100 outlets (the current number being 67) across the country," says Vikram Bakshi, managing director, McDonald's, North India. The fast food eatery has already invested Rs 800 crore in India and is working on changing its menu, especially targeting children.

Using celebrities to promote their products has proved to be a successful marketing strategy to lure children.

Source: Ratna Bhushan 2005, Big bite, in *The Times of India*, Bennett and Coleman Pvt Ltd, New Delhi, March 16.

people in the age group of 20-35 years used to suffer from diabetes. But now, children aged anywhere between three months and 17 years are also developing diabetes, which is a cause for great concern.²²

Cardiovascular diseases

Obesity is one of the etiologies of CVDs. "By 2020, around seven million Indians are expected to die of heart-related diseases if they do not change their sedentary lifestyle", warns Reddy. The manifestations of CVD risk factors are slowly becoming apparent in younger age groups too.²³ Obesity amplifies the risk factors by synergistic mechanisms. An elevated BMI results in an increase in heart rate and blood volume, as well as increased systolic and diastolic blood pressure. These changes affect the cardiac system. "Recent years have seen an eight-fold increase in the incidence of heart ailments in the country", says Balram Airan of the department of cardiovascular-thoracic surgery at AIIMS.²⁴

Cancer

Obese men are at a risk of developing cancer of the colon, rectum and prostate.²⁵ Obesity also results in increased fat deposits in the liver, thereby triggering an increase in liver cancer cases.²⁶ J C Presti from the Stanford University School of Medicine, USA, reported in January 2005 that there is a direct relationship between risk for prostate cancer and obesity in men under the age of 60.²⁷ There are evidences of a possible link between breast cancer and diet.²⁸ Women are more likely to develop breast cancer and osteoporosis due to stressful lifestyles.²⁹

Asthma

Vinod Mishra at the East West Centre, Hawaii, used 1998-1999 data of non-pregnant women, collected by the Indian Institute of Population Studies, Mumbai, to find a possible link between asthma and obesity. The weight and height data provided by the survey was used to calculate BMI.



Statistical analysis suggested that prevalence of asthma was lowest among women with normal BMI and highest among the obese.³⁰ Similarly K Wickens from the Wellington Asthma Research Group in Wellington found in January 2005 that between 1989 and 2000, there had been a significant increase in the prevalence of asthma and obesity.³¹

Dementia

Obesity can also lead to dementia (loss of mental abilities) among women. This was concluded in a study conducted by Deborah Gustafson and colleagues at the Sahlgrenska University Hospital in Gothenburg, Sweden, subsequently published in November 2004.³² It found that obese women were much more likely to show brain atrophy — the abnormal loss of neurons — compared to slim women.

What do experts feel?

Several scientists world over are studying obesity-related issues and have varied opinions (see Box: Experts say).

International view

The prevalence of obesity is higher in the developing world as compared to the developed world. "This is an ironical situation that in their efforts to reduce hunger, some developing countries are facing the problem of obesity," says George L Blackburn, associate director of nutrition, division of nutrition, Harvard Medical School, Boston. But there is another school of thought that believes it's a bigger problem in the developed world.³³

Slowfood it

Delhi government is essentially silent on the issue of school canteens endorsing junk food items

The Delhi government had introduced an ambitious "health alternative" for youngsters with an aim to give scores of youngsters in the capital a chance to eat healthy food in school. But it has had a very few takers and the announcement has remained largely on paper.

Besides the lack of the will on the government's part, schools have chosen to remain silent on this matter. This besides the fact that the increase in the lifestyle ailments among children is being attributed to eating junk food from school canteens. And although the Directorate of Education's campaign — "Ban on Junk Food and Aerated Drinks from School Canteen" — received good publicity, it was largely forgotten due to protests from various quarters like fast food industries.

"There has been a general lack of will in implementing the programme. Earlier, we went to the court because of the non-implementation after which the government agreed to cooperate and implement the programme. But things have still remained unchanged. I have also written to over hundred schools in the capital seeking their support in the matter and urging them to implement the directive regarding health foods; but there has been no response," rues Vinod Jain, the chairman of Tapas, the New Delhi based non-governmental organisation behind the move. And although there has been pressure on the government since 2003 to begin the healthy eating practice in the capital, the programme is put on cold storage. "Besides insisting to implement the programme immediately, we have also provided the government a menu prepared by the chief dietician of the All India Institute of Medical Sciences, Rekha Sharma, ascertaining the value of all meals recommended for introduction in the school canteens," says Jain.

Source: B Perappadan 2004, No takers for healthy food in schools, in *The Hindu*, May 21.

Experts say

Experts speak on various obesity-related issues

"Consume less food and do more physical exercise. Change lifestyle pattern and be physically active."

— Umesh Kapil, professor, public health nutrition, department of human nutrition, All India Institute of Medical Sciences, New Delhi
Email: umeshkapil@yahoo.com

"We need to tackle the obesity problem both at the individual and community/national levels. The latter include dealing with the nature of change in our urbanised globalised environments."

— Prakash Shetty, chief of nutrition planning, assessment and evaluation service, Food and Agriculture Organization, New Delhi
Email: prakash.shetty@fao.org

"Policies that encourage healthy diet and being more active can help tackle the problem of obesity."

— Marion Nestle, professor of nutrition, food studies, and public health, New York University, USA
Email: marion.nestle@nyu.edu

"One child policy in China is one of the major factors responsible for a rise in obesity prevalence in the country."

— Tsung O Cheng, professor of medicine, George Washington University Medical Center, Washington, DC, USA
Email: tcheng@mfa.gwu.edu

"It is easier to catch the problem early, so education of parents and children about proper nutrition and physical activity is important. Interventions through schools is also important."

— Peter Walsh, chronic disease prevention division, Centre for Chronic Diseases Prevention and Control, Health Canada, Canada
Email: peter_walsh@phac-aspc.gc.ca

"It is predicted that in 20 years, diseases associated with obesity will account for 60 per cent of the disease burden and mortality in the developing world."

— Kirsten Rennie, researcher, Human Nutrition Research

Elsie Widdowson Laboratory, Cambridge, USA
Email: klr1000@cam.ac.uk

"As poor countries become more prosperous, they acquire some of the benefits along with some of the problems of industrialised nations. These include obesity."

— George L Blackburn, associate director of nutrition, division of nutrition, Harvard Medical School, Centre for the Study of Nutrition Medicine, Boston, USA
Email: gblackbu@bidmc.harvard.edu

"In the next decade, obesity will overtake malnutrition and starvation as the key health concern in the developing world."

— Jason C Halford, associate director, Kissileff Laboratory, Department of Psychology, University of Liverpool, Liverpool, UK
Email: j.c.g.halford@liverpool.ac.uk

"The problem of obesity is not given adequate importance by the government of Japan. Here, the health sector is concerned with malaria and HIV/AIDS. So it's not even well known or understood by the general population that obesity is indeed a problem."

— Marina Njelekela, department of life science, Graduate School of Human and Environmental Studies, Kyoto University, Japan
Email: mnjelekela@muchs.ac.tz

"Indians are at increased risk to get diabetes or heart problems due to obesity compared to Caucasians of same weight, height and age."

— Nikhil Dhurandhar, department of nutrition and food science, Wayne State University, Detroit
Email: ag8675@wayne.edu

"Proper balanced diet with particular care during adolescence is needed to handle this grave disease in India, because childhood obesity correlates with adult problems."

Dr Mandakini Parihar, director, Mandakini IVF Centre, Mumbai
Email: map@parihar.com

It has been predicted that in 20 years, NCDs — predominantly those associated with obesity — will account for 60 per cent of the disease burden and mortality in the developing world. Some experts are of the opinion that in the coming decade, obesity problem will persist uniformly across the countries.³⁴ The added cost incurred by the growing prevalence of these diseases will have huge economic and quality of life implications in the hitherto economically weak countries.³⁵

Indian view

Anoop Misra says that the problem is more or less confined to the urban areas.³⁶ But now the trend is shifting, affecting smaller towns and more people, largely due to the hard sell of easily available fast food (chips, colas) on the audiovisual media. Misra says, "Government should have clear programmes to control NCDs, which should percolate down to the common people living in smaller towns and villages."

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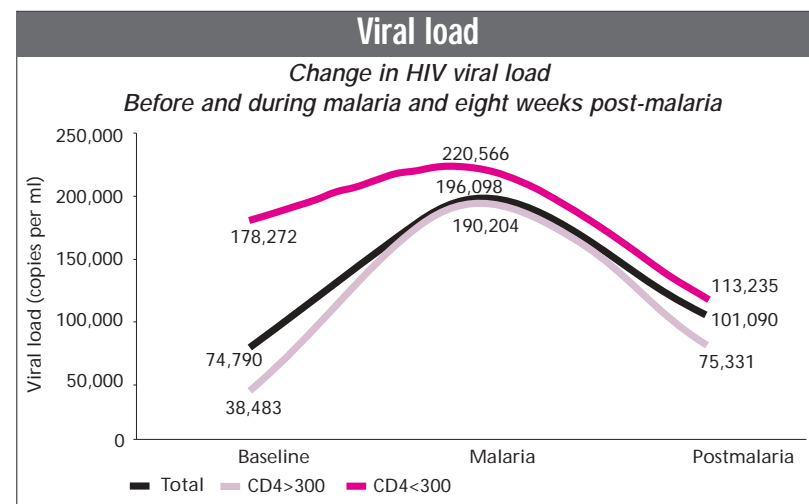
BREAK THROUGH

Does malaria enhance HIV transmission?

Both malaria and human immunodeficiency virus (HIV) infection are endemic in many parts of the world. People with HIV infection are more susceptible to malaria due to their depressed body immunity. But does malaria enhance HIV transmission and accelerate the disease progression? James G Kublin from Fred Hutchinson Cancer Research Center from Seattle, USA, and his team conducted a prospective cohort study in Malawi (Africa) to find out the changes in concentration of virus (virus load) in HIV-infected adults who didn't have malarial infections at the time of enrolment. The underlying idea was that the malarial parasite causes an increase in enzymatic activities that might promote HIV virus replication and, thereby, increase the HIV virus load. Individuals with increased HIV virus concentration in blood transmit the infection more effectively and have accelerated progression of the clinical disease. The researchers were of the opinion that a better understanding of this concept is necessary because co-infection is a very common phenomenon, consequences of which might be of importance to clinical and public health.

Scientists used a prospective cohort design to assess the effect of malaria on concentration of HIV virus in blood over three time points — during the enrolment visit when persons did not have malarial parasite in their blood; during an episode of malaria; and during a visit about eight weeks after the episode when the person had neither malarial parasite nor any further episode of malaria. All study subjects were adults aged at least 18 years and HIV positive.

The findings showed that the concentration of HIV virus in the blood increased significantly with malaria, especially when the individuals had fever and parasite density more than 2,000 cells per microlitre and baseline CD4 (lymphocyte) counts more



than 300 cells per microlitre. Data analysis also showed that increase in malaria coincides with a significant increase in HIV viral load (see Graph: *Viral load*).

The study also revealed that the increased HIV virus concentration was reversible within eight to nine weeks in individuals who had been treated for malaria and the viral load reached almost the baseline level. The findings imply the importance of concerted efforts to prevent HIV and malaria in areas where both diseases are endemic. James Whitworth of infectious disease epidemiology of London School of Hygiene and Tropical Medicine supporting the views of Kublin (in the same issue of *The Lancet*) concurred there is a possibility of 50 per cent increase in HIV transmission during the short period of higher viral load in blood during malaria. In India, this study is of special importance, as the country is known to be malaria endemic and also ranks second, after South Africa, in the world in terms of total HIV infection cases.

Source: James G Kublin et al 2005, Effect of *Plasmodium falciparum* malaria on concentration of HIV-1-RNA in the blood of adults in rural Malawi: a prospective cohort study, in *The Lancet*, Vol 365, No 9455, pp 233-239.

PRODUCT WATCH



One dose of life

To ensure the success of the polio eradication programme, a new vaccine — the "monovalent oral polio vaccine" (mOPV) — to fight the type 1 strain of polio virus is being introduced. The polio virus transmission still persists in the Indian slums. According to Brent Burkholder, acting regional advisor, vaccines and other biologicals, World Health Organization-Regional Office for South East Asia (WHO-SEARO), the decision to introduce the

monovalent vaccine is waiting for the final approval of the secretary, ministry of health and family welfare. He said the vaccine will be given to the people in the areas where the type 1 virus is more prevalent, particularly after spring. The type 3 virus is known to strike after September. Type 2 virus has been eradicated, while the type 3 is still prevalent, but not largely so. Type 1 virus is the most lethal followed by type 3. This fact prompted the introduction of mOPV against the type 1 polio virus that leads to paralytic polio. In Mumbai, 84 environmental samples tested positive for the above virus in 2004. "Data from five tropical countries shows that just one dose of mOPV conferred immunity in 81 per cent of those vaccinated," says Ronald Sutter from the Centre for Disease Control and Prevention, USA. This is in contrast with 30-40 per cent immunity rate conferred by one dose of present trivalent OPV. This is because the live and dormant virus that replicates in the gut does not have to compete with the other two virus types of cells susceptible to infection. "At this stage, the benefits of the vaccine are only theoretical," opines Bruce Alyward, who coordinates the polio eradication programme from WHO. Two companies —

Sanofi Pasteur in Lyon, France and Delhi-based Panacea Biotech — are going to deliver 200 million doses. But because mOPV has not been produced by any company in years, it is no longer licensed. So the vaccine has to be reviewed as a new product. If the vaccine is ready by May 2005, as planned, there should be delivery of at least two rounds in parts of India before the beginning of the peak season of viral transmission, from July to September. Another concern is that the promise of a more effective vaccine might divert attention from the need to reach every single child with doses of the type 3 OPV, which needs to be continued. According to WHO, in 2004, the number of type 1 polio virus cases was 129 as compared to seven type 3 polio virus cases. Thus, it is logical to increase the number of vaccine polio viruses type 1 in OPV. But the noteworthy fact is that type 3 polio virus was also found in places like western Uttar Pradesh where type 1 is present. Hence, focussing only on the type 1 polio virus could lead to the ignoring of the other virus that is still not totally eradicated. It is very important to plan the initiation of mOPV administration, taking into consideration all these vital factors.

BRIEFS

Potential fathers beware

Research by scientists at the New York State University reveals that laptops could cause sperm counts to fall. Lead researcher, Yefim Sheynkin, State University of New York at Stony Brook, notes, "Laptops can reach internal operating temperatures of over 70°C. They also produce direct local heat and require their users to sit with their thighs close together to balance the machine, trapping the scrotum. Both factors seriously affect fertility." The study '*Increase in Scrotal Temperature in Laptop Computer Users*' was published in the UK journal *Human Reproduction*. Twenty-nine volunteers between the ages 21 and 35 years took part in the study. The temperature of the men was tested with and without computer on their laps. The scrotal temperature increased significantly when the men had the laptops on their laps. "The body needs to maintain a proper testicular

temperature for normal sperm production and development," says Sheynkin. He also warned that years of frequent laptop use "may cause irreversible or partially reversible changes in male reproductive function". Many other European fertility studies have shown that in general, an increase in scrotum temperature by 1°C can reduce sperm count by as much as 40 per cent. Heat generation from laptops is a common phenomenon. A number of cases have been reported of laptops catching fire due to defective batteries or faulty AC adapters. Laptop users have been known to use pillows, books or other items on their laps to buffer the heat emitted from portable computers. It is worth noting that sperm counts in Western countries have been dropping for the past 20 years. But before hardware makers rush out to develop new laptop peripherals designed to protect fertility, Sheynkin has a word of caution.

"Devices or pads to protect the scrotum are not a bad idea, but these would need to be investigated and tested before putting out just another gadget for people to use", he opines. "Depending on the position people use to balance the laptop and how close their thighs are, the scrotum temperature can still go up", he adds. According to him, the only remedy is that men should place their laptops on the desk while using them.

Source: Yefim Sheynkin 2004, *Increase in scrotal temperatures in laptop computer users*, in *Human Reproduction*, European Society of Human Reproduction and Embryology, USA.

Lead to anaemia

Doctors at the All India Institute of Medical Sciences (AIIMS), New Delhi, have found that iron deficiency is linked to high levels of lead in blood. This is because iron and lead are biochemically very similar. "The absence of iron creates

a nutrient deficit in the body that responds by grabbing more of the lead ingested by the child, or hanging onto the lead more strongly, once it is in the body", explains Dr Bradman, associate director of the Centre for Children's Environmental Health Research at University of California Berkeley's School of Public Health. He further reports that insufficient iron levels in the blood may put children at higher risk for increased lead exposure. Researchers have found significantly higher lead levels in the blood of iron-deficient children — average blood lead level 5.6 microgrammes per decilitre ($\mu\text{g}/\text{dL}$), or in other words, one $\mu\text{g}/\text{dL}$ higher than that in children with normal blood iron levels. Furthermore, in highly contaminated environments, iron-deficient children had average blood lead levels 2.8 $\mu\text{g}/\text{dL}$ higher than those in children having sufficient iron in their blood.

H S Kim and co-workers from the department of food science and nutrition, Soonchunhyang University, South Korea, conducted a study on the Korean lead workers in 2003 by measuring their dietary iron intake and biochemical indicators to test the hypothesis that a high blood lead level is associated with impaired iron function. Blood lead, haemoglobin and other haematological parameters were evaluated to find the levels of iron and lead in their blood. It was found that the workers had significantly lower haemoglobin and dietary iron intake compared to normal people. Iron deficiency was



associated with high blood lead levels.

Similarly, A W Wolf and his co-workers, researchers at the Case Western Reserve University, USA, found in December 2003 that changes in blood lead levels corresponded closely with changes in iron levels. They suggested that prevention of iron deficiency was a rapid and effective means of checking high blood lead levels in infants.

Sources:

1. University of California 2001, <http://www.pslgroup.com/dg/207d8e.htm>, as viewed on March 1, 2005.
2. A W Wolf et al 2003, Effects of iron therapy on infant blood lead levels, in *Journal of Pediatrics*, Vol 143, pp 789-795.
3. H S Kim et al 2003, Cross-sectional study of blood lead effects on iron status in Korean lead workers, in *Nutrition*, Vol 19, pp 571-576.

Dyed food

The Food Standards Agency (FSA) of Britain has warned people against more than 350 food items that contain a carcinogenic dye called Sudan 1. The illegally used dye was found in a batch of chilli powder used by a British tea and pickle-maker, Premier Foods, to make Worcester sauce. Presently, investigations are being carried out to find how the chilli powder was contaminated before it was supplied to the sauce manufacturer. FSA has published a list of 359 products that may have used the sauce in question and advised the public not to eat them. The same agency had issued a warning in December 2003 on Sudan 1 contamination of another International Brand in

Water: A Matter of Life and Health

Maggie Black and Rupert Talbot, OUP, New Delhi, 2005, pp 262, Price- Rs 545/-



Although India faces serious problems of freshwater scarcity, groundwater depletion, and environmental pollution, there has been little effort to find a comprehensive solution. Rather, introduction of new technologies without prior testing in the Indian context has become a cliché in today's water and sanitation programmes. This book critically examines what has been done and needs to be done to fulfil the promise of 'drinking water and sanitation for all'. The authors have extensive experience on the issues pertaining to water and environmental sanitation. Apart

from astute scientific description of these issues, importance of community involvement, particularly that of women has been singularly emphasised. Experience of the United Nations Children's Fund shows that sustainability of the water and sanitation programme is directly linked with the extent of women's participation. The important point highlighted and reiterated throughout the book is that the complex water-related problems cannot have any single technological solution. The lucid language, clear depiction and analysis of data and field-based examples are bound to generate interest among various segments of readers — from research scholars to panchayati raj institutions, policymakers, politicians, social workers and doctors.

BOOK
REVIEW

ginger-garlic spice mix. Since then, the use of this dye had been banned in food products.

Sudan 1 is a red dye normally used as a colouring agent in solvents, oils, waxes, petrol, and shoe and floor polish. A study by the German Cancer Research Centre in 2002 confirmed that Sudan 1 could cause cancer of liver and urinary bladder among humans.

Following this, more than 418 food products have been withdrawn from the Britain's supermarkets. But the Indian market continues to sell these products. According to the government, "The Spices Board had imposed very stringent norms about colouring agents, and the chillies supplied to the European Union did not have any cancer-causing substances." Another fact worth noting is that India is the chief exporter of spices to the world. The presence of carcinogen-laden dye in the spices puts a question mark on the monitoring of these ingredients. Food companies in the UK have admitted that the adulterated chilli powder added to the sauce had been used in food sent to hospitals and schools. FSA is still trying to track who has been responsible for adulteration or whether anyone should be prosecuted for it.

Sources: 1. Anon 2005, Cancer risk warning in UK, in *The Indian Express*, New Delhi, February 19.
2. Marie Stiborová et al 2002, Sudan I is a potential carcinogen for humans, evidence for its metabolic activation and detoxication by human recombinant cytochrome P450 1A1 and liver microsomes, in *Cancer Research*, Vol 62, pp 5678-5684.

Nineteen years after Chernobyl

Since the 1986 Chernobyl (Ukraine) nuclear reactor accident, incidence of thyroid cancer is steadily on rise in the neighbouring country of Republic of Belarus. A report to this effect has been published by Martin Mahoney of Roswell Cancer Institute, Buffalo, USA, in 2004 in the *International Journal of Epidemiology*. Between 1970 and 2001, age-adjusted thyroid cancer incidence rates have increased from 0.4 per lakh to 3.5 per lakh populace among men and from 0.8 per lakh to 16.2 per lakh populace among women. The increase in cancer cases was remarkable for both sexes after the accident and was found in both

'high exposure' (regions closer to the nuclear plant) and 'low exposure' (regions far off from the reactor site) areas. But the relative increases in the 'high exposure' area from the Chernobyl disaster exceeded those in the 'low exposure' areas, with marked increases in thyroid cancer incidence rate ratios between both genders and in all age groups. Lower age at the time of radiation exposure was thought to be a factor behind increased susceptibility as a result of higher radiation doses per unit of thyroid tissue and higher metabolic activity of the thyroid gland relative to adults. Highest increases were observed among children from 'higher exposure' areas in the age group 0-14 years at the time of diagnosis. Furthermore, there were more atypical thyroid cancer incidences among the children exposed to radiation at the age of two or less, which was presumed to be radiogenic. Pre-existing iodine deficiency in the region coupled with radiation exposure doubled the risk of developing thyroid cancer in children and adolescents. Women showed notable increase in thyroid cancer compared to men. These radiations cause damage to deoxyribonucleic acid and trigger uncontrolled cell division, resulting in cancers in thyroid, lung, breast and blood.

Source: Martin C Mahoney 2004, Thyroid cancer incidence trends in Belarus: examining the impact of Chernobyl, in *International Journal of Epidemiology*, Vol 33, No 5, pp 1025-1033.

Before time

Preterm birth is the leading cause of infant mortality in industrialised countries. Adverse pregnancy outcomes are more frequent among socially disadvantaged women. Following the introduction of economic and political reforms in Russia in 1991, majority of the population became impoverished. There was a considerable decline in the overall life expectancy and an increase in the social and health inequalities. The proportion of infants born before term increased in many industrialised countries during the same time span. For instance, preterm birth rates increased from 9.4 per cent in 1981 to 11.9 per cent in 2001 in the US. A study was conduct-



ed by Grjibovski and his co-workers from Karolinska Institute in Severodvinsk, a town in Russia in 1999. All pregnant women registered at prenatal care centres in the town were enrolled for the study. Data on maternal education, occupation, marital status, pre-pregnancy weight, gestational length and pregnancy outcomes was obtained from the medical records of the maternity homes. Data on maternal reproductive history and complications was also abstracted from the records. Statistical analysis of the data revealed that maternal education was significantly associated with the period of gestation and spontaneous preterm birth. A low level of education among the women was associated with the risk of preterm birth. Mothers aged more than 30 years were also at increased risk of preterm delivery. Two mechanisms to explain social disparities in preterm birth were proposed. The first involves unhealthy behaviours, infections, exposure to stress and physiological reactions to these factors that shorten gestation. The second one involves gene and environment interaction resulting in a structural change of the former. Economic crisis in Russia led to poor compliance with the medical recommendations on diet and vitamin supplementation.

Source: A M Grjibovski et al 2005, Large social disparities in spontaneous preterm birth rates in transitional Russia, in *Public Health*, The Royal Institute of Public Health, USA, Vol 119, pp 77-86.

Healthy cooking

The Kerala Sastra Sahitya Parishad (KSSP) — a pioneering people's science movement in India — is working towards providing education and fuel-efficient stoves to poor households. It has substantive programmes on issues pertaining to health and women. The organisation led Kerala's high efficiency *chulha* (stoves) programme. It funded the Integrated Rural Technology Centre (IRTC) that became the main research site for testing various *chulha* models and bringing together scientists and villagers to solve problems related to the use of the *chulhas* in ordinary people's homes. This *chulha* reduced indoor air pollution and health hazards, particularly to women. KSSP has received a number of awards, including United Nations Environment Programme's Global 500, the *Vriksha Mitra* and the King Sejong (UNESCO) award.

Its mission is to popularise science

and technology in the country and to oppose abuse of environmental resources. A group of concerned activists and science writers started the movement as early as 1957. The organisation had 2,600 members in 1976 and presently has 60,000 members.

In 1989, KSSP undertook a massive literacy campaign in the district of Ernakulum, Kerala. The district administration and KSSP, along with various other voluntary and mass organisations, are working hand in hand on the platform of the now famous *Zilla Saksharatha Samithi*. This campaign approach has helped



Kerala in spearheading its literacy campaign.

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Eradicating TB

A voluntary organisation, *Seva Mandir*, is working on rural and tribal development issues in and around Udaipur district in Rajasthan. It is involved in the Revised National Tuberculosis (TB) Control Programme (RNTCP) of the government and in the implementation of the DOTS (Directly Observed Treatment, Short course) therapy for



TB under RNTCP at the field level. Twenty-nine paramedical workers were trained under the government's TB DOTS programme in the year 1999-2000 and since then, in collaboration with the government health department, they have been providing services to the TB patients in their villages. Besides this, Health Education and Maternal and Child Health Programme are the major components of its Health Programme. As of today, this programme is reaching out to about 250 villages through a network of 325 health workers comprising village health workers (VHWs), home remedy workers (HRWs) and traditional birth attendants (TBAs). They hold meetings, treat minor ailments and provide safe drinking water. The organisation provides health and other development activities to 583 villages. Its goal is to provide sustainable livelihood to village communities and to achieve well-being in terms of health, education and gender equalities. It has 282 staff and 737 paramedical workers.

The latter work at the village level. Traditionally, rural Udaipur has been dependent on forestry, agriculture and livestock rearing for livelihoods. However, in recent years, due to large-scale degradation of natural resources, people are migrating to work as daily-wage labourers. Low literacy rates and poor nutritional and health status amongst the rural poor (especially the women) further compounds the problem. *Seva Mandir* provides livelihood to these people by wasteland, watershed and water resource development. It involves the village community to undertake soil and water conservation interventions and public action to support education, women welfare and health-related activities.

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Readers write in

Thank you for the newsletter. Also many thanks for the lead article, the subject of which is the most serious threat to public health. The newsletter is attractive and useful.

Wishing it a long life

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Some months ago, you had carried a brief of my study on carbonated soft drinks and reflux-induced increase in adenocarcinoma of the oesophagus in Americans. Unfortunately, I went on leave and the issue was lost. This week, I received Jan-Feb 2005 copy of the magazine.

I wish to let you all know that during the process of my research, I realised that the carbonated soft drink industry is producing huge amounts of CO₂. Every 1,000 ml of a drink has 4,000 ml of CO₂. Furthermore, a lot of CO₂ gas escapes during packing and carbonation. In short, it is my rough estimate that for every 500 ml of a soft drink, the industry produces at least five to six times the volume of CO₂. Given the fact that the industry makes billions of litres of soft drinks, it also releases five to six times CO₂ into our environment.

Someone from your agency could take up this issue and get exact figures. After all, little drops of water make a mighty ocean.

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Happy to see and read newsletter from CSE, in particular Vol 3 No 1. The problem of arsenic in India seems to be a very serious one and may force our scientists to solve it. Other contents are also very much informative and useful for the readers. I appreciate the quality of this magazine.

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He works for knowledge management and mitigation of environmental pollution, especially arsenic contamination in rural ecosystems. His aim is to build community efforts for mitigation of arsenic toxicity from drinking water and conserve ecosystem and diversity for sustainable development, health and poverty alleviation.



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She heads a non-governmental organisation that takes part in neurology, psychiatry and neurotoxicology research and discussions. Her recent projects have focussed on arsenic, phenomenology, visual perception and geriatric psychiatry. The objective is to understand human mind and envisage ways of alleviating human suffering from the knowledge so gained.



CSE's Health and Environment Newsletter is a bi-monthly publication and is available online and downloadable at

www.cseindia.org/html/healthnews.htm

Other stories related to environment and health are available at our website: <http://www.cseindia.org>

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How fresh is a red apple? Don't trust your eyes. It is lined with harmful pesticide residue and heavy metals. And it is not only the apple. Most of our foodstuff and the water we drink are suspect materials for our health.

But we cannot complain or build up any meaningful and informed opinion against it. We are helpless as we lack scientific data.

Centre for Science and Environment, as part of its commitment towards a clean and safe society, has started a state of the art laboratory dedicated to detect deadly pesticide residue and heavy metals in our foodstuff, beverages, water and bloodstream. It also undertakes testing of water for a complete profile of pollutants, even for individuals. We encourage civil society organisations around the country who are into mass movements against pollution to come forward and use this facility to test any "suspect" material.

CSE POLLUTION MONITORING LABORATORY

For details, contact:
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