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SOFT TARGET

Children are bearing the brunt of environmental degradation. Across the class divide, they are eating, drinking and breathing poison. And their special bodies make them most vulnerable to a host of diseases

PRANAY G LAL AND SARITA BAHL

Safe inside the warm womb of the mother, a child kicks and turns. This is the third time that Sarah Connell is pregnant, but she has never reached her second trimester of pregnancy. She aborted twice earlier. This time she has moved houses, cleaned up her home, and taken every precaution to ensure that this baby survives. So far all is well. The seed to the problem began when Sarah was a not quite in her teens, but had reached puberty when she was all of nine years old. Like every girl in the scenic town of Lake Charles, Lousiana, also known as the capital of the vinyl industry of USA. "All the girls are reaching puberty early in this generation," assured the local gynaecologist. Sarah remembers this vividly. She knows that her failure to conceive is because of the contamination of her womb. She is not alone — at least not the only one from Lake Charles. Or from any industrial town elsewhere in the world, including India.

When Shubha Kulkarni, a nine-year-old schoolchild from Mumbai, reached home, she complained of severe uneasiness. Then she started coughing, often bending with pain, her eyes watering. Her mother thought she had caught an allergy, given the city's high air pollution levels. Suddenly, Shubha spluttered, her face contorted and almost choked, her lungs gasping for air. This was Shubha's first asthma attack. She's had several since then.

PHOTOGRAPHS: PREETI SINGH / CSE

More children are suffering from asthma, cancer and learning disorders than ever before. Global figures suggest that since 1990, childhood cancer rates have risen by 12 per cent, asthma in children by 17 per cent and systemic disorders by 16 per cent. But these are just conservative estimates. Developing countries like India do not have authoritative registries, and guesstimates do the rounds. "There are few epidemiological studies conducted in India," says India's leading paediatrician H N Billimoria. Worse, even physicians are inept in diagnosing diseases. A critical review published in the *Journal of the American Medical Association* shows that doctors in India 'under-diagnose' asthma by 15 per cent.

Some indicators do throw light on this alarming increase. Some may argue though that this could be due to increased awareness. Still sample this. Children's hospitals in India increased from 22 in 1990 to 148 in 2001, according to the Directorate General of Health Services. Contribution of asthma drugs for children increased from seven per cent in 1987 to 18 per cent in 1999, says the All India Pharmaceutical Manufacturers Association. Childhood cancer cases grew from 4,124 in 1988 to 6,187 in 1996, says the recently-published Cancer Registry of India. "These figures in many ways reflect the poor environment we live in," says Anupam Sachdev, paediatric oncologist at the Sir Ganga Ram Hospital, New Delhi.

Brittle bodies

Environmental changes affect children the most

It is frightening. Children and adults today carry an estimated 300 or more chemical residues that were not present in their grandparent's body. The fact that a compound bio-accumulates tells us that the body cannot metabolise and eliminate every compound. The human body simply doesn't possess enzymes or other chemical mechanisms to counter the assault of novel compounds whose molecular structures are different from natural compounds. These chemicals accumulate in the body with time and are passed on to the next generation through the placenta and breast milk, often in high concentrations.

From conception to adolescence, rapid growth can be easily disrupted due to exposures to toxins. Cell growth is particularly rapid in the embryo, providing more opportunity for chemicals to cause mutations and congenital anomalies. During this period, structures are developed and vital connections are established. The foetus and infant have different vulnerabilities to damage. Children's metabolic pathways, especially in the first months after birth, are immature. And their ability to detoxify and excrete chemicals is much lower than adults.

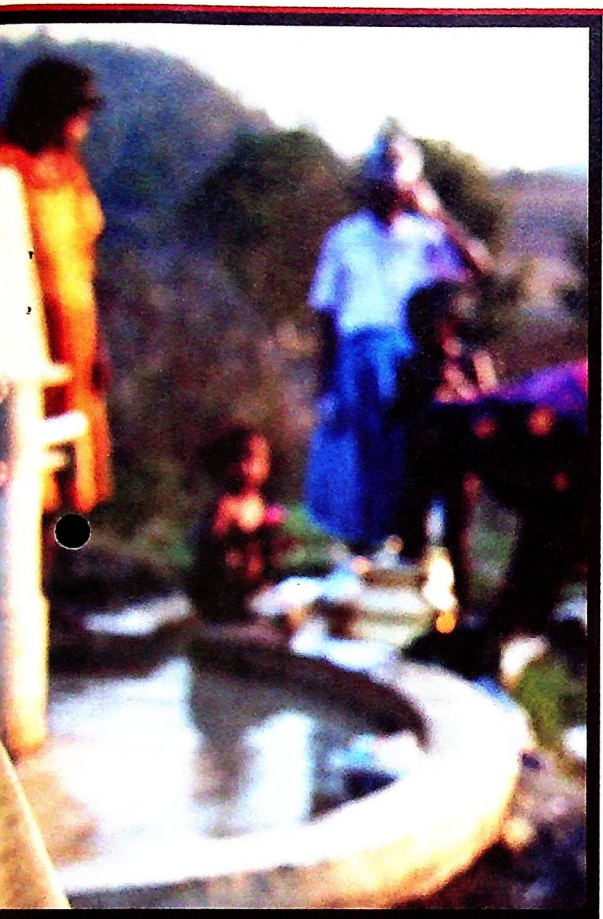
That's why any change in the environment will affect them the most. Children drink more water, eat more food and breathe more air than adults in relation to their body weight. For example, the air intake of a resting infant is twice that of an adult. An infant (six months old) drinks

Children consume more water, food

8-12 times more water per kilogramme of body weight than an average adult. Children between the age of 1-5 eat three to four times more food per unit body weight than the average adult. Absorption rates are also higher: infants absorb as much as 50 per cent of the lead and other heavy metal contaminants present in food while adults have an uptake of only 10 per cent.

Recent research shows that the link between a degraded environment and children's health is unmistakable. "Even in the rich countries of Europe, the major environmental impact on people are borne by children. Policies as well as impacts are deeply unjust and hurt the poor communities more than the rich," says the World Health Organisation's (WHO) latest publication *Children's health and environment: a review of evidence.* In industrialised countries, many children die due to birth defects that cannot be explained. In USA, about 6,500 children die due to birth defects, which is the leading cause of infant morbidity. While only about 20 per cent of birth defects are due to known factors, the causes for the remaining 80 per cent remain elusive. And evidence against environmental factors is mounting.

Consider just three studies, which conclusively prove the



in 1979 to 29 per cent in 1999. He attributes the rise in asthma due increasing urbanisation, industrialisation and more importantly vehicle exhaust.

A study by S G Kabra, a physician at the Indian Institute of Health Management Research in Jaipur, found that pesticide residues in food are responsible for deformed babies. An estimated 8,000 babies are born with neural defects each year in Rajasthan (see *Down To Earth*, Vol 9, No 3; June 30).

A recent study by K Senthil Kumar of University of Yokohama, Japan, shows that dioxin levels in tissues of Indians is as high as heavily industrialised countries like Japan, while other developing and some industrialised countries have lower levels of dioxin. Dioxin are produced by incineration of plastics and vinyl. Children are particularly susceptible to dioxin exposure. It causes structural birth defects, premature births, mental retardations, and systemic cancers. It is also considered one of the most potent carcinogens.

What's eating our children?

The threats just don't end with pesticides and dioxins. Large amounts of toxic chemicals used in industrial processes are incorporated into products. For example, over half of the top 20 chemicals in use (over 120 million tonnes), and half of those incorporated into products in India, are known or suspected carcinogens. An additional 80 million tonnes of restricted pesticide products are legally released each year in India. Mercury and other heavy metal contamination of our waterways is growing.

These toxic chemicals diffuse across the globe — to even environments that were considered pristine. Inuit mothers in the Arctic, far from sources of industrial pollution, have some of the highest levels of PCBs in their breast milk as a result of a diet rich in marine mammal fat. With "safe" levels for hazardous

and air than adults. That's why they are more susceptible to any contamination

link between environmental contamination and their impact on children. A review of global studies published in the *Journal of Epidemiology and Community Health* in 2001 showed that exposure to polychlorinated biphenyls (PCBs) caused childhood neurological disorders to the foetus, which can lead to birth defects, spontaneous abortions, mental retardations and reduce fertility. PCB are commonly used as industrial reagents in electrical equipments like transformers and in household cleaning solutions and sprays. Another study published in *The Lancet* in November 1999 showed that pregnant women and the foetuscan be affected indirectly by pesticides — people can bring pesticides used in farms and gardens and expose them. The study showed that children between 0-9 years, whose parents had occupational exposure to pesticides, developed acute lymphoblastic anaemia (ALL) during early childhood.

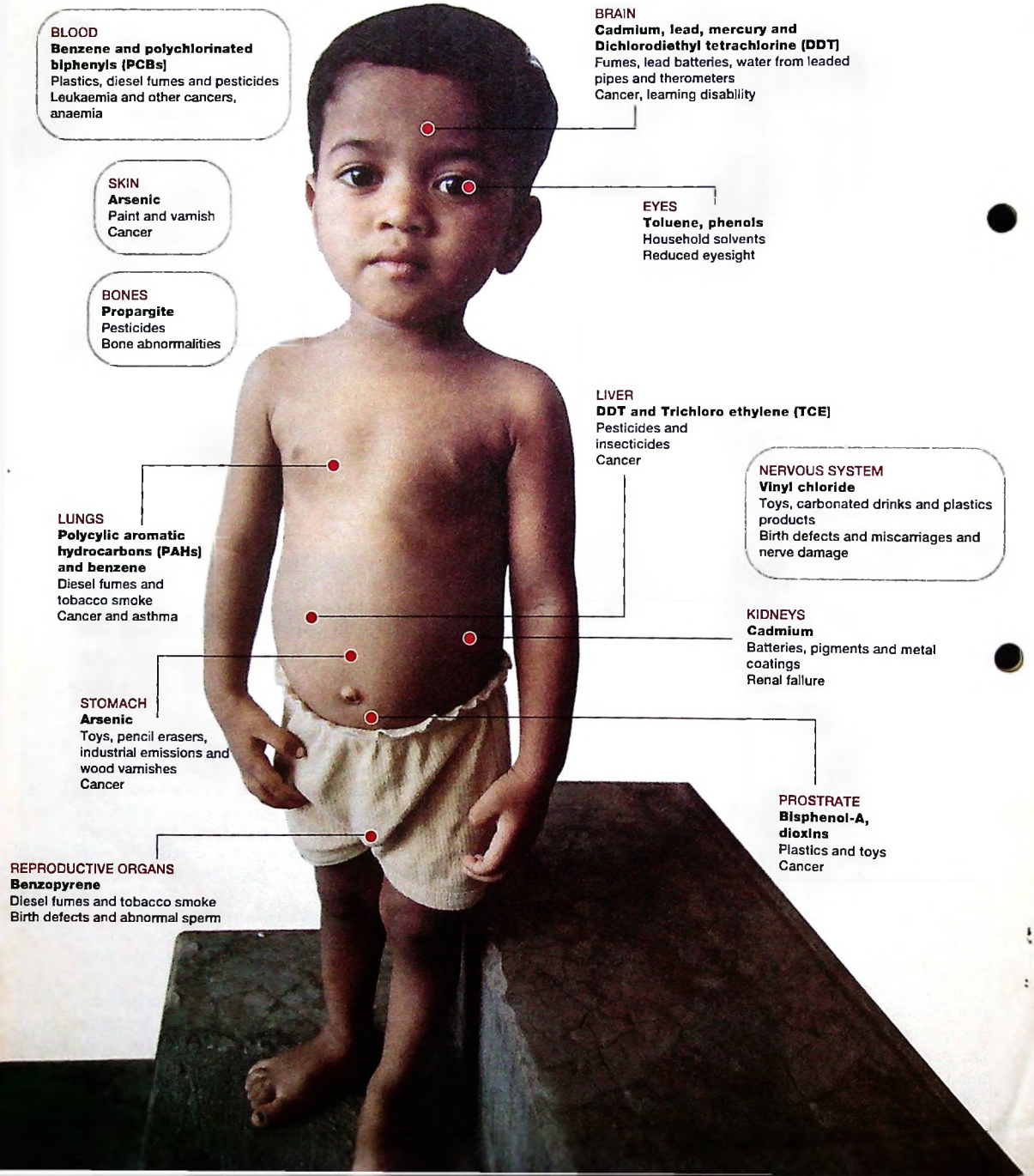
In India, studies linking a changing environment to children's diseases are few. H Parmesh of the Lakeside Medical Centre, Bangalore, recently conducted a study using 20-year data for asthma in 20,000 cases in children under 18 years. He found that Bangalore, a city with comparatively cleaner air, showed a high rise of asthma prevalence — from nine per cent and toxic chemicals being revised more frequently than before, it appears that there is no safe limit to many chemicals. In combination, their safe limits decrease manifold.

Over and above, the Indian child suffers from a double burden — dirty water is still the biggest killer in the country. All this exacerbated by the lack of nutrition. Incidences of traditional diseases like diarrhoea and malaria are also increasing. "Over half of the children under age of five years in India are moderately or severely malnourished, 30 per cent newborn children are significantly underweight," says the *National Human Development Report 2001* of the Planning Commission.

The burden of disease on children is increasing. The constant onslaught of both traditional diseases and modern diseases (pesticides and fertilisers in dusts, air, water and food, plastic wastes, agricultural or industrial effluents) make children vulnerable to a range of infections. Lifestyle-related diseases such as diabetes and obesity are also on the rise, as urban children are getting addicted to "junk" food with little or no nutritive value and lead an increasingly sedentary life. The web of death and diseases does not seem to end.

BODY OF EVIDENCE

Toxins present in the environment can invade almost every part of the child's body. Some threats



Every drop kills

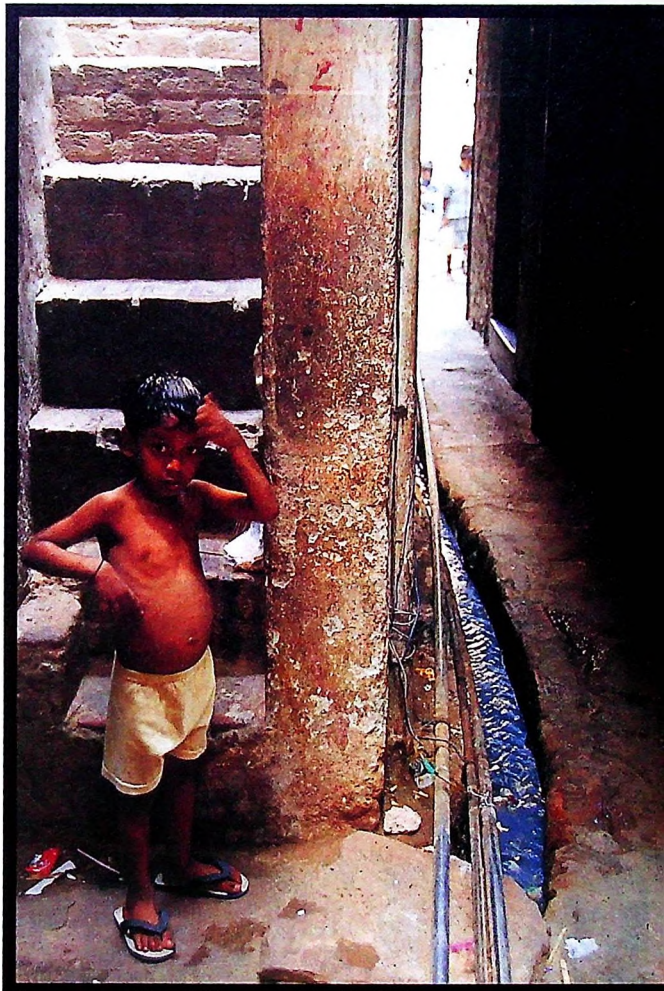
Waterborne diseases are the biggest threat to children

Waterborne diseases, caused by the intake of chemicals and contaminated water, affects around 3.4 million people globally. In India, around 563,000 people are affected annually, one fourth of which are children, according to the Union ministry of health and family welfare.

Water gets contaminated due to sewage from households, industrial effluents, human excreta and even groundwater contaminants like arsenic, fluoride and nitrates. Flouride in water is essential to protect teeth but higher levels can adversely impact health. Groundwater contamination due to fluorine affects six million children in India. High fluoride content is found naturally in the waters of Rajasthan. So are nitrates.

High levels of nitrates can prove fatal for infants who drink powdered milk. Nitrates restrict the amount of oxygen reaching the brain, causing the 'blue baby' syndrome. Nitrates are also linked to digestive tract cancers and affect lungs. Cholera, another waterborne diarrhoeal disease, causes death of about 700,000 people every year. Needless to say, children succumb to changes be it in water or any other source faster than adults.

But diarrhoea still remains the most common symptom of water contamination. Every year, a billion children get sick with diarrhoea, and for 3.3 million of those infected, the disease is fatal. Rotavirus, considered to be the main cause of severe diarrhoea, causes over 800,000 deaths annually in children aged less than five years in developing countries. Diarrhoea also causes over one-half of diarrhoeal deaths of children below the age of five in rural northern India.



Every year a billion children get sick with diarrhoea

The pathogens originate in manure heaps, domestic garbage and human faeces where there are no proper latrines. Malnourished children exposed to contaminated water are more susceptible to a diarrhoea attack. An estimated 60-70 per cent of diarrhoeal diseases are caused by dehydration.

Polio targets children under the age of three. Nearly 50 per cent of polio cases are found in this population. Young children, pregnant women and people with low immunity are especially at risk. Lack of hygiene and sanitation worsen their condition.

Roundworm, hookworm, tapeworm, threadworm and whipworm infections couple with malnourishment in tropical countries. In India, infestation from worms is widespread, especially in rural areas, where it is estimated that 20 per cent of outpatient morbidity is due to helminth infestation. There is no regular monitoring of such diseases, therefore little reliable data is available. But it is believed that about 10 per cent of the population in India carries heavy worm loads with mild symptoms, while one per cent is severely affected. Worldwide, about 400 million schoolchildren are affected by worm-related diseases, often with multiple infections. Of these, the two most significant in terms of mortality are roundworm and hookworm, each believed to cause about 60,000 deaths every year globally.

Groundwater contamination affects around six million children in India

Tropic of cancer

Childhood cancer rates in India are increasing by six per cent every year

Paediatricians are worried about rising cancer rates among children. Like Anupam Sachdeva and A K Dutta, head of department of paediatrics at Lady Hardinge Medical College, New Delhi. They have been witness to a rise in the incidences of brain cancer and acute lymphocytic leukaemia, commonly found among children.

In fact, incidence rates of childhood cancer in India have risen in the past decade by about 14 per cent, according to the ICMR's latest cancer registry. The greatest surge has been in leukaemia, says L S Arya of the All India Institute of Medical Sciences (AIIMS), New Delhi, who has worked extensively on such illnesses. Arya also says that parents are more aware today and seek early treatment, which may have also led to this upward trend in cancer registries in hospitals. Recent research attributes this to environmental causes.

P MADHAVAN

Pesticides cause biological changes in the body that enable cancer cells to multiply

Plastic toys and teddy bears can lead

A study in *Cancer Research*, a US-based journal, in 1991, found that baby rats were seven times more susceptible than older rats to a potent liver carcinogen. To make matters worse, infants and children have greater exposure to carcinogens than adults. For instance, chemicals like formaldehyde, exuded by new carpets, insecticides sprayed at home, herbicides in the lawn, even benches coated with wood preservatives linger longer at the ground level. Children crawling on the floor, playing on the lawns or tumbling in the grass with pets come in close contact with such chemicals.

High exposure to toxic compounds like pesticides (specially organophospates) have long been recognised to cause nerve damage (called the nerve gas syndrome). More recent animal studies have suggested that even low dose exposures can cause injury to the developing foetus, and can do so at exposure levels that do not cause clinical symptoms in the mother.

For example, on an average, children in the US by the age of six, would have accumulated about 35 per cent of their allowable lifetime cancer risk from captan — a fungicide frequently used on apples, grapes, and peaches. Similarly, despite the partial ban on DDT, a toxic insecticide, India still has one of the highest concentration of DDT in breast milk in the world. DDT is known to cause severe nerve disorders in children.

Pesticides also cause biological changes in the body that enable cancer cells to multiply. They can change the body's genetic code by damaging the deoxyribonucleic acid (DNA) structure. They can also seriously weaken the human immune system, making the individual more susceptible to the onslaught from cancer cells.

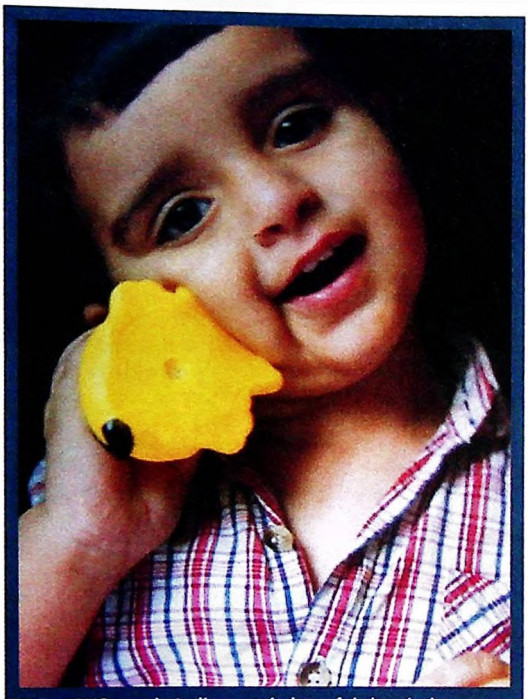
Exposure at an early age can increase an individual's risk of developing cancer over his or her lifetime. Experts believe that transformation of pre-cancerous cells into a malignancy generally takes years, even decades.

Gender bender

Chemicals cause birth defects and premature births

Chemicals in the environment can alter sex ratio dramatically. A study in Seveso, northern Italy — the scene of a devastating explosion at a chemical factory in 1976 that released large quantities of dioxin into the atmosphere — found that more girls than boys were born into families living in 12-kilometre radius. Says Shikha Reddy, researcher at UK-based Barkins Institute: "The real challenge is for infants. Breast fed infants are exposed to levels to dioxins that exceed adult exposure by as much as a factor of 50."

to impaired mental development and growth retardation in the child



Many PVC toys in India contain harmful chemicals

Early maturity

Today consumer products too are reported to contain toxic chemical compounds. Recently, *New Scientist* reported that shampoos containing traces of female hormones could lead to girls attaining early puberty. Certain shampoos, especially those marketed to blacks, were found to contain small amounts of hormones that could cause premature sexual development in girls. In every developed country, girls are reaching puberty earlier, a phenomenon that has been blamed variously on hormone pollutants in the environment. Chandra Tiwary, former head of paediatric endocrinology at Brooke Army Medical Centre in Texas, says that these hormones are probably absorbed into the bloodstream through the scalp and lead to premature puberty.

The report cites that "at least five US companies" made hormone-laced products, which appeared to fall into a regulatory "grey area". The products are on sale without the specific approvals required from the US Food and Drug Administration. Even in a less chemical-intensive country like Puerto Rico, researchers have found that eight in 1,000 children attained early puberty. Before they have outgrown dollhouses, many young girls are faced with confusing mood swings, hormonal changes and sexual attention that accompanies physical maturity.

Toxic toys

Even innocuous consumer items like plastic toys and teddy bears can lead to impaired mental development and growth retardation in the child. Gone are the traditional red sandalwood dolls or medicinal teethers made of *Vasambu* wood. Many soft and chewable toys, chemical pacifiers, teethers and even baby bottles are made of recycled polyvinyl chloride (PVC). This material contains a group chemical called phthalates, which are confirmed growth retardants.

Manufacturers of toys in Mumbai, New Delhi and Chennai confirm that most toys are today made from virgin and recycled plastics. Toys made of PVC contain dangerous additives, which leak out and are ingested by children. In fact, the softest and most chewable toys could be the most poisonous and toxic.

Investigations carried out by the international pressure group, Greenpeace, found that 71 soft PVC toys, including five from India, contained high levels of phthalates.

Even adults are known to be susceptible to the effects of phthalates, especially pregnant women. It can result in immature babies, underweight neonates and depressed immune responses. The adverse effects of these chemicals on children takes many years to become apparent.

FOETAL ATTRITION

Womb may not be quite the safest place on earth

A mother's womb could well be a tomb for the foetus. Studies show that exposure to toxic chemicals during pregnancy interfere with normal growth and development of the foetus resulting in intrauterine growth retardation (IUGR). Some chemicals affect foetus' growth. There is also a high probability of abortion or peri-natal morbidity. If they survive the ordeal of birth, these babies are more likely to experience poor cognitive development and mental deficiency during childhood.

Even as adults, IUGR babies have increased risk of cardiovascular disorders, high blood pressure, diabetes, and related diseases. Certain chemicals, such as methyl ethyl ketone (MEK), have the capacity to produce abnormally small head circumference (microcephaly) because they target the developing foetal brain and interfere with proper, timely, and adequate proliferation and migration of the neural cells and impact the foetal liver, preventing it from detoxifying toxins and cause irreparable brain damage.

Ethanol inhalation and ingestion as in glue or paint sniffin, certain drugs, maternal infection like rubella and radiation are common environmental factors associated with microcephaly.

A study by S Srivastava and his colleagues from the University of Faizabad showed that lead and zinc levels in the blood of pregnant women and their offspring can cause IUGR.

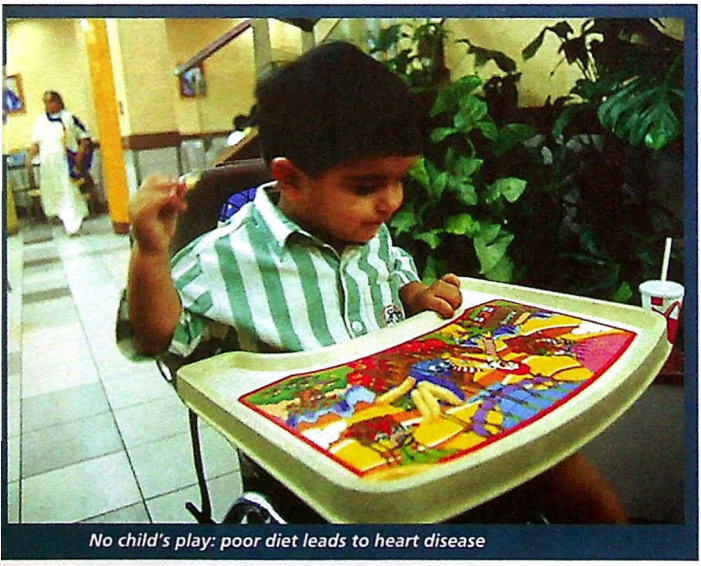
Diseases linked to lifestyle are more prevalent in upper-middle

Junk life

Fast food and slow death

Indians are at great risk of lifestyle diseases. Inactivity alone claims two million lives globally every year, warns a recently-published WHO report. Indians, particularly the younger generation, are increasingly facing problems due to overweight, blood pressure, stress, high cholesterol and diabetes, all of which are a fallout of physical inactivity. Studies show that up to 80 per cent of coronary heart disease, 90 per cent of diabetes and about one-third of all cancers can be avoided through a change in lifestyle.

In the industrialised world, junk food like burgers, fries and pizza are extremely inexpensive, compared to green vegetables. The inherent subsidies to the meat industry means that poor people (especially the blacks and Hispanics in the US) predominately consume such foods. As a result, they develop obesity and many children suffer from attention deficit disorders. A survey by a restaurant association found that fast food companies prefer to open shop in poorer areas, rather than in an up-market area. The trend in India is, however, opposite. The prime targets for fast food joints are the rich and the middle class.



No child's play: poor diet leads to heart disease

Studies conducted by the National Foundation of India (NFI), a non-governmental organisation, in Delhi have revealed that it is not the well off, but the poor and the underprivileged that are increasingly falling victim to sedentary lifestyles. One reason for this is the migration from villages to urban centres. Among non-communicable diseases, cardiovascular diseases caused by obesity account for the highest number of deaths. Of the 15 million deaths due to cardiovascular disease worldwide in 1990, 2.5 million occurred in India alone. Several studies in India have shown that changes in dietary patterns, physical activity levels, lifestyles associated with affluence, and migration to urban areas are related to increasing frequencies of obesity and the risk of diseases, such as coronary heart disease and diabetes.

The incidence of diabetes is the highest in India with 20 million contracting the disease that in 50 percent of cases can be avoided through a healthy lifestyle and diet. By 2020, the number of diabetics in India is expected to touch 58 million and around seven million will die of heart-related diseases, if they do not change their sedentary lifestyle, warns K Srinath Reddy, a leading Delhi-based cardiologist.

Another risk factor for heart disease striking early is low birth weight, a problem that is not uncommon in the country. Experts say that children with birth weight of 2.5 kg and less are prone to getting heart disease in early adulthood. Recent studies have, in fact, indicated that a mother's poor diet may place the foetus at a higher risk of getting heart disease later in life. Such infants would not only be underweight but could also have a disproportionately large head or a narrow waist. These features, experts point out, indicate damage to the baby's organ systems and affect the way the body regulates cholesterol and blood clotting in adult life.

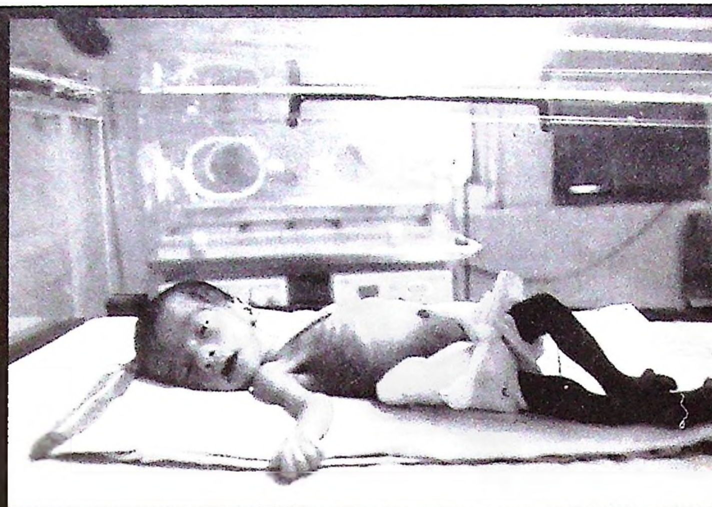
Another NFI study shows that malnourished populations in developing societies, particularly in Asia, have an increased predisposition to obesity and, more specifically, to abdominal obesity, largely during the foetus' development period. These changes, as a result of prenatal and postnatal malnutrition, increase susceptibility to obesity under the right environmental influences such as an increased intake of fat in the diet and reduced levels of physical activity. These environmental changes are now characteristic of economic development and urbanisation in these countries and will hence fuel the epidemic of obesity currently seen in these societies, says the study

Another study conducted by NFI in Delhi found that the problem of obesity was found to be more prevalent in the upper-middle class than among slum dwellers. Thus, as against the prevalence rate of obesity of one per cent for males and four per cent for females in the slums, the corresponding figures for the high-income group among the middle class were 32.2 per cent and 50 per cent, respectively. More females than males have been found to be overweight in all age groups. Apart from dietary errors and excesses, the lack of regular physical exercise among urban middle class with sedentary occupations is a major contributor to overweight and obesity.

class than slum dwellers

Brain dead

When pencils and paints lead to lower IQ



AMIT SHANKER / CSE

The developing human brain is vulnerable to toxic assault

Some chemicals can affect brain development and function. They also have serious effect on children's learning and behavioural abilities. Compared to other organs, the human brain develops over a long period of time — beginning with the first week after conception. Brain weight at birth is about one-third of adult weight. There is a brain growth spurt from the third trimester of pregnancy, which continues until the age of two. Brain development continues during the early years, some systems maturing at puberty and beyond. Most of the basic brain structure is laid down before birth, with great postnatal activity, for example, in the development of connections, enzymes and nerves. The blood-brain barrier is not complete until about six months after birth. The developing human brain is much more vulnerable to toxic assault than the mature brain in most cases. And this not only affects those processes undergoing development, but some processes programmed to come later.

Lead and other heavy metals like cadmium, arsenic and mercury are the most-studied neurotoxicants. Their effect on children has led to revisions in their levels within the US — from about 60 microgrammes per decilitre of blood (µg/dl) in the late 1960s to 10 µg/dl today. It is possible that many children were, in fact, lead-poisoned during the decades when high lead-levels were acceptable and not recognised.

Other heavy metals, such as cadmium and aluminium, are known to be neurotoxic, but there is very little research on their potential to affect the developing brain. Polychlorinated biphenyls (PCBs) are organic chemicals that have been banned, but persist by accumulating in fat tissues. It was found in fish in the Great Lakes region in USA. A study of the offspring of women who ate Lake Michigan fish during their pregnancies showed extremely high prevalence of mental retardation in their children.

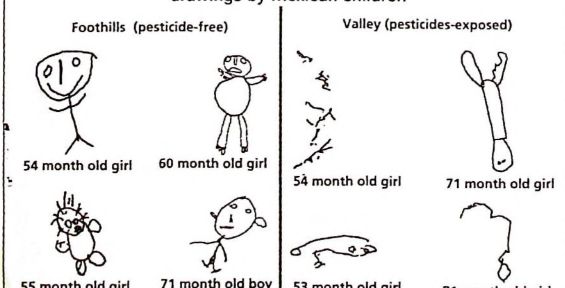
"But distinguishing among the various syndromes, and the "normal" from the "abnormal" is a subject of considerable discussion and uncertainty. These disorders may be best characterised as works in progress, rather than rigid diagnostic test. Often it is confounding as many syndromes are overlapping, and decisions to identify the real cause eats into crucial time. If the (environmental) source is not identified, then it gets too late to reverse the damage," says Ganesh Murthy, psychometric specialist at the Institute for Children with Learning Disability, Dehradun.

Unleading of fuel has been one of the most significant public health and educational advances of the 20th century. Research now equates a 10-point drop in blood lead levels with an average 2.8-point gain in IQ. Since the elimination of lead from gasoline in the US, there has been a 15-point drop in mean blood lead levels. This gives every baby born today a gift of an average of four to five additional IQ points. What is that worth economically? In the US, conservative calculations suggest that each IQ point is worth about US $8,300 in additional lifetime income, which would mean that the 15-point drop in blood lead levels is worth an average of US $30,000 in income to each baby born. With approximately four million babies born every year, the elimination of lead has an economic value of over US $100 billion per year for the lifetime income of those children.

The US Census Bureau estimates that nearly 12 million children in the US under 18 (or about 17 per cent) suffer from one or more developmental, learning, or behavioural disabilities. According to the National Academy of Sciences, toxic exposures are directly implicated in about three per cent of these disabilities — about 360,000 US children in 1998 or one in every 200 children.

THE WORK OF PESTICIDES

Effect of pesticides on neurological development as revealed by drawings by Mexican children



In Harm's Way, Global Boston Physicians for Social Responsibility

Children of a lesser god

Children don't have a voice. They can't lobby or fight governments. The initiative lies with India's medical establishment and the civil society

Open the recent National Human Development Report (NHDR), or any glossy document of the World Bank and its ilk, and it will reveal how the world is a much better place. Death rates have declined, people live longer, fewer children are dying and incomes are increasing. Of course, forget the places that are in the grip of wars and disasters. Barring them, all's well. So how does one explain the increase in the cases of asthma, cancer, learning disabilities, obesity and diabetes. They persist because governments have preferred to remain oblivious. The Indian government does not collect or publish data concerning the health of children. It just simply does not care.

And if you think the scourge extends only to the poor, the marginalised and the already suffering — you couldn't be more wrong. Asthma affects the rich more than the poor. So does obesity and diabetes in India. Even childhood anaemia is more prevalent in the better-off states, according to the NHDR. The Planning Commission has no explanations for this.

Cancer registries that are sporadically produced once in a decade do not track areas and communities where these cases originate. "Cancers are not tracked because the focus is to provide curative and surgical solutions to the patients," says Delhi-based cancer surgeon Anish Goyal. "In the West, tracking birth defects, cancers and mapping their origins, linking them to possible causes are done so that trends can be established, based on which investments are made. This foresight is absent in India," says H N Billimoria.

"Research on children will happen only there is strong evidence of a causal link. In the absence of research little is done to invest in establishing such links. This is true of the West," says Sue Brenner of the International Network for Promoting Children's Health based in Toronto, Canada. She points out that drug development and health research focuses only on drugs that are largely lifestyle-related diseases because rich countries can pay for them. It is not profitable to invest in research and manufacture vaccines for malaria and cholera.

There are drugs for cancer, asthma and diabetes since only the rich can afford them. "Tropical diseases will remain neglected if the current trends in drug development continue. Investments will increase specially for lifestyle-related diseases like obesity, asthma and diabetes," says Francois Salle of the Médecins Sans Frontières, who has been championing the cause for neglected diseases at international forums. Investments too in programmes on children's health is decreasing. According to a report by the United Nations Foundation, international programme assistance has shrunk by 20 per cent since the last decade and south Asia has the least share — about US $110 million.

The Indian Council of Medical Research (ICMR), India's apex medical research body, has no clear strategy for health, let alone children's health. Ranbir Singh, spokesperson of ICMR, says that there is no research allocation earmarked for children's health." Still, it published an advertisement in national dailies claiming it had made "giant strides in medical research". It is another matter that most of its programmes have been going on for several years, without any substantive results. It's performance has been criticised by the governments' own watchdog, the Comptroller and Auditor General of India (CAG). It is frightening how public health is governed in this country. With no vision and strategy.

Children lack a voice. They can't lobby or fight against governments, corrupt corporate and powerful bureaucrats. The initiative lies with parents and civil society to give children the chance to live in a safer world. It is also time to push governments to secure a cleaner environment. ■

Pinch of salt

How poor research claimed 14,000 lives every year

Apathy towards neglected diseases that affect children most can be seen with the research done on oral rehydration salts (ORS). In 1975, the WHO and UNICEF agreed to promote a single, orally administered solution of ORS to prevent dehydration caused by diarrhoea. However, the ideal composition of this solution has been a bone of controversy for many years. Standard ORS has caused several deaths mainly in children because of its high salt concentration. The new ORS has reduced osmolarity or concentration of salts and has proved to be more effective in children and adults with cholera.

Overall a total of 14,000 deaths per million episode of diarrhoea could have been avoided had the reduced osmolarity ORS solution been produced earlier. This would have also resulted in cost savings of US $500 per death, or US $7.1 million per million episodes. Though many donors and organisations like WHO claim to have been working towards a more effective ORS solution, in reality, most of the research was intermittent and lacked political will.