

Can Vitamin-A Prevent Cancer?

by G.S. Mudur

VITAMIN A which has helped the world combat night-blindness might soon figure on doctors' lists as a cancer preventive agent. This follows medical studies linking the high consumption of vitamin A compounds with reduced cancer risk.

Studies on the effect of vitamin A deficiency on laboratory animals have now given way to detailed investigations on how the two classes of vitamin A compounds, the retinoids and the carotenoids, might have a protective effect against cancer.

Studies on laboratory animals decades ago showed that vitamin A deficiency could lead to premalignant changes in the respiratory, gastrointestinal and genitourinary tracts. Such studies also indicated that the administration of retinoids could lead to the regression of induced tumours and delay the appearance of transplanted tumours.

Evidence of the chemopreventive effect of retinoids in

humans has come from several clinical trials of topical retinoids which have been shown to be effective in reversing malignant and premalignant changes in the skin. A report in the medical

journal cancer said oral administration of retinoids seemed to produce a beneficial effect on several cancerous and precancerous conditions.

The inverse link between carotenoids and retinoids and the risk of cancer was also evident from a study conducted in the Philippines by a team of Canadian scientists who studied chromosomal changes in a population of regular chewers of betel quid, made up of the areca nut and the betel leaf.

The scientists examined structures called micronuclei in the cells scraped from the inner cheeks of the betel quid chewers who were presumed to be at a high risk of developing oral cancer because of their chewing habit. These mi-

cronuclei are indicators of damage to the DNA and appear long before any cancerous changes become evident.

In the study, the scientists supplemented the diet of a group of regular betel quid chewers for three months with sealed capsules of retinol and beta carotene. This resulted in a three-fold decrease in the average proportion of cells with micronuclei. The study was repeated to test with retinol and carotene separately and a similar reduction in chromosomal breakage was found for both these compounds. The scientists found that these vitamin A compounds, appeared to be effective as an inhibitors of micronuclei cell formation.

Researchers are now exploring theories on the possible mechanisms of action by which the retinoids and the carotenoids produce a protective effect against cancer.

Retinol and other retinoids play a role in cell growth and

cell differentiation which might affect carcinogenesis. Such a role for retinoid has been supported through laboratory tests in which retinoids inhibit malignant transformations induced in cultured cells.

Carotenoids, the biological precursors of vitamin A are found in vegetables and fruits, and they are converted into retinol in the body. Researchers believe this increase in retinol level in the body could be one indirect way by which they reduce the risk of cancer.

But beta carotenoid has the ability to trap some organic free radicals and to deactivate excited oxygen molecules which are generated as a byproduct of many normal metabolic processes. So, scientists believe that free carotene in the body might also have a direct protective effect against the onset of cancer by deactivating these molecules or preventing damage by oxidation. Most of the data on preven-

tive action of beta carotene comes from epidemiological studies of dietary vitamin A which could be regarded as a measure of the intake of beta carotene. According to the report in the journal Cancer, the strongest and most consistent evidence of a protective effect of high intake of carotene rich foods comes from studies of lung cancer and cancer of the esophagus.

But doctors are not making any conclusions yet. The researchers who studied the inverse relationship between serum carotenoid and subsequent lung cancer three years ago speculated that the protective effects of beta carotene against lung cancer could be due to other micronutrients in green or yellow vegetables that are highly correlated to beta carotene. Trials involving thousands of people are now under way, and a final answer to whether vegetables rich in vitamin A like carrots can indeed keep cancer away might itself be years away.

India Evolves New Strategy in Family Planning

Culture and religion

Cultural and religious attitudes need to be no bar to family planning. But programmes must be appropriate to the community concerned.

- In Muslim Bangladesh, many women leave their homes only with an escort. But they can be involved in family planning when information and services can be brought to them at home.
- In Catholic Mexico, birth rates dropped by 20% in a decade after a national family planning programme was introduced.
- In Buddhist Thailand, fertility dropped from an average of 6.5 children per woman to 3.5 in only 8 years. Nearly 70% of couples use contraception.



A Milestone in the Fight Against Blindness

It is estimated that up to 20 million people in the world are made blind by cataract — many of them in Africa and Asia. Yet cataract blindness can be relatively easily cured. The problem is, as always, distribution of resources — getting help to those who can't afford it. Gemini News Service reports on Sight Savers, a charity which has made it possible for three million people to see again. by Andrew Walker

ple, there is one ophthalmologist for every million people; in Britain there is one for every 20,000.

It is problems like that

which are being tackled by organisations such as Sight Savers, part of the Royal Commonwealth Society for the Blind. Dr. Arifa Gulab, who

performed the operation on Mrs Taj Bibi, is an ophthalmologist who was sponsored by the charity for specialised training in Britain in commu-

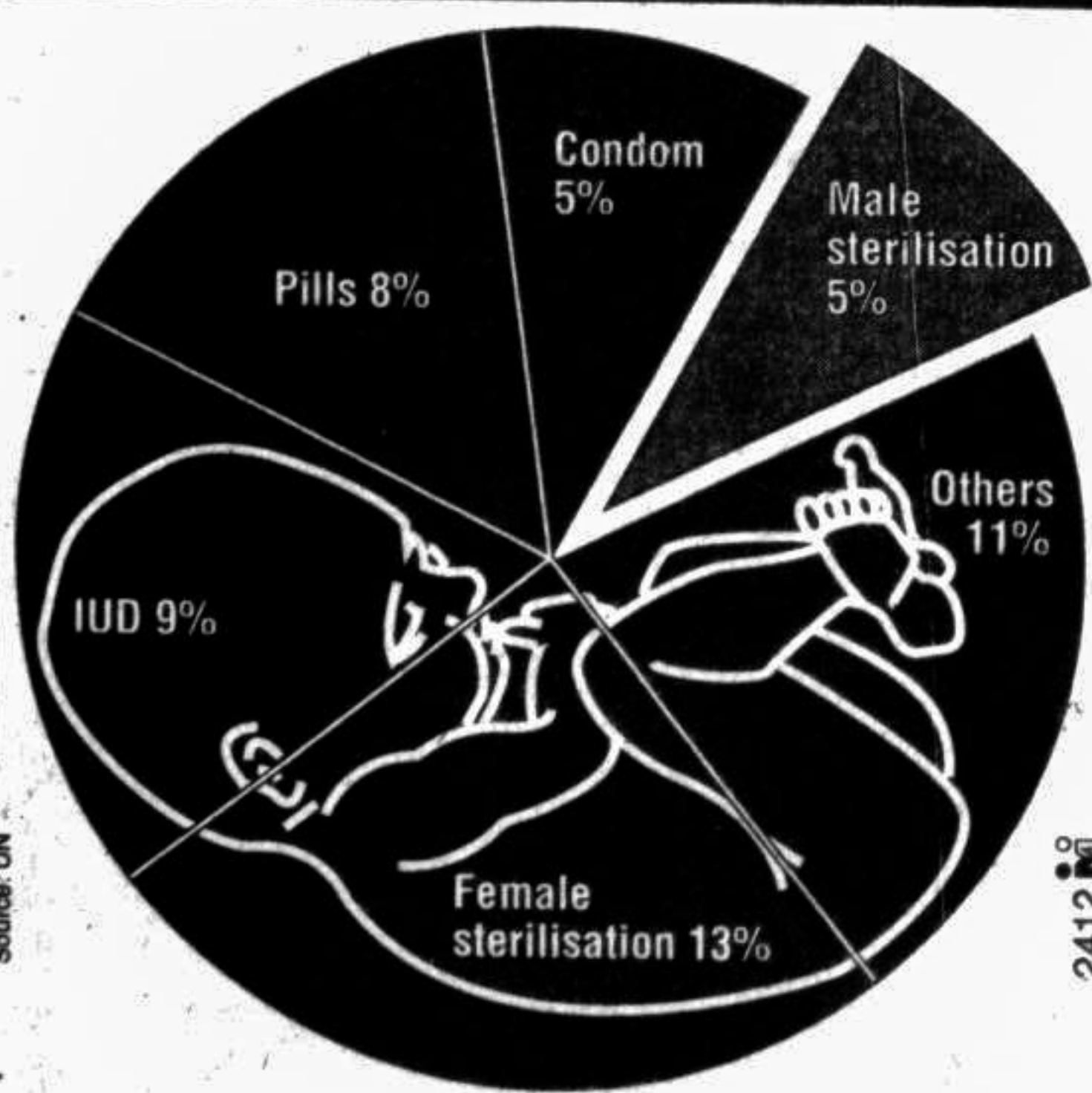


Mrs Taj Bibi (left) with Dr. Arifa Gulab: sight restored after 25 minutes

How John Stopped His Family Getting Any Larger

In Africa one of the least used forms of birth control is vasectomy. People do not even talk about it. In Kenya, which has the fastest-growing population in Africa, an attempt is being made to encourage men to undertake the brief, virtually painless operation. One man who underwent vasectomy is John Maina, father of six. A Gemini News Service correspondent tells his story. by James Jura

Contraception world-wide



Current methods in use among married women of reproductive age

wife, she had never heard of vasectomy, but when Maina explained she gave her consent.

All this happened in 1986. In Kijabe Hospital the doctor interviewed Maina to make sure Maina knew what vasectomy was all about, that it is irreversible and that one cannot father any more children. At the end of the interview the doctor always asks again whether the patient is sure he wants to go ahead.

It is said that men fall into great depression after vasectomy. Maina says there was no change in his sexual performance, except that his wife was happier and more relaxed because she had no fear of pregnancy. Maina says: "It enriched our relationship a great deal."

Maina says he has not received any ridicule as a result of the vasectomy, but men often want to talk to him when he relates his experience at seminars. As they open up to him he realises their main fear is of impotency.

As for payment for the operation, the Association for Voluntary Surgical Contraception (AVSC) pays Sh450 for each patient who attends a mission hospital. The patient pays Sh100.

AVSC was started in the forties in the United States. In those days it was difficult for men to get sterilised. A group got together and identified doctors who could operate.

The organisation spread to Latin America, Africa and Asia. I started operating in Kenya in 1986. Dr Pamela Lynam, medical consultant for AVSC, says 200 Kenyan men have had vasectomy in AVSC-supported sites. More may have been done elsewhere.

Dr Lynam says they are now spreading awareness to men and women of "mini-laparotomy," a tubal ligation which takes 15-20 minutes. A woman can go home the same day. The option for men is scapel vasectomy. — GEMINI NEWS

nity ophthalmology. In Uganda, Sight Savers is working with the government to train ophthalmic clinical officers, paramedics who will provide medical and minor surgical care to people with eye problems in rural areas, referring more complex cases to hospital.

In India it has pioneered a new concept in eye care at very little cost. The problem is that hospitals are not being used during the hot season from April to June, nor in the monsoon season which follows, because they are not properly equipped to deal with the conditions. By upgrading facilities, for example, providing air conditioning in operating theatres and fans in the wards, Sight Savers has begun to make it possible for the facilities to be used all year round.

In hospitals where this has been done the number of patients treated has shot up. In one hospital in Delhi, 312 people were operated on in April last year compared with an average of 80 in the same month of the previous two years.

Even in July, when heavy rains and floods disrupted roads for days, there were more than twice as many operations as before — 98 as opposed to 41.

Sight Savers, which has been in operation for 40 years, works in collaboration with national governments and local partner organisations to bring eye care services to as many people as possible. It builds and helps to support permanent eye units and funds mobile units and eye camps which reach out to remote rural areas and promote education about eye health.

A few of its projects are jointly funded by the British Overseas Development Administration or the European Community, but nearly all its money comes from public donation in Britain.

Poverty is at the root of the main blinding diseases in the developing world, which apart from cataract include trachoma and childhood blindness, and Sight Savers' latest campaign, "Please don't turn a blind eye," is committed to reaching these people.

Trachoma is associated with overcrowded and unhygienic living conditions, particularly a lack of clean water. Childhood blindness could be greatly reduced by immunisation against measles and correct diet, particularly in fresh vegetables containing Vitamin A.

Sight Savers now works in over 40 countries, with the bulk of its efforts in Africa and South Asia. Its constitution was revised in 1990 to enable to work in countries outside the Commonwealth and it has already begun operations in French-speaking West Africa against river blindness.

Not all blindness can be prevented or cured, and for those who cannot regain their vision Sight Savers helps them overcome their disability while still living in their own communities. It is also working with education authorities to enable blind children to study in ordinary schools alongside sighted children, instead of being sent to institutions away from their families and friends. It provides braille mathematics kits and braille textbooks.

In the words of Kerrie-Anne Hill, the first blind girl on the Caribbean island of Barbados to attend an ordinary school: "I can now look forward to having a profession. I can use my brain, which was something I always wanted to do. Before, blind people were looked at only as singers and craft makers. Now we are looked at as children with brains and intelligence."

A new package of awards and incentives has been formulated by the Indian government to step up the pace of birth control. Many observers believe that the family planning programme has hit a plateau and that it requires drastic reforms and pruning.

Policy-makers and analysts have told *Depthnews*: "We are facing a difficult situation. If we launch disincentives, the danger is that the entire birth control project may collapse. Politicians may hit the entire programme. So, a compromise formula has to be found."

One of the major planks of the family planning programme so far has been the giving away of cash incentives to state governments, individuals and promoters. Now, such incentives are to go with the exception of compensation money given to individual acceptors for loss of wages.

The restructuring of the package has been thoroughly discussed by planners and officials in the Health Ministry recently. Analysts pointed out that the state governments in their anxiety to win large sums of money as awards had hooked their books.

As one senior official pointed out, "They were over-reporting the number of sterilisation operations. The family planning targets fixed by the state governments were often unrealistic and driven by the desire to win awards."

The belief has hardened that this scheme has not helped much in bringing down the population figures.

A whopping sum of 1,000 million rupees (US\$80 million) is being spent annually by the Health Ministry on incentive packages. Of this, 500 million rupees (US\$40 million) is awarded to the state governments. Now this will go.

But 500 million rupees will still be available to individual acceptors of the sterilisation scheme. "We do not want to be seen as a big bully or a central regulator. But we have to make sure that the money we spent must yield results," says one government official.

Policy-makers worry that if such funds are totally withdrawn, there would have been a hue and cry. Now it is believed that the state governments will come round the view that the incentive scheme has not done much to push the family planning programme.

It has been suggested that there should be soft options like curtailment of maternity leave and leave travel allowance for those civil servants and employees of public sector firms who insist on having large families.

Policy-makers have now agreed that there should be a community-based package of incentives. These will include house-building loans and allotment of house sites on a preferential basis. A young civil servant who has just one or two children will be offered a house or land for building a house at a concessional rate.

A major departure point is the dropping of pre-determined targets for various

methods of family planning. Instead, different parameters are to be used. These will take into account the literacy rate of women, the maternal and infant mortality rates, the birth rate, the state of the maternal and child health services and the marriage age.

Thus, there will be a greater stress on the role of women for giving awards and the grant of incentives.

One policy analyst has calculated that the share of family planning in the total public sector outlay has remained static at 1.3 to 1.8 per cent.

"How can you achieve anything by spending such poor amounts on family planning when you are spending thousands of millions of rupees on the defence services and buying arms?" asks one observer.

It is now increasingly felt that the state governments are living on the bounty of New Delhi. They must dig in their own purse to find money for running health centres and

medical clinics.

Another aspect of the strategy is to identify districts which are doing poorly in the states of Uttar Pradesh, Bihar, Madhya Pradesh and Rajasthan in what is known as the Cow Belt. As many as 206 districts have been pinpointed. Area specific plans will be prepared to strengthen the infrastructure in these Northern states.

A different kind of monitoring and evaluation mechanism will be set up. It should not be based on the achievement of targets, but on success measured on the basis of declining birth rates, reduction in infant and maternal mortality rates and the rise in the marriage age.

Appalled at the lack of response of non-governmental organisations to the family planning programme (barely 300 agencies are working in this field), a new plan will have 20 per cent of the money coming from voluntary organisations. — *Depthnews*.

Electromagnetic Fields: A Health Hazard?

THE ubiquitous electromagnetic fields associated with ordinary household electric appliances and power lines have in recent years been the subject of controversy with several studies linking them with health hazards, notably cancer.

Epidemiologists in the United States about a decade ago published a study showing a statistical link between childhood cancers and the proximity of high current power lines. Researchers from the University of Colorado found that children suffering from cancer were twice as likely to live in high current homes. Another study conducted in 1986 appeared to yield similar findings, although the correlation was less significant.

A recent study conducted by two more US researchers, suggests that children of fathers working in industries associated with exposure to electromagnetic fields appear to have increased risk for cancers of the nervous system.

Researchers have had to primarily rely on epidemiological studies to evaluate the effects of electromagnetic fields on humans. Such studies are often difficult to conduct and there could be several other factors in the environment or lifestyles of people that could also be contributing to the presumed effects of the fields.

Biologists who have conducted several laboratory-based studies on cells or animals have however come up with evidence that low frequency electromagnetic fields can indeed exert biological effects.

Several studies have shown that these fields can produce changes at the cellular level. The effects observed through such studies include interference with DNA synthesis and RNA transcription and interaction with the biochemical kinetics of cancer cells.

A researcher with the Cancer Therapy and Research Centre in Texas placed cancer-colony stem cells taken from human victims of colon cancer in dishes of growth medium and exposed them to various combinations of electromagnetic fields for 24 hours. The exposed cancer cells proliferated anywhere from 2 to 24 times more than a control group of unexposed cells. The exposed cells also appeared to be more resistant to natural killer cells, the white blood cells that attack cancer cells.

It is possible that electromagnetic field exposures could play a role in the genesis of mutations or tumours, although convincing evidence has yet to be reported, researchers C C Johnson and M Spitz who conducted the study linking paternal occupations with childhood nervous system tumours, said.

The two epidemiologists conducted a population based study to test the association between the occurrence of central nervous system tumours in children and paternal occupation at the time of birth, in jobs involving exposure to low frequency electromagnetic fields.

They found that there were elevated risks for children of workers in the computer and

electronic component manufacturing sectors. Reporting their findings in the *International Journal of Epidemiology*, the researchers said employment in electric repair services was also associated with increased risk for children.

This, they however pointed out, was not evident for the telephone, television and radio industries.

"Any deleterious biological effect in children resulting from paternal exposure to electromagnetic fields could be a consequence of germ cell mutation or non genetic biochemical changes in the germ cells," they said.

The Office of Technology Assessment in a background paper has said that the emerging evidence no longer allows one to categorically assert that there are no risks. However, according to OTA the overall evidence now available is too weak to allow firm conclusions either way.

A study conducted by the Office of Technology Assessment indicates that if there are effects on human health from exposure to fields created by electricity, they arise mainly from use in the home.

Household appliances and wiring produce electric and magnetic fields that in magnitude are comparable to those near a transmission line. — G. S. Mudur — PTI Science Service