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Incidence of cancer set to rise: Lancet study

May11, 2019/ The Hindu

Between 2018 and 2040, the number of patients requiring first-course chemotherapy annually will increase from 9.8 million to 15 million. A study published in The Lancet, Oncology estimates that a steady growth curve of patients (eligible for chemotherapy) will be seen in low and middle income countries going from 63% in 2018 to 67% in 2040. The most common indications for chemotherapy worldwide in 2040 will be lung cancer 16.4%, breast cancer 12.7% and colorectal cancer 11.1%. "We estimated that in 2018, 65,000 cancer physicians were required worldwide to deliver optimal chemotherapy — a figure that we estimate will rise to 1,00,000 by 2040 [with estimates ranging from 50,000 to 1,50,000 depending on workload," the study noted. This first of its kind study is aimed at helping the global community scale up chemotherapy provisions. "Strategic investments in chemotherapy service provision and cancer physicians are needed to meet the projected increased demand for chemotherapy in 2040," it said. The study conducted by researchers, including those at the UNSW Sydney, the Ingham Institute for Applied Medical Research, the Liverpool Cancer Therapy Centre and the International Agency for Research on Cancer, Lyon looked at data for the incidence of 29 types of cancer in 183 countries in 2018, and projections of incidence in 2040, were obtained. An Indian study "Projections of number of cancer cases in India by cancer groups" has noted that for the country the cancer cases are likely to go up from 9,79,786 cases in 2010 to 11,48,757 cases in 2020.

Completing first-time marathon 'reverses' ageing of blood vessels, says study

May11, 2019/The Indian Express

Training for and completing a first-time marathon reverses ageing of major blood vessels, according to a study which found that the older and slower runners benefit the most. A hallmark of normal ageing is stiffening of the blood vessels, which increases the risk of stroke and heart disease even in healthy people. Compared to their peers, lifelong athletes have biologically younger blood vessels, researchers said. The study investigated whether training for a marathon could modify aortic stiffness even in novice runners. "Novice runners who trained for six months and completed their first marathon had a four-year reduction in arterial age and a four mmHg drop in systolic blood pressure," said Anish Bhuva, from the University College London in the UK. "This is comparable to the effect of medication, and if maintained translates to approximately 10 per cent lower risk of stroke over a lifetime," Bhuva said. The study included 139 healthy first-time marathon runners aged 21-69 years who were advised to follow a first-time finisher training programme and ran an estimated 10-20 kilometres a week for six months ahead of completing the 2016 or 2017 London Marathon. Older participants and those with longer marathon finish times had greater reductions in aortic stiffness after training. Reductions in aortic stiffness were independent of changes in blood pressure. "You don't have to be an elite athlete to gain the benefits from marathon running, in fact the benefits appeared greatest in those who were older and slower," said Bhuva. "By completing training, and getting to the finish line, it is possible to rejuvenate the cardiovascular system of first-time marathon runners," he said. Fitness improved and heart rate dropped after training — both to a modest extent. The participants had been running for less than two hours a week before marathon training and their finish times were slower than average, which was expected as it was their first race. "The study shows that the health gains of lifelong exercise start to appear after a relatively brief training programme," he said.

Genetic therapy heals damage caused by heart attack

May12, 2019/The Tribune

Scientists have developed a gene therapy that can induce heart cells to regenerate and repair the damage caused by a heart attack. Myocardial infarction, more commonly known as a heart attack, caused by the sudden blocking of one of the cardiac coronary arteries, is the main cause of heart failure. The condition affects over 23 million population in the world, according to the World Health Organization (WHO). At present, when a patient survives a heart attack, they are left with permanent structural damage to their heart through the formation of a scar, which can lead to heart failure in the future, according to the researchers from King's College London in the UK. "It is a very exciting moment for the field. After so many unsuccessful attempts at regenerating the heart using stem cells, which all have failed so far, for the first time we see real cardiac repair in a large animal," said Mauro Giacca, from King's College London. In the study, published in the journal Nature, researchers delivered a small piece of genetic material, called microRNA-199, to the heart of pigs, after a myocardial infarction which resulted in the almost complete recovery of cardiac function at one month later. This is the first demonstration that cardiac regeneration can be achieved by administering an effective genetic drug that stimulates cardiac regeneration in a large animal, with heart anatomy and physiology like that of humans. "It will take some time before we can proceed to clinical trials," Giacca said in a statement. "We still need to learn how to administer the RNA as a synthetic molecule in large animals and then in patients, but we already know this works well in mice," he said. PTI

The dangers of air pollution: What you need to know about Delhi smog

May13, 2019/The Indian Express

Experiencing breathing difficulties? If you are making a conscious effort to breathe as opposed to your normal breathing pattern then it could be related to the rising levels of air pollution in Delhi NCR. The Air Quality Index (AQI), that measures the quality of air, was recorded at 376 in Gurugram while in Delhi, it was recorded at 381, on voting day on May 12. Aided by summer dust storms that have increased in the city in the last two days, there has been an increase in the pollution levels and the recurrence of smog. Smog, that appears as a thick haze with a brownish tint, is mostly caused by high concentrations of nitrogen oxides. India’s Ministry of Earth Sciences published a research paper in October 2018 attributing almost 41 per cent of PM2.5 air pollution in Delhi to vehicular emissions, 21.5 per cent to dust and 18 per cent to industries. Largely the result of industrial and road traffic pollution, nitrogen oxides react with hydrocarbons in sunlight to form ozone, which can then be mixed with particles to form the thick haze. Anyone who engages in strenuous outdoor activity, from jogging to manual labour, is prone to smog-related health hazards. Since physical activity causes people to breathe faster and more deeply, it exposes their lungs to more ozone and other pollutants. As per experts, four groups of people are particularly sensitive to ozone and other air pollutants in smog. These are children who spend a lot of time outdoors – especially children with asthma, healthy adults who exercise outdoors or spend a lot of time in the sun, people with allergies or sensitive to changes in the environment, and elderly people. Try limiting your outdoor activities if ozone levels are unhealthy, as elevated ozone levels increase the chances of being affected. Keep your activities gentler on smoggy days as vigorous activity levels can increase your chances of experiencing respiratory problems.

Over 1.5 crore people will need chemotherapy globally each year by 2040: Study

May13, 2019/ The Tribune

Over 1.5 crore people will need chemotherapy globally each year by 2040, a new study has said, suggesting that around one lakh cancer physicians will be required to treat the growing number of cancer patients mostly in low and middle-income countries. The study published recently in the prestigious the Lancet Oncology journal has predicted that from 2018 to 2040, the number of patients needing chemotherapy each year will rise by a 53 per cent from 9.8 million to 15 million (1.5 crore) globally. It is the first study to estimate the scale of chemotherapy provision needed at national, regional and global scales to respond to this situation. The study was conducted by researchers at University of New South Wales in Sydney, Ingham Institute for Applied Medical Research, Kinghorn Cancer Centre, Liverpool Cancer Therapy Centre in Australia and International Agency for Research on Cancer, Lyon. According to researcher Brooke Wilson of UNSW, the rising global cancer burden was undoubtedly one of the major health crises of today. “As a crucial component of cancer care, chemotherapy is likely to benefit a large proportion of these cases," he said. “Population growth and changes in distributions of cancer types by country were the leading factors driving the increased chemotherapy demand we saw in our study.” The authors used best-practice guidelines, patient characteristics and cancer stage data from the USA and Australia to calculate the proportion of newly diagnosed cases of cancer who would benefit from chemotherapy. They applied these rates to international estimates of global incidences of adult and paediatric cancer from 2018 up to 2040 (GLOBOCAN) to provide estimates of global chemotherapy demand. The findings are of particular concern for regions expected to have the greatest increases in new cases requiring chemotherapy - doubling or more in eastern Africa, middle Africa, western Africa and western Asia. In 2040, the most common cancers needing chemotherapy will be lung, breast and colorectal cancer and the greatest absolute increases in new cases will occur for these same three types of cancer. **— PTI**

Achilles’ heel of aggressive brain cancer found

May14, 2019/Hindustan Times

Inhibiting the function of a gene may lead to the death of the most prevalent and lethal type of brain tumour in adults, according to a study. With no curative treatment currently available, glioblastomas cannot be surgically completely excised, as the tumour cells are adept at invading tissues and spreading around the brain. In addition, glioblastoma cells are extremely resistant to existing drug therapies, said researchers from the University of Helsinki in Finland. For a long time, researchers have been looking for weaknesses in glioblastoma cells which could be targeted with efficacious therapies. They have already earlier found that the expression of a small fatty acid-binding protein (MDGI, or FABP3) in glioblastoma cells increases their ability to invade tissues and is linked with a poorer prognosis for the patient. “Our new research revealed that glioblastoma cells depend on the expression of a gene which produces the MDGI protein,” said Professor Pirjo Laakkonen from the University of Helsinki. “Inhibiting the function of this gene results in the death of the tumour cells,” Laakkonen said. This change apparently increased the permeability of the membrane, according to the study published in the EMBO Molecular Medicine journal. “Our research demonstrates that MDGI is a key factor regulating and maintaining the structure of the lysosomal membrane. This is the first gene found to regulate the stability of the membrane,” Laakkonen said. What makes this finding particularly interesting is that cell death caused by leakage in the lysosomes of glioblastoma cells can be activated by using drugs that cross the blood-brain barrier. In their studies, Laakkonen’s group used an antihistamine known as clemastine. In cell cultures, clemastine resulted in lysosome-mediated death in glioblastoma cells already at concentrations which had no significant effect on healthy cells of different types. In mouse models, clemastine was very effective in reducing the spread of brain tumours and improving the survival rate of the animals, researchers said. In the case of the most

invasive brain tumour model, the administration of clemastine resulted in the disappearance of the entire tumour, they said. “Our findings demonstrate that antihistamines and other drugs that increase the permeability of the lysosomal membrane can be considered as an enhancing therapy for patients with glioblastoma alongside established treatments,” Laakkonen said.

New method may detect dementia before it’s too late

May14, 2019/ The Indian Express

By studying a rare form of dementia, scientists may have found a way to detect neurodegeneration before brain cells are lost, an advance that could give therapeutic drug treatments a chance to work. According to the study published in the journal Neuropsychologia, patients with a rare neurodegenerative brain disorder called Primary Progressive Aphasia, or PPA, show abnormalities in brain function in areas that look structurally normal on an MRI scan. “We wanted to study how degeneration affects function of the brain,” said Aneta Kielar, the study’s lead author and assistant professor at the University of Arizona in the US. The team discovered that the brain showed functional defects in regions that were not yet showing structural damage on MRI scans. “We want to know if the decreased brain function is coming from the areas that are already atrophied or areas in an earlier stage of decline,” Meltzer said. Kielar and her colleagues compared brain scans of patients with PPA to healthy controls while both groups performed language tasks. The researchers also imaged participants’ brains while at rest. The functional defects were related to worse performance in the tasks, as individuals with PPA lose their ability to speak or understand language while other aspects of cognition are typically preserved. Identifying the discrepancy between a PPA brain’s structural and functional integrity could be used as an early-detection method. This is promising because “many drugs designed to treat dementia are proving to be not really affective and that might be because we’re detecting the brain damage too late,” Kielar said. “Often, people don’t come in for help until their neurons are already dead. We can do compensation therapies to delay disease progress, but once brain cells are dead, we can’t get them back,” she said. This technique could allow patients to get ahead of the damage, researchers said.

Antibiotic use can increase nerve damage risk

May15, 2019/The Tribune

A common class of antibiotics—used to treat respiratory and urinary tract infections—may increase a patient’s risk of suffering a serious and potentially permanent form of nerve damage by almost 50 per cent. Scientists from the University of Dundee in the UK looked at a database of 1.3 million adults issued one or more prescriptions of fluoroquinolone or amoxicillin-clavulanate antibiotics with no diagnosis of peripheral neuropathy at the outset of treatment. Peripheral neuropathy has long been recognised as a potential side effect of fluoroquinolone antibiotics—that are commonly used to treat a variety of illnesses such as respiratory and urinary tract infections. The study, published in the journal JAMA Neurology, found that current use of systemic fluoroquinolone antibiotics appeared to increase the risk of peripheral neuropathy by 47 per cent, causing an additional 2.4 cases per 10,000 patients per year of treatment. A person prescribed with amoxicillin-clavulanate were not significantly more likely to experience peripheral neuropathy. While the absolute risk of a peripheral neuropathy diagnosis remained low, the findings should still be considered as one of the different potential side effects before prescribing antibiotics, researchers said. “The safety of fluoroquinolone antibiotics has received a lot of attention regarding their potential to cause long-term side effects in some people,” said Daniel Morales, from the University of Dundee. “Fluoroquinolones are effective antibiotics but health care professionals should recognise that peripheral neuropathy may rarely occur following fluoroquinolone therapy,” he said. “We observed that treatment with fluoroquinolones could increase the risk of peripheral neuropathy by around 50 per cent and that this risk may last for up to six months following treatment,” he said. PTI

Eating disorders linked to long-term depression risk for mothers

May15, 2019/Hindustan Times

Any kind of eating disorder and body image concerns before or during pregnancy can be associated with long-term depression risk for mothers, recent findings suggest. “We found that women who have had an eating disorder at any point before childbirth, even if it was years earlier in adolescence, were more likely to experience depressive symptoms during pregnancy and up to 18 years after the birth of their child,” said the study’s lead author Francesca Solmi. According to the researchers, this finding suggests that many people with eating disorders might not fully recover since we know that eating disorders and depression often happen at the same time. Previous studies had suggested that depressive symptoms among mothers with eating disorders might improve after the perinatal period, but those studies didn’t have such a long follow-up time to confirm that the increased risk of depressive symptoms does, in fact, persist for women who have had an eating disorder. The research team found that women who had ever had anorexia nervosa or bulimia nervosa experienced more depressive symptoms over an 18-year follow-up than those who had never had an eating disorder. Abigail Easter, one of the authors of the paper who developed training materials to help identify eating disorders in pregnancy, added: “There is a need for more training for practitioners and midwives on how to recognise eating disorders in pregnancy, which could help to reduce the long-term impact of mental ill-health.”

India had world's highest child mortality rate in 2015: Lancet study

May15, 2019/The Tribune

India had more deaths among children under five than any other country in 2015, with large disparities in the child mortality rate between richer and poorer states, a Lancet study has found. The researchers at the Johns Hopkins Bloomberg School of Public Health in the US analysed state-level Indian data on the causes of death among children under five for the years 2000-2015. They found that India made great progress during the period, reducing annual mortality among children under five from 2.5 million in 2000 to 1.2 million in 2015—which was still the highest in the world. However, among India's states, great disparities remained: The highest mortality rate in Assam was more than seven times that in Goa. Although most under-five deaths were due to preterm complications, preventable infectious diseases featured prominently as causes of death in higher-mortality states. Although progress in reducing the under-five mortality rate has been occurring throughout India, the period from 2000 to 2015 saw widening disparities among richer and poorer states—ranging from Goa's 9.7 under-five deaths per 1,000 live births to Assam's 73.1. Liu used as a basic indicator of overall disparity the ratio of the highest regional mortality rate (Northeast region) vs the lowest (South region), and found that that ratio increased from 1.4 in 2000 to 2.1 in 2015. To accelerate India's progress against child mortality, the team recommends more extensive use of childhood vaccines, particularly against pneumonia- and meningitis-causing Streptococcus and H influenzae bacteria. They also advocate—especially for higher-mortality regions—a scaling up of standard care strategies for newborns, including "kangaroo care" in which the baby rests against the mother's skin, thermal care to reduce hypothermia and early initiation of breastfeeding. **— PTI**

Brainwaves during sleep strengthen memories: Study

May16, 2019/Hindustan Times

Brainwaves produced during sleep helps us store new information in our memory, according to a study that explains how bedtime helps boost our learning. Researchers have known about the close relationship between sleep and memory for decades. The study, published in the journal NeuroImage, shows how learned information turns into reliable memories during sleep. Researchers from Concordia University in Canada and University of Liege in Belgium studied how declarative information like facts and faces get stored after they have been learned. Brainwaves -- specifically, ones called sleep spindles, are fast bursts of electrical activity produced by neurons mainly during Stage 2 sleep, prior to deep sleep. Using medical imaging machines, researchers were able to assess brain activity related to these waves. "It's hypothesised that sleep spindles play an important role in transferring information from the hippocampus to the neo-cortex," said Thanh Dang-Vu, associate professor at Concordia University. "Our aim was to compare the sleep spindles from the night where the subjects learned the new information to the night where they didn't have any new information to learn but were exposed to the same stimulus with the same faces," Dang-Vu said. The researchers found that during spindles of the learning night, the regions of the brain that were instrumental in processing faces were reactivated. They also observed that the regions in the brain involved in memory -- especially the hippocampus -- were more active during spindles in the subjects who remembered the task better after sleep. This reactivation during sleep spindles of the regions involved in learning and memory "falls in line with the theory that during sleep, you are strengthening memories by transferring information from the hippocampus to the regions of the cortex that are important for the consolidation of that specific type of information," Dang-Vu said. Using non-invasive imaging to identify the mechanisms that strengthen memories can lead to improvements in our understanding of how memories work -- and can lead to improved interventions for people with sleep or memory issues.

Jawless fish may hold key to effective brain cancer treatment

May16, 2019/ The Tribune

A chemical found in jawless parasitic fish can be used to deliver anti-cancer drugs directly to brain tumours, as well as lead to more effective treatments for trauma and stroke, a study has found. The research, published in the journal Science Advances, found that molecules from the immune system of the parasitic sea lamprey may also be combined with a wide array of other therapies, offering hope to treat disorders like multiple sclerosis, Alzheimer's disease or even traumatic injuries. "We believe it could be applied as a platform technology across multiple conditions," said Eric Shusta, a professor at the University of Wisconsin-Madison in the US. When injected into the bloodstream, many drugs cannot reach targets in the brain as the blood-brain barrier prevents large molecules from leaving the blood vessels in the brain, researchers said. Researchers said that the technology takes advantage of the fact that many diseases disrupt body's natural defense mechanism—the blood-brain barrier, which lines the blood vessels of the central nervous system, protecting the brain from circulating toxins or pathogens. They also linked the molecules to a chemotherapy called doxorubicin. The treatment prolonged survival in mouse models of glioblastoma, an incurable cancer. "This could be a way to hold therapies in place that don't otherwise accumulate well in the brain so they can be more effective," said Ben Umlauf from the University of Wisconsin-Madison. "There are several disease processes that disrupt the blood-brain barrier and we could conceive of delivering a variety of different therapies with these molecules," said John Kuo from the University of Texas in the US.

World Hypertension Day 2019: Uncommon reasons you may have high blood pressure

May17, 2019/The Indian Express

Hypertension is one of the leading causes of mortality and morbidity around the world, and is an important risk factor for chronic disease burden in our country. While 90-95 per cent of patients having high blood pressure have no clear etiology and are classified as having primary or essential hypertension, 5-10 percent of people may have an underlying pathology or a reversible cause behind their high blood pressure (secondary hypertension). Essential hypertension is usually linked to genetics, poor diet, lack of exercise and obesity. Whereas secondary hypertension may be caused by a number of uncommon causes or diseases. On World Hypertension Day, which is celebrated on May 17 every year to promote awareness about hypertension, Dr Udgeath Dhir, director and head cardiac surgery, Fortis Memorial Research Institute shares some not to common yet important and treatable causes of hypertension. Common in middle aged obese males, it is marked by severe snoring. In this condition, the breathing repeatedly stops and starts during sleep. Common symptoms include headache, fatigue, daytime somnolence, confusion, difficulty concentrating, depression, personality changes, hypertension, and cardiac arrhythmias. It causes part of the nervous system to be overactive and release certain chemicals that increase blood pressure. Constant lack of sleep can also increase the amount of stress hormones, which can also raise blood pressure. Obesity causes an increase in total circulating volume of the body, thereby increasing the blood pressure. Also, fat deposits can release chemicals that raise blood pressure.

AI tool to detect hallmarks of Alzheimer's disease

May17, 2019/The Indian Express

Researchers have found a way to teach a computer to precisely detect one of the hallmarks of Alzheimer's disease in human brain tissue using artificial intelligence (AI). The study, published in the journal Nature Communications, is a proof of concept for a machine-learning approach to distinguishing critical markers of the neurodegenerative disease. Amyloid plaques are clumps of protein fragments in the brains of people with Alzheimer's disease that destroy nerve cell connections, said researchers at University of California, Davis (UC Davis) in the US. Much like the way Facebook recognises faces based on captured images, the machine learning tool can "see" if a sample of brain tissue has one type of amyloid plaque or another, and do it very quickly. Keiser and his team designed a "convolutional neural network" (CNN), a computer programme designed to recognise patterns based on thousands of human-labelled examples. The team devised a method that allowed it to rapidly annotate or label tens of thousands of images from a collection half a million close-up images of tissue from 43 healthy and diseased brain samples. Like a computer dating service that allows users to swipe left or right to label someone's photo "hot" or "not," they developed a web platform that allowed Dugger to look one-at-a-time at highly zoomed-in regions of potential plaques and quickly label what she saw there. This digital pathology tool — which researchers called "blob or not" — allowed Dugger to annotate more than 70,000 "blobs," or plaque candidates, at a rate of about 2,000 images per hour. The UCSF team used this database of tens of thousands of labelled example images to train their CNN machine-learning algorithm to identify different types of brain changes seen in Alzheimer's disease.

With regards,

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