Averting deaths in Muzaffarpur

All it could have taken was to ensure that the children had a meal at night

T. JACOB JOHN

PTI

Along with my colleagues, I had investigated the so-called mystery disease in Muzaffarpur, Bihar, during its outbreak in 2012, 2013 and 2014. The local name for it was acute encephalitis syndrome, but we found that the disease was not encephalitis but encephalopathy. This distinction is important. Encephalitis results from a viral infection, unless proved otherwise. The pathology is primarily in the brain. Encephalopathy is a biochemical disease, unless proved otherwise. The primary pathology is not in the brain. Specific treatment is scanty for viral encephalitis, but encephalopathy is eminently treatable.

Hypoglycaemia (when the level of glucose in the blood falls below normal) is usually due to an overdose of insulin in children with diabetes. It is easily corrected with oral sugar or intravenous glucose. The easily available 5% glucose solution suffices. Hypoglycaemic encephalopathy, however, is different from simple hypoglycaemia.

The disease pathway

We found that the disease broke out during the months when litchi was harvested, i.e. April, May and June. Muzaffarpur is full of litchi orchards. The illness started suddenly – children were found vomiting, displayed abnormal movements, were semi-conscious, and were convulsing between 4 a.m. and 7 a.m. The disease progressed fast – children went into coma and died within a few days. When sick children were tested, the blood glucose level was always below normal.

This disease was reminiscent of the Jamaican Vomiting Disease, a form of hypoglycaemic encephalopathy. It is triggered when unripe ackee fruits are eaten. These fruits contain a substance, methylene cyclopropyl alanine, which blocks a biochemical process called fatty acid oxidation, or gluconeogenesis.

There are two essential steps: gluconeogenesis is turned on and is then blocked midway by methylene cyclopropyl alanine. The back-up molecules of the unfinished process are certain amino acids that are highly toxic to the brain cells. Ackee and litchi belong to one plant family. My toxicology colleague, Dr. Mukul Das, found generous quantities of methylene cyclopropyl glycine in litchi fruit pulp.

The disease affected only malnourished children between the ages of two and 10. A majority of them were from families camping in orchards for fruit harvesting. No child from the nearby towns fell ill. Children of well-to-do families never fell ill.

Litchi harvest usually begins by 4 a.m., which means that families are awake before that. They go to sleep early. If children go to sleep without dinner, parents usually do not wake them up and feed them. Litchis are collected in bunches and sent to the collection points, but single fruits fall to the ground. Children are free to collect and share the fruits with their friends.

With this information we made the hypothesis that the disease was hypoglycaemic encephalopathy. Along with my paediatric colleague, Dr. Arun Shah, we conclusively showed that the disease was indeed hypoglycaemic encephalopathy. With all the pieces in hand, we reconstructed the disease pathway.

After prolonged fasting, malnourished children slipped into hypoglycaemia in the morning. Since they had very little reserve glycogen in their livers, they were unable to mobilise glucose from liver glycogen, unlike well nourished children. The brain needs glucose as a source of energy. As a result of lack of liver glycogen, gluconeogenesis was turned on. Had there not been litchi methylene cyclopropyl glycine, the glucose levels would have been maintained, and the children would have come to no harm. As the children had consumed litchis the previous day, gluconeogenesis had been blocked, aminoacidaemia had developed, and brain functions had been affected. Hypoglycaemic encephalopathy had set in.

We were unable to demonstrate aminoacidaemia in children with hypoglycaemic encephalopathy, but that was done by investigators from the U.S. Centers for Disease Control and Prevention (CDC). The only missing piece in our studies was filled in by CDC colleagues.

The disease can be prevented if children are well nourished, but that is not possible in the immediate term. It can also be prevented by ensuring that children eat a meal at night. All families were taught to provide a cooked meal to children before going to sleep at night. Preventing children from eating litchis is not easy, but the quantity of the fruit can be restricted with parental supervision. With all this health education, I was told that the disease number had come down drastically in 2016-18 compared to what it was in 2014-2015. I don't know what went wrong this year.

In 2015, all primary health centres were supplied with glucometers to check the blood glucose levels of sick children. Doctors were instructed to take a blood sample for glucose estimation and, irrespective of the results, infuse 10% glucose intravenously. To correct mild hypoglycaemia, 5% glucose is enough, but here the problem is not hypoglycaemia alone, but aminoacidaemia as a result of blocked gluconeogenesis. To prevent any further back-up amino acid from accumulating, the fatty acid oxidation process has to be turned off quickly. That requires raising blood glucose level to abnormally high levels so that insulin secretion is stimulated, and that in turn turns off the gluconeogenesis.

No sustained health education

What Dr. Shah and I found was that if ill children are infused with 10% glucose within four hours of onset of brain dysfunction, recovery is fast and complete. If only 5% glucose is given, or if 10% glucose is not administered within four hours, recovery is unlikely. I do not have detailed information from the field, but there seem to have been some human slip-ups this time.

Glucometers have not been maintained well. Health education was not sustained. New doctors are not familiar with all the information. Instead of 10% glucose, 5% is given. Children are taken mostly to private clinics and are then referred to the Sri Krishna Medical College in Muzaffarpur city since ambulance services are free of cost and easily available. Ambulances take more than four hours to reach the city hospitals from many rural clinics. We might think each error is minor, but when all the errors add up they contribute to deaths that should have been averted.

T. Jacob John is a retired professor of virology from CMC Vellore

Doctors and patients deserve better

Violence against doctors is a symptom and not the disease. Structural and policy changes in India's hospitals, and not increased security, may help in controlling it

SANJAY NAGRAL

AFP

Yet another chapter in the sickening saga of violence against doctors in India is coming to an end. It mostly ran a predictable course: junior doctors in a state-run hospital in Kolkata were attacked by the angry relatives of a patient who died there, junior doctors across West Bengal went on strike, outraged senior doctors paid lip service to their cause, medical associations went on a token strike, and there were calls for stricter laws and for increasing security for doctors. It was the usual narrative involving lumpen mobs, allegations of political instigation, unrealistic expectations from patients, overworked doctors, and calls for increased security, which included bizarre demands for bodyguards and even bouncers. Perhaps the only novelty was the rather knee-jerk and insensitive response by a Chief Minister suffering from a poll hangover, which seems to have acted as further provocation.

Will punitive action, new laws or increased security change this scenario? Will we never see an incident like this if such measures are taken? As someone who participated in a strike by junior doctors as long back as 1985 in response to an assault by a corporator in Mumbai and continues to witness such events in the public hospital where I work, I can only dismiss these as rhetorical questions. But is there something beyond this customary discourse that springs from the debris of such a fracas that we should recognise? In medical parlance, is there a disease that is producing these symptoms in recurring fashion? These are questions worth examining.

Examining the setting

The setting in which a majority of such incidents have taken place offer some clues. The most common scenario is that of a patient being brought to the casualty ward of a public hospital in a critical condition by family members or neighbours. If the patient does not survive, there is the reality or perception that treatment was not administered to him or her in time. The tipping point is when the staff in hospitals display insensitivity when they are questioned about delays. It is true that the emergency wards of India's public hospitals are chaotic, disorganised and resemble conflict zones. While there are several factors that contribute to this, the complete absence of the globally recognised protocol of 'triage' is a big reason. Triage involves a rapid examination of a patient to determine whether he or she needs instant care, early care, or care that can wait. The absence of this protocol means that emergency wards are often occupied by patients with all sorts of minor injuries. Data from a study at our hospital showed that more than 90% of patients frequenting the casualty ward over a two-year period had minor injuries which could have been easily treated in a smaller setting. In India, when people go to the police with a complaint of an assault, they are advised to go to a government hospital even if they have very minor injuries, to record them to strengthen their legal case. All these patients come to the casualty ward adding to the crowd and the burden of the hospital staff. If the staff have to treat only 10% of the load of critical patients, they would do a much better job and perhaps even save lives.

The huge workload in large teaching hospitals in cities, such as in Kolkata's Nil Ratan Sarkar Medical College and Hospital, is also the result of the poor capacity of suburban and rural hospitals to handle sick patients. This uneven scenario is due to excessive centralisation of funds, staff and equipment.

A growing chasm

A dangerous argument that is put forth in the aftermath of such attacks is that people's expectations have increased. I am not sure what this means in a system where the bar has been set very low. Are people who see huge delays, rickety ambulances and lack of equipment or malfunctioning equipment not supposed to respond? Isn't it possible that common citizens who see swanky private hospitals delivering quick, organised care wonder why they get such a raw deal? That they now realise that just putting an oxygen mask on an individual who is gasping for breath is not enough, a ventilator is needed? In other words, is the realisation that there is a more effective way of care, which the common man is being denied because of his or her inability to pay for it, the cause for anger which periodically explodes in a perverse manner?

One reason why laws are unlikely to work is that patients and their families or friends do not come to a hospital with a plan to attack. Attacks are impulsive responses in an emotional moment. What may work instead is softening the blow on families by examining how, where and who delivered the bad news to them. If family members in moments of intense grief are now regularly donating organs to their near and dear ones, there must be something that we are doing right. This is happening probably because the news is broken to them in a planned and organised manner by a trained transplant coordinator, usually in the sanitised setting of an intensive care unit of a large private hospital.

Demanding change

As members of a profession who have been trained in the method of science, we can do better than imitate the impulsive, inappropriate responses of those who attack the first doctor in sight, as well as the political class. We can certainly do better than come up with ludicrous demands such as appointing bouncers or bodyguards in hospitals. Several structural and policy changes in the way India's hospital systems work can reduce, if not eliminate, the perception that there is negligence in caring for patients. Medical associations who swing between fawning over politicians when they need favours to faux militancy after an incident, such as the one that took place in Kolkata, need to take the lead in demanding policy change.

In the heat of this debate it is worth remembering that in spite of being caught in the pincer of a tottering public health sector and an unaffordable private sector, a large majority of our patients show tremendous tolerance, resilience and trust in their interaction with us. We all deserve better.

Sanjay Nagral is a Mumbai-based surgeon

SINGLE FILE

Linking civilisation, culture and religion

We need to make sense of these terms in less exclusive ways

UDAY BALAKRISHNAN

AKHILESH KUMAR

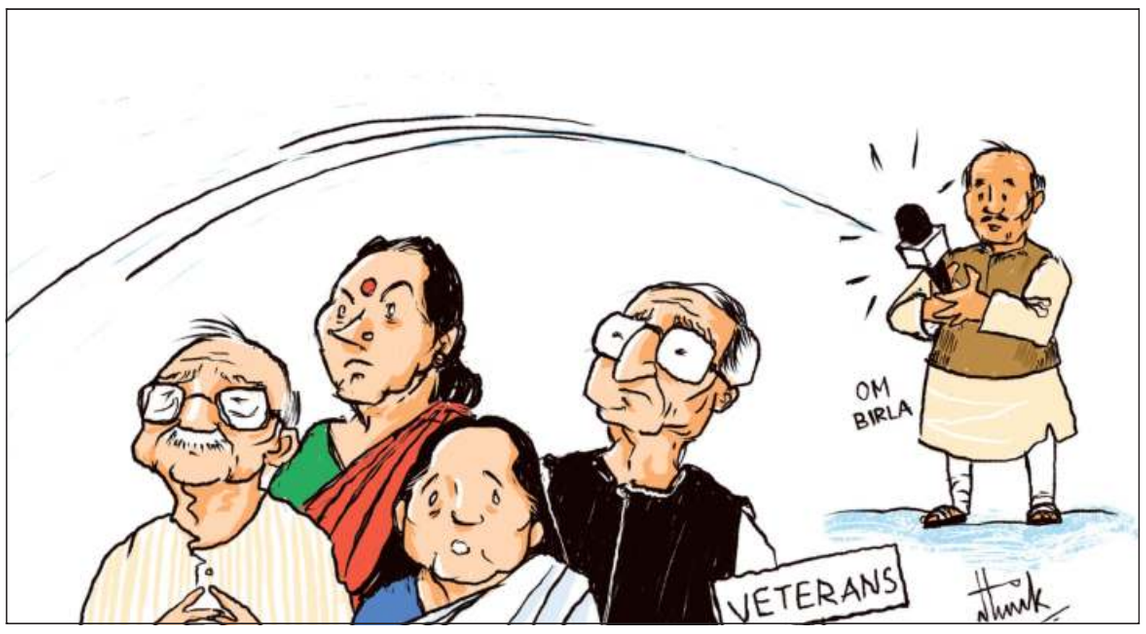
The words civilisation and culture are bandied about a lot these days. We are defensive about the first and protective of the other to a point where insulation becomes exclusion. Add religion to the two and we have a venomous plait that is near impossible to undo. Collectively we need to step back and look at these terms in perspective, if only to make sense of them in less exclusive ways and appreciate the common thread that runs through them. This is more important now as majoritarian points of view are being mistaken for, or are being passed off as, voluntary consensus.

Let's take religion first. Is mine better than yours? This is a question that has no answers, no sensible ones in any case. However much we may argue, there is much to commend in each faith and a lot to condemn in every one of them. The great philosopher, Sarvepalli Radhakrishnan, observed: "To admit the various descriptions of God is not to lapse into polytheism. When Yajnavalkya was called upon to state the number of gods, he started with the popular number 3306, and ended by reducing them all to one Brahman. 'This indestructible enduring reality is to be looked upon as one only.'" So where is the big difference between the many faiths in India? I, for one, am proud of the juxtaposition of a temple, a mosque and a church at Palayam in my home town Thiruvananthapuram, and hail the Holkar queen of the Maratha Malwa kingdom, Ahilyabai Holkar, for preserving the Gyanvapi Mosque even as she rebuilt the Kashi Viswanath Temple. There is a lot to learn from our past.

Culture is more problematic than religion. It is an omnibus term that hints at something good. But in the way it is deployed, it is a loaded and sinister term seeking to establish the superiority of one way of life and the inferiority of another. In his thoughtful book, *The Seduction of Culture in German History*, the sociologist Wolf Lepenies suggests a direct relationship between the German understanding of culture, which "has remained the catchword by which the Germans tried to distinguish themselves from the rest of the civilized world", and the rise of Hitler. Totalitarianism has deep roots in the collective minds of people. To be aware of it and keep it in check is a task cut out for civilisation.

As a term, civilisation is somewhat ambiguous but it strongly suggests harmony, unity, tolerance, enlightenment and confidence. But civilisation can be easily destroyed, as the renowned art historian Kenneth Clark cautions, "by cynicism and disillusion just as effectively as by bombs". That happens when, quoting Yeats in his book *Civilization*, he exclaims, "The best lack all conviction, while the worst /Are full of passionate intensity." How true.

The writer teaches at IISc, Bengaluru

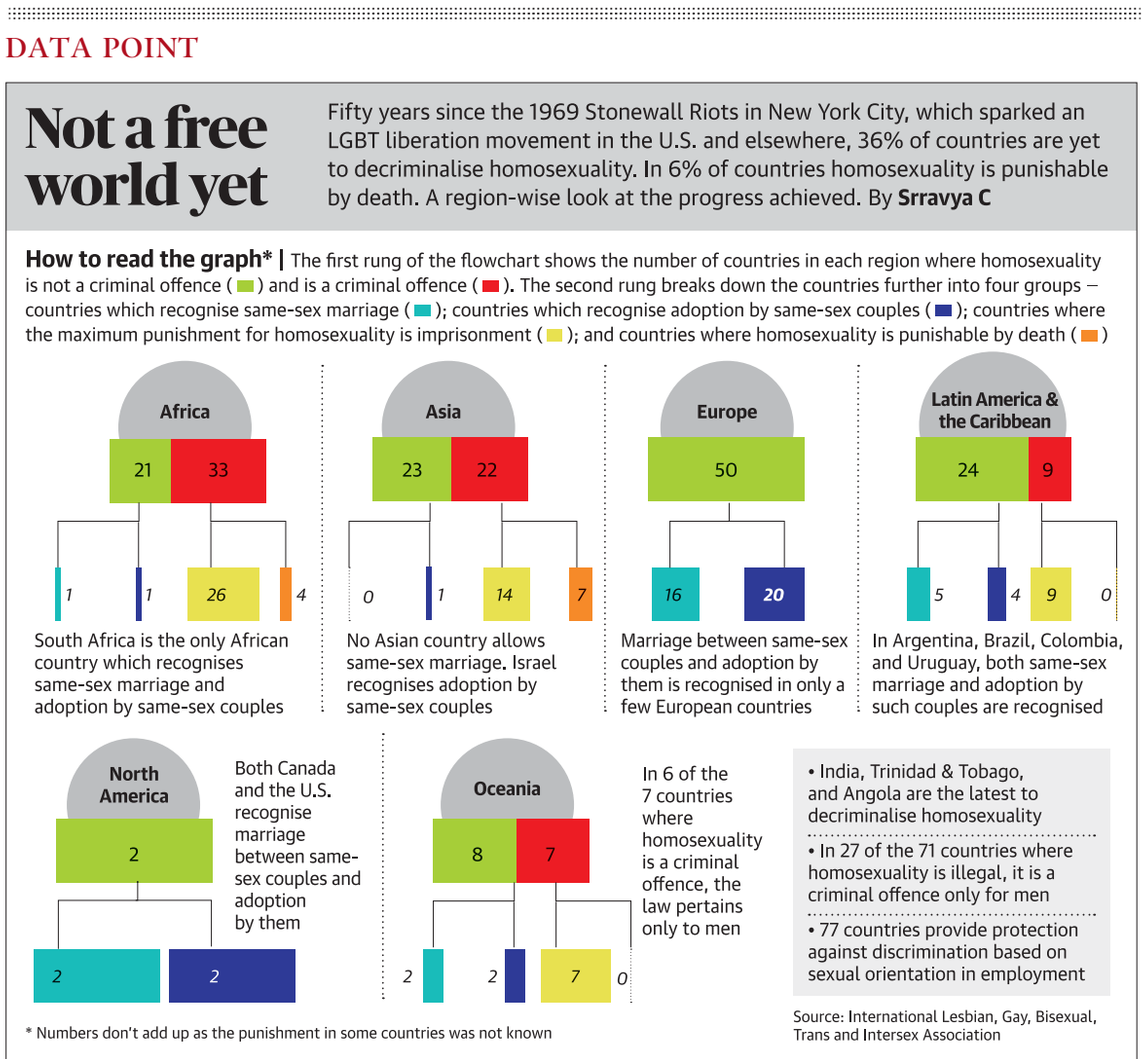


DATA POINT

Not a free world yet

Fifty years since the 1969 Stonewall Riots in New York City, which sparked an LGBT liberation movement in the U.S. and elsewhere, 36% of countries are yet to decriminalise homosexuality. In 6% of countries homosexuality is punishable by death. A region-wise look at the progress achieved. By **Srravya C**

How to read the graph* | The first rung of the flowchart shows the number of countries in each region where homosexuality is not a criminal offence ( ) and is a criminal offence ( ). The second rung breaks down the countries further into four groups – countries which recognise same-sex marriage ( ); countries which recognise adoption by same-sex couples ( ); countries where the maximum punishment for homosexuality is imprisonment ( ); and countries where homosexuality is punishable by death ( )



* Numbers don't add up as the punishment in some countries was not known

Source: International Lesbian, Gay, Bisexual, Trans and Intersex Association

FROM The Hindu. ARCHIVES

FIFTY YEARS AGO JUNE 19, 1969

P.M.'s choice of Giri not fully supported

All day to-day [June 18] and until late to-night, there was hectic political activity in the capital [New Delhi] with an endless series of high-level consultations between the Prime Minister, Mrs. Indira Gandhi, and her senior Cabinet colleagues and the principal Congress leaders over the selection of the Congress party's nominee for the Presidential election. But even after these intensive discussions, it was not clear whether Mrs. Indira Gandhi and her close supporters will be able to have their way in getting Mr. V.V. Giri nominated as the Congress candidate. The party leaders led by the Congress President, Mr. Nijalingappa, were still opposing Mr. Giri's nomination on the ground that a tried and trusted Congressman - which clearly meant one of them - should be chosen for this key post in view of the many political uncertainties ahead.

A HUNDRED YEARS AGO JUNE 19, 1919.

Swadeshi Campaign.

Another swadeshi cloth store to sell purely indigenous cloth was opened last night [June 18] at Morarji Goculdas Market [in Bombay] by Mr. Gandhi. One of the organisers of the movement, Mr. Narandas Purshotamdas, in opening the proceedings said that the necessity of opening the stores arose from the fact that there had been promulgated two swadeshi vows, the pure swadeshi vow and the mixed swadeshi vow. Those who had taken the first vow found it difficult to obtain such goods from the existing stores. The stores they were opening would sell only goods manufactured from Indian yarn charging only five per cent on the cost price so that the buyers would get clothes at the cheapest rate. Mr. Gandhi in declaring the stores open, said that the swadeshi vow was necessary for the progress of a nation and if they took a vow to use swadeshi clothes only, they would achieve truth.

CONCEPTUAL

Epistocracy

POLITICS

This refers to a form of political governance where the votes of people who are well informed about politics are weighed more heavily than the votes of people who have very little political knowledge. This is in contrast to democracy where everyone's vote is given the same weight despite the large differences in the political knowledge possessed by individual voters. The idea of epistocracy was first proposed by American political scientist Jason Brennan in his 2016 book *Against Democracy*. Supporters of epistocracy believe that such a system will incentivise people who are ignorant about politics to educate themselves in order to vote.

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