Correspondence

Letter from Ganiyari

May I express my sincere appreciation of this very welcome addition to the series *Letter from Ganiyari* in the *Journal*?[1]

The experiences of those working under very difficult circumstances in our poorly equipped, under-rated and neglected villages and tribal areas are worthy of record here. We do hope that such essays, published regularly, will inspire those of us who are working in vastly more fortunate and congenial circumstances.

Dr Prakash Amte, speaking on InkTalks[2] had expressed his wish that young doctors from the cities visit rural and tribal health centres to see for themselves the conditions under which villagers and tribals live and work and the problems they face when they are injured or are ill. The 'Letter from Ganiyari' will serve as an additional means for alerting our young doctors of the grim realities there and the enormous tasks that face those working to help those who desperately need succour.

The Letter[1] brings up the crucial role of correction of undernutrition if we are to make a dent in the programme for eradication of tuberculosis. Perhaps future Letters will tell us of the efforts made by the anonymous authors to correct this deficiency and other lacunae such as lack of hygiene, deficiency in the supply of potable water at or near the residences of villagers and tribals and their difficulties in getting local children educated and employed.

We have much to learn from the admirable and intrepid groups working under tough conditions to help the underprivileged in many parts of India.

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Compact fluorescent lamps: Advantages and health issues

Energy efficient lighting has been revolutionized by the introduction of compact fluorescent lamps (CFLs). CFLs have been designed to replace the once commonly used traditional incandescent lamps (ILs). CFLs are being promoted as 'green alternatives' because of less consumption of energy.

The role of CFLs in saving energy is important, but the benefits over ILs may get overshadowed and their superiority threatened if used indiscreetly and without proper disposal systems in place, due to the presence of mercury, though in very small amounts. However, exposure to mercury occurs only when the CFL breaks and is disposed of carelessly.

CFLs release ultraviolet (UV) radiations and generate strong electromagnetic fields. Their impact on human health has not been well studied. It is, therefore, important to discuss the benefits of CFLs vis-a-vis the presently debated adverse health issues.

In a CFL, the current flows through a tube containing argon gas and a small quantity of mercury. There is generation of invisible UV light which excites the fluorescent coating on the inner part of the tube (phosphor) emitting visible light. The content of mercury in a CFL has not been specified in India. However, a typical CFL contains 3–5 mg of mercury.[1] The permissible mercury content in CFL varies from country to country (Table I).[2–4]

There is little information about the amount of mercury in different brands and different wattages of CFLs sold in India. A study on a small sample found that the average content of mercury in CFLs sold in India is 4–6 times higher than that in developed nations.[2] There is also a report by USAID in 2010 on 'Testing for quality, benchmarking energy-saving lamps in Asia', which states that around 90% of CFL samples tested from Australia, India, Indonesia, Philippines, Thailand and Vietnam did not meet the European equivalent standards.[5]

The Electrical Lamp and Component Manufacturing Association (ELCOMA) in India has projected a steady growth in the manufacture of CFLs from 67 million pieces in 2005 to 401 million pieces in 2012.[6] Considering an average of 5 mg of mercury in each unit and production of 100 million units per annum, the total mercury consumption in the CFL sector is estimated to be 0.5 metric tonnes per annum.[4] The actual amount of mercury is likely to exceed the estimates in view of the import of CFLs with a high mercury content.

CFLs have an average operating life of 6000–15 000 hours compared to that of ILs (750–1000 hours). The efficiency and light output is dependent on the ambient temperature with the optimum temperature being 38 °C. At temperatures below or above the optimum, the light output is diminished.[7] When a CFL breaks, it is estimated that around 11% of mercury in it finds its way into air, water or a landfill site.[8] The total environmental load of mercury is expected to be partly compensated by the reduction in demand for power with the use of CFL, which in turn leads to a reduction in burning of coal and thereby release of mercury into the environment from coal-fired thermal power plants. It is difficult to estimate the difference between mercury exposure due to CFLs and the mercury exposure saved because of a resultant decrease in coal combustion. However, the US Environment Protection Agency (EPA) reports that for CFL lighting, the net emission of mercury was lower than that for incandescent lighting of comparable lumen output.[1]

There is no published study from India indicating the environment load of mercury because of breakage of CFLs and its health impact. However, it is well known that exposure to even a small quantity of mercury can have adverse effects. Mercury is a persistent bio-accumulative metal of toxicological concern. It is a neurotoxin with serious adverse effects on human health, if ingested or inhaled over a period of time. However, its presence in CFLs becomes an issue only when the broken lamp finds its way into the environment through soil, water and air. Several studies have reported the adverse health effects of mercury when present even in traces.[9] The clinical manifestations of toxicity involve multiple organ systems with variable

TABLE I. Mercury content in compact fluorescent lamps in various countries

Country/region	Mercury content in mg
China	5–10
European Union	2.5–5
India	3–12
USA	4

features and intensity and depend on chemical form, route and duration of exposure. Elemental mercury volatilizes and potentially causes adverse health effects, as the inhaled vapour is easily absorbed. Studies done to estimate indoor exposure from elemental mercury report that proper ventilation of rooms can reduce the indoor air mercury concentrations within 20 minutes, stressing the need for immediate clean up of the site and ventilation.[10,11]

A study by Peter Braun of Alab Laboratory, Berlin, Germany, states that CFLs may have harmful effects on health. A contentious issue raised by the group, about the use of CFLs, is the emission of chemicals such as phenol, styrene and naphthalene, which could be carcinogenic.[12]

According to the International Agency for Research on Cancer (IARC) of WHO, styrene and naphthalene are classified in Group 2B (possibly carcinogenic to humans). The evidence for carcinogenicity in humans is inadequate, but there is sufficient evidence in animals. However, the US EPA classifies naphthalene as Group C based on limited evidence of carcinogenicity, following inhalation exposure in animals and lack of data on humans. The IARC has classified phenol as Group 3 (not classifiable as to its carcinogenicity to humans). The major issue is: can the tiny amount of these substances released in the environment pose a risk to human health?

In an *in vitro* study, adverse effects such as decrease in proliferation rate and ability to contract collagen and significant increase in reactive oxygen species have been reported on exposure of healthy skin tissue (fibroblasts and keratinocytes) to CFLs.[13] A number of studies have shown that exposure to CFLs pose a low risk to normal individuals and potential harm to those who are photosensitive due to ultraviolet radiations.[14–17] Double envelope lamps have been reported to reduce the levels of UV radiations (UVB and UVC), but it has been highlighted that some lamps do emit radiations that are sufficient to provoke reactions in UVA-sensitive individuals.[18] The Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR) has concluded only UV/blue light radiation as a potential risk factor for exacerbation of light-sensitive symptoms in diseases such as chronic actinic dermatitis and solar urticaria.[19] Increased risk of breast cancer, after exposure to blue light emitted by lamps, has been reported due to suppression in melatonin levels.[20] CFLs also emit electromagnetic fields up to one metre. Hence it is advised not to use CFLs as desk or reading lamps.[21]

Broken CFLs can be a source of exposure to mercury in the environment. This is important for countries such as India where there is lack of proper disposal systems and public awareness about hazards due to mercury is negligible. A survey of healthcare professionals, in some hospitals in India, highlighted a low level of awareness about environmental toxicity due to mercury.[22] Some developed countries have disposal mechanisms in place such as recycling, municipal waste collection services, etc. Recycling of used CFLs is a good method for preventing the release of mercury in the environment. However, there are logistic issues involved, such as the collection of used CFLs, transportation to recycling units, and the high cost of recycling. The European Union follows the Waste Electrical and Electronics Equipment (WEEE) and Restriction in Hazardous Substances (RoHS) directives, based on the concept of extended producer's responsibility. In the USA, Universal Waste Rules are followed.[4] The Resource Conservation and Recovery Act (RCRA) requires the EPA to control generation, transportation, treatment, storage and disposal of hazardous waste including mercury.[23] However, despite various rules in western countries, it has been reported that CFLs are usually disposed of along with household rubbish and there is lack of necessary information on correct disposal on package inserts. Even retailers are not aware of their responsibility of collection or recycling of CFLs.[24]

In India too, most CFLs are disposed of with household waste or sold to scrap dealers. There is a complete lack of necessary information about disposal in public. The Ministry of Environment and Forests, Government of India constituted a 'Task Force on Environmentally Sound Management of Mercury in Fluorescent Lamps' to evolve a policy for safe management of mercury in CFLs, safety in manufacture, usage and disposal besides creation of public awareness.[4] However, the implementation of this policy has not been effective so far.

Conclusion

The great advantage of energy economy by the use of CFLs should not be masked by the possible health risks because of mercury exposure and emission of toxic substances. By taking due caution and adopting good waste disposal practices, the adverse effects are largely avoidable. Public should be made aware of the potential risks due to improper disposal. In addition, the veracity of various claims made about the negative impact on health need to be substantiated and proven with well-designed research studies.

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A handicap to the growth of quality radiology in India

The last century has seen path-breaking changes in the field of imaging, especially with respect to magnetic resonance (MR) imaging. However, despite these paradigm shifts in technology, a major limiting factor has been the implementation and understanding of protocols by the 'man behind the machine'.[1] This challenge has often and for long been faced by various clinical trials.[2] A recent US Food and Drugs Administration (FDA) regulatory inspection study also showed that one of the most commonly encountered problem was non-compliance to protocols.[3]

Quality control (QC) in diagnosis means standardization of diagnostic procedures, their strict implementation and central review.[4] The backbone of QC is rigorous review of protocol and adherence to standard operating procedures (SOPs).[4] Its failure leads to unnecessary repeat scanning and improper diagnosis.

We obtained 38 scans with 1.5 tesla MR scanners across 13 cities of India as part of a possible multicentre study that required implementation of a relatively new but easy technique for imaging patients with metal prostheses—the metal artifact reduction sequences (MARS). A detailed protocol of the study mentioning the scan parameters, types of sequences and their planning was circulated to all centres along with telephonic training and guidance. Telephonic support was also made available at the time of patient scanning. Soft copy images of the study were then received back for review and reporting.

A comparison between the standard protocol and the study performed was done independently by two radiologists. They assessed the parameters for sequences performed (more, less, different), planning of the sequences, parameters used in various sequences and quality of the scan. The quality of the scans was then graded as: Grade A: strict protocol compliance; Grade B: extra sequences performed and/or inadequate planning; Grade C: one of the sequences was missed and/or adequate parameters were not used in <3 sequences; and Grade D: more than one sequence was missed and/or adequate parameters were not used in >2 sequences. Grade A and B studies were considered optimum for diagnostic purposes.

Of the 38 scans from 13 cities across India, only 1 centre adhered strictly to the protocol, and only 2 other centres provided 100% diagnostic quality (Table I) scans (i.e. either Grade A or B scans). The most frequently encountered problem was the inability to adhere to the number of sequences required followed by non-compliance of the prescribed scanning parameters, i.e. bandwidth, TR, TE, slice thicknesses, etc. The most commonly violated parameter was bandwidth, the backbone of MARS imaging.

TABLE I. Grading of the quality of the scans (n=38) obtained from various centres

S.No.	Centre	Grade				Total scans
		A	B	C	D	
1.	Bengaluru	0	0	0	1	1
2.	Chandigarh	0	1	0	0	1
3.	Chennai	0	5	0	8	13
4.	Coimbatore	0	2	0	0	2
5.	Delhi	0	0	7	0	7
6.	Hyderabad	0	1	2	0	3
7.	Jaipur	0	0	1	2	3
8.	Kolkata	0	0	3	0	3
9.	Nagpur	0	0	1	0	1
10.	Pune	0	0	1	0	1
11.	Surat	0	0	0	1	1
12.	Trichur	0	0	0	1	1
13.	Vishakapatnam	1	0	0	0	1
	Total	1 (3%)	9 (24%)	15 (39%)	13 (34%)	38

The reasons for non-compliance could be: (i) inability to understand how to create protocols in the systems; (ii) inability to adhere to new protocols; and (iii) a belief that it is unnecessary to use new protocols for specific indications.

We spoke to the technologists and some of the radiologists at the centres and the main reason seemed to be an inability to grasp the importance of following rules and set protocols all the times. Reaping the benefits of technical advances can often be futile if standards are not adhered to and this may be partly responsible for problems with the quality of radiology practice and trials in India.

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Cardiac tamponade: A rare presenting manifestation of systemic lupus erythematosus

Atypical and emergent presentations of systemic lupus erythematosus (SLE) are rare and their diagnosis can be challenging. Though pericarditis is a well-known manifestation of SLE, cardiac tamponade resulting from a massive pericardial effusion is rare in SLE and even rarer as a presenting manifestation.

A previously healthy, 56-year-old woman presented to the emergency department of Jawaharlal Institute of Postgraduate Medical Education and Research, Puducherry with breathlessness for 1 week. There was no history of fever, cough, chest pain, arthralgia, skin rash,

photosensitivity or neuropsychiatric problems. On examination, she was breathless, had tachycardia and was hypotensive. Jugular venous distension and muffled heart sounds were noted. Echocardiography showed a massive pericardial effusion and cardiac tamponade. Emergent percutaneous catheter pericardiocentesis drained about 1000 ml of serous fluid. Laboratory tests revealed anaemia (haemoglobin 8.5 g/dl), erythrocyte sedimentation rate of 65 mm in the first hour, thrombocytopenia (platelet count 72×10^9/L), normal renal, liver and thyroid function, exudative pericardial fluid (fluid protein 6.2 g/dl) with normal glucose content (74 mg/dl) and lymphocyte predominance. The pericardial fluid was negative for acid-fast bacilli and malignant cells. Pericardial fluid adenosine deaminase was 15 IU/L and the culture did not grow bacteria or *Mycobacterium tuberculosis*. Polymerase chain reaction of the pericardial fluid also did not reveal any *Mycobacterium*. Contrast-enhanced computed tomography of the chest (Fig. 1a), abdomen and pelvis was unremarkable, except for pericardial effusion and minimal bilateral pleural effusions. Tests for human immunodeficiency virus, and hepatitis B and C infections were negative. The patient developed palpable purpuric rash over the legs (Fig. 1b), painful oral ulcers and left-sided pleurisy over 8 days in hospital. A diagnosis of late-onset SLE was made, based on polyserositis, cutaneous vasculitis, oral ulcers, strongly positive ANA, anti-dsDNA antibodies and low complement levels. Urine examination revealed 1+ proteinuria, but no active sediments. She received pulsed intravenous methyl-prednisolone 1 g daily for 3 days, followed by oral prednisolone (1 mg/kg/day). She improved and was discharged on day 9. After 12 months of follow-up, there was no re-accumulation of pericardial fluid and she was doing well on low-dose steroids.

Late-onset SLE (LO-SLE), with onset at the age of ≥50 years accounts for 3%–18% of patients with SLE and tends to have a more insidious onset, a slower course and less severe organ involvement.[1,2] Serositis, neurological and pulmonary involvement are more common, while arthritis, cutaneous and renal involvement are less common in LO-SLE.[1,2] Serious complications of SLE encountered in the emergency department include renal failure, seizures, stroke, myocardial infarction, myocarditis, diffuse alveolar haemorrhage, pulmonary thromboembolism, cortical venous thrombosis, systemic vasculitis and infections arising from immunosuppression. Pericarditis is the commonest and the earliest cardiac manifestation of active SLE, others being myocarditis, endocarditis, conduction system abnormalities and atherosclerotic coronary artery disease. In a study[3] of 395 SLE patients, 19% developed pericarditis and 2.5% had cardiac tamponade. Cardiac tamponade was the initial manifestation of SLE in 4 (0.01%) of these patients. Cardiac tamponade is even rarer in patients with LO-SLE.[4,5]

In the index patient, pericardial tamponade was the sole initial manifestation and other manifestations of SLE evolved rapidly, within a week of hospital admission. Thus, SLE needs to be considered, along with other possible causes such as viral/tuberculous pericarditis, malignancy, hypothyroidism, rheumatoid arthritis, uraemia and radiation pericarditis in middle-aged women presenting with pericardial effusion and cardiac tamponade. Rapid evolution of the disease, with renal involvement, cutaneous vasculitis and hypo-complementaemia, as seen in our patient, is uncommon in LO-SLE.[1,2]

To conclude, SLE should be considered in the differential diagnosis of pericarditis and cardiac tamponade in women, irrespective of their age. Further, women with pericardial tamponade of uncertain aetiology need to be followed up closely, keeping in mind that other features of SLE may evolve subsequently.

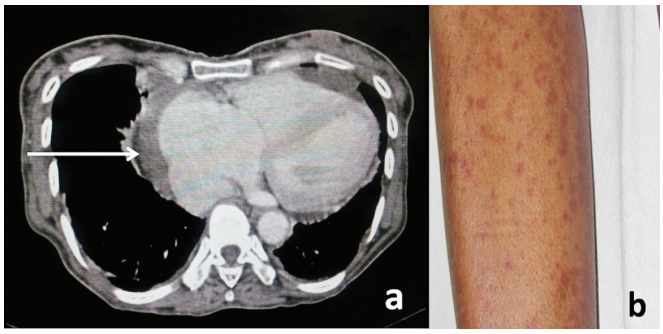

FIG 1. (a) Contrast-enhanced CT of the chest showing pericardial effusion (white arrow), without pericardial thickening or calcification and minimal pleural effusion on both sides. (b) Cutaneous vasculitis resulting in palpable purpuric rash over the right leg

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Why do we submit double-space manuscripts to medical journals?

I am constantly surprised at the number of otherwise perfectly reasonable journals (including *The National Medical Journal of India*) with completely logical instructions to authors, but who nonetheless insist that all submissions to them should be double-spaced. A literature search reveals that the angst is neither mine alone nor recent. In 1965, Quay[1] wrote to the *JAMA* wondering at the 'everlasting enigmatic command… to double-space everything'. He ended his letter by enquiring whether editors were more likely to accept submissions if double-spaced. He received an inscrutable one-word reply, 'Yes –Ed'.[1]

Fifty-eight years later, the digital age publishing industry stands transformed by the internet revolution. However, this 'Thou shalt double-space' diktat thrives unquestioned in the instructions to authors of virtually all journals that follow the guidelines of the International Committee of Medical Journal Editors (ICMJE).[2] These uniform requirements for papers submitted to biomedical journals bore this stipulation well into their 2010 update.[3] Although the latest 2014 version has expunged it,[2] corresponding changes in journals' instructions to authors have been painfully slow in coming.

In typographical parlance, line spacing is called 'leading', pronounced led-ing (rhymes with 'wedding'). Its etymology is traceable to the times of handset type when lead strips were inserted between lines to add vertical spaces. Double-spacing, i.e. successive lines vertically separated by 200% of the font height, avoided overcrowded solid text where successive lines almost touched each other.[4,5] In the era of paper submissions, double-spacing, with generous margins, was intended to accommodate editors' and reviewers' written comments.[3] It might have also aided visual tracking from the end of one line to the beginning of the next one.[3,4]

Today, nearly all manuscripts are submitted online and reach reviewers in PDF or similar file formats.[6] Navigating the same length of an electronic double-spaced manuscript read on a notebook or tablet computer screen requires twice the amount of mouse scrolling, keystrokes or screen swipes as compared to similar length single-spaced text. Health consequences on the metacarpo-phalangeal, inter-phalangeal and wrist joints of this extra activity necessary to read double-spaced text are debated.[7] However, what is not in doubt is that excessive scrolling wastes time and can be frustrating on all but the largest of monitors.

The ICMJE guidelines till recently stated that double-spacing enables '... reviewers to edit the text line-by-line and add comments and queries directly on the paper copy'.[3] But the paper copy itself is dying. Granted, some reviewers might be uncomfortable reading long papers on computer screens and may prefer paper printouts. But they should realize that double-spaced prints require twice as much paper as single-spaced versions. Paper comes from wood pulp, so double-spaced means double the number of felled trees. It is impossible to reduce the line spacing in a PDF file without additional software. In any case, since most review comments are now submitted online,[6] even referees who prefer print-outs might already be directly composing their critique on a computer (or dictating it to a typist). For the recalcitrant few who insist on marking the paper original, it is imaginable that single-spaced or 1.15-spaced print-outs might induce them to write comments on a separate paper (or the reverse blank side of a single-sided printout).

Scrolling fatigue and the environmental impact aside, most current sources agree that it is more difficult to read double-spaced texts than its tauter counterparts.[5,8–10] How many newspapers, novels or, for that matter, journals' instructions to authors are printed double-spaced? Online fora discuss this extensively. A few there do lament the demise of the double-space.[10] Some even curiously, and perhaps laughably, compare it to the fading of good manners and fastidiousness about correct spellings.[10] Their unfounded hubris, however, does not alter the reality that the 1.15 spacing is now the default setting in Microsoft Office Word™ software (Microsoft Corp. Richmond, VA), 2007 version onwards.[8,9] This change was purportedly aimed at improving efficient vertical space utilization and giving documents a 'fresh, more professional look'.[9] The developers apparently felt that for most readers, the golden mean between the extremes of text uncomfortably set solid-versus-extravagantly double-spaced lay near this 1.15 spacing.[8,9]

To close my case, the 1965 protest in *JAMA* against double spacing (by a man who was ahead of his times) may have been easy to dismiss, considering it was still defensible in the paper-only era. But today, this relic of the past only hinders efficient utilization of vertical space, wastes paper on printing and, perhaps worst crime of all, hampers readability on electronic devices. A logical change in journals' guidelines for manuscript formatting appears to be in order.

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