Environmental Health: Addressing the Knowledge Gaps

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Climate change and air pollution occupy centre stage in academic, political, and social discourse across the country. Every speaker discusses need for taking actions, and expresses concern over enough not being done to address the issue of climate change and pollution. This usually is the concluding statement after narrating the number of deaths and burden of disease estimates that are attributable to air pollution as well as climate change. The often quoted figures are based on global burden of disease estimates and *The Lancet* commission reports. It pegs mortality and disease burden due to air pollution as one of the highest, as the number adds up to millions in our country. Recent addition to the list is premature mortality attributable to air pollution. The hue and cry is louder in proportion to the size and significance of the city with Delhi sitting uncomfortably at the top of the list, closely followed by Mumbai and Kolkata. If the news papers are picked up in the month of October through January, it is mandatory to find an article in the pages everyday, covering the city news describing the air quality index. It is invariably accompanied by 'expert comments' from representatives of pollution control boards, research institutes and academia in general. But majority content has a common language and rhetoric: pollution is worsening, number of cases of COPD/Bronchial Asthma/Heart Attacks/ hospital admissions are rising and Delhi is declared a gas chamber, even some one waiting to go to the gallows is also pleading for mercy citing that as it is they live in a gas chamber so why should they be sent to gallows? And behold, newspapers carry this piece of news with aplomb and elan. And when one of the parliamentarians of this country states with confidence that there is no evidence that air pollution reduces life expectancy and that no Indian studies exist showing relation between air pollution and health, typically his views are looked down upon with adjectives such as uninformed, defensive, denial mode etc.

After examining both sides of the picture, one is compelled to consider that there is an element of truth in the parliamentarian's statement, if closely and unbiasedly examined. One should ask the same question, where is the databased evidence? What percentage of deaths in the country are certified using a death certificate? The most optimistic figure is not more that 30%. Among the issued death certificates, how many carry the primary and secondary cause of death clearly written on the certificate. I have records of a municipal corporation in possession where cause of death is written as 'neonatal tetanus' for a person older that 65 years. The death records are neither complete nor correct in several cases. Therefore, how can we comment on the number of deaths that can be attributed to air pollution? In continuity, there are a few more questions. In spite of being made mandatory, how many hospitals in the country follow ICD coding for the patients? How many hospitals maintain electronic data base of the OPD and IPD patients? During a training program for the medical superintendents of Community Health Centres of a progressive state in western India, among the 24 present, none said that they follow ICD coding system and equally emphatically they mentioned that in none of the CHCs they work in, computerized records are maintained of indoor and outdoor patients. So if we do not have the data, how can we talk about evidence? There is hardly any published study where cohorts have been setup to study the incidence of air pollution related diseases in any part of the country, be it mega cities, industrial towns, or mining areas, unarguably the hotspots of air pollution? We are unfortunately not even aware of the pollution levels in small towns and industrial hubs because simply monitoring has not been taken up yet at such micro levels. And so far we have not tried to study the association in our populations. Mostly the predictive models developed in USA or Europe using their air pollution data and morbidity and mortality data, have been extrapolated on countries like India and burden of disease estimates are released. There is nothing wrong with

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extrapolation, but the biological plausibility of linear positive correlation between $PM_{2.5}$ levels and morbidity calculated for values ranging from 10 to 40 μgm/M^3 on population living in $PM_{2.5}$ levels ranging from 70 to 300 μgm/M^3 is not tenable. Had it been so, asthma and COPD would have crippled more than half of Delhi's population and acute cardiovascular events would have far outnumbered the available Intensive Coronary Care Unit beds by a huge margin.

Further, whatever little data is available in some of the better managed hospitals with electronic patient records in place and ICD coding is followed, the data is not available for researchers and epidemiologists to make use of, to develop our own predictive and forecasting models. Access to data from private hospitals and health service providers is like a day dream, we have not even started thinking about it. It will be delightful if someone can share a *url* or a hyperlink to access aggregated health facility data on morbidity and mortality. Another dangerous trend has been trying to use fishing epidemiology to find pollution at the root of all illnesses ranging from pregnancy wastage and poor outcome of pregnancy to occurrence of diabetes mellitus to cognitive behavioural disorders and genetic diseases. It seems like air pollution will soon become the universal risk factor, a risk factor for every disease, thereby implying that if we win over air pollution, the risk of majority of diseases will become sizeably small. I don't think that epidemiology can become funnier than this.

We are still not allocating money for constituting cohorts to follow for next 5 to 10 years, we are still not considering to set up environmental health science departments in medical colleges to augment research in air pollution's health effects in our own population. Thankfully environmental science education has been made mandatory in schools and colleges. As usual, we have taken a back seat in this aspect too. But as the saying goes, it is never too late to start.

In making the health data of individuals available in public domain, there are ethical and privacy issues, no denying of that but it is always possible to provide unlinked anonymous aggregated data at ward/village/PHC/CHC or district level purely for research purposes.

It is recommend that there should be improvement in data recording and digitization of hospital records be expedited and aggregated data sharing must be made mandatory even for the private sector health care providers. Following and coding of cases using ICD 10 must be made legally mandatory just like birth and death registration are. Detailed history of occupation, residence, migration and transport used should be recorded along with that exposure to environmental tobacco smoke, biomass fuel, industrial toxicants, VOC and other toxic materials like heavy metals in an empirical format. Through these records we may be able to build the natural history of events leading to causation of respiratory morbidities and assess attributable fraction of risk from air pollution in case of diseases with multiple risk factors, be it COPD or Diabetes Mellitus or a pregnancy wastage or low birth weight. Till then focus should be on mitigation of air pollution, management of existing cases and generic advisory to protect from effects of pollution should be the only tangible communications made in public and scientific media.