Indo-US nuclear deal: A challenge for occupational health

With the nuclear deal with US, the country is poised towards investing in nuclear power. However, there are concerns stemming from the track record of nuclear installations in the past regarding the safety aspects. The present editorial discusses the connected issues and reviews India’s preparedness towards meeting the occupational hazards posed by nuclear power.

INTRODUCTION

The nuclear deal between US and India has been approved, only some formalities are remaining. This might be counted as an achievement of this government, but this also poses several challenges regarding a safe nuclear occupational environment. The much publicized government’s viewpoints and media hype, largely based on optimism that energy needs of our country can be met with if we resort to nuclear energy for power generation has to be tempered with the track record of nuclear installations. Concerns are coming forward from different quarters. Several issues need to be addressed such as whether this a safe and economically viable proposition? What about the health hazards of radioactive material and even the radioactive wastes on the workers and on the entire community.

HISTORICAL ASPECT

In spite of marked improvement in radiation protection, some 285 nuclear reactor accidents have been reported in various countries between1945-1987.[1]

Two major nuclear reactor plant accidents are:

1. Chernobyl nuclear disaster:[3] On April 26th, 1986 the World’s worst nuclear power accident occurred at Chernobyl in the former USSR (now Ukraine). The Chernobyl nuclear power plant located 80 miles north of Kiev had 4 reactors and whilst testing reactor number 4 numerous safety procedures were disregarded. At 1:23 am the chain reaction in the reactor became out of control creating explosions and a fireball which blew off the reactor’s heavy steel and concrete lid. The Chernobyl accident killed more than 30 people immediately and as a result of the high radiation levels in the surrounding 20-mile radius, 135,00 people had to be evacuated.

2. Three mile island: On an island 10 miles from Harrisburg Pennsylvania resides the Three Mile Island nuclear power Station. There are two reactors at the plant, dubbed Unit 1 and Unit 2. One of them is inoperable. Unit 2 experienced a partial reactor meltdown on March 28, 1979. A partial nuclear meltdown is when the uranium fuel rods start to liquefy, but they do not fall through the reactor floor and breach the containment systems. The accident which occurred at Unit 2 is considered to be the worst nuclear disaster in US history. Although surveillance within the Three Mile Island cohort between 1979-1998 (n = 32,1350), provided no consistent evidence that radioactivity released during the nuclear accident had a significant impact on the overall mortality of these residents, several concerns persist and certain dose -response relationships cannot be definitely excluded.[4]

SAFETY CHALLENGES FOR INDIA

India is not immune to the nuclear reactor plants accidents. So far we experienced two such kind of accidents fortunately they were not major accidents.

- JAN-1-1992: Four tons of heavy water spilt at Rajasthan nuclear power plant.[5]
- MAY-13-1992: Tube leak causes a radioactive release of 12 Curies of radioactivity from Tarapur nuclear power station.[5]

Apart from accidents, there is a major problem of radioactive waste management. There is no full proof method of disposal of radioactive waste.[6]

As we engage in nuclear enterprise on a large scale we should gear up our
nuclear safety protocols to avoid major nuclear disasters.

OCCUPATIONAL HEALTH HAZARDS OF RADIATIONS[6-11]

The radiation related diseases in population around uranium mines and nuclear facilities are well known.

- Health hazards of radiation have wide spectrum ranging from acute radiation syndrome to carcinogenesis (major cause of occupational carcinogenesis of thyroid, skin, breast, lungs and salivary glands). Radiation may act to enhance the effect of another carcinogen i.e. they may act as co-carcinogens.
- Radiation dermatitis is also very common amongst the laborers.
- Long-term exposure to radiation also related with chromosomal mutations.
- Long-term exposure known to be associated with the foetal abnormalities for eg. An excess of leukemia and non-Hodgkin’s lymphoma in young people residing in village of Seascale, England was caused by occupational irradiation of their fathers at Sella-field nuclear installation as suggested by case control study.[12]
- According to studies conducted by International Physicians for Prevention of Nuclear war (IPPNW) and German Society for Radiation Protection, 50,000 to 100,000 liquidators (clean-up workers) died in the year up to 2006 since Chernobyl. Between 540,000 and 900,000 liquidators have become invalids, 12,000 and 83,000 children born with congenital deformation in region of Chernobyl. In Belarus alone over 10,000 people developed thyroid cancer since catastrophe.[6]
- Till date there is no such method to safely dispose the nuclear waste products. The threat posed by dumping wastes into a storage pond is already causing grave environmental concerns. Its is important to note here that half-life of Uranium is 760 million years and that of Plutonium is 24,100 years. This means that after so many years half of the radioactive substance will remain around us.[1]
- Insurance costs in case of accidents of nuclear reactor are so high that no private company came forward to cover the insurance cost of these facilities in U.S. Ultimately government had to pay insurance cost. It is going to be repeated here in India.[1]
- In India the traditional public health concerns likes communicable diseases, malnutrition, poor environmental sanitation and reproductive health care get emphasis and priorities in the health policy. Recent industrialization and globalizations is changing the occupational morbidity drastically, the new pathologies like cancers, stress, AIDS, geriatrics, psychological disorders and heart diseases are on rise. The transition pose challenges to health care system with new concepts of environmental legislation, ethical issues, new safety regulations, insurance and high costs of healthcare.[13]
- Due to lack of education, unawareness of the hazards of the occupations, general backwardness in sanitation, poor nutrition and climatic proneness of this geographic region to epidemics aggravate the health hazards from work environment.[14]

CONCLUSION

Though India is showing signs of becoming a major economic power, the state of public health is not up to the mark. We still have large burden of communicable diseases and increasing trends of non-communicable diseases. So far occupational health as a part of public health is somewhat neglected sector due to lack of policy making and research.

As already discussed due to many lacunae in basic infrastructure in occupational health, India is ill prepared for new occupational hazards like nuclear radiation hazards. The overall improvement in the occupational health infrastructure is needed to initiate any new projects particularly hazardous ones dealing with nuclear power.

It is emphasized by some experts in the power sector and government that nuclear power is only option which can fulfill the power requirement of the country, but many experts think that more safe and economic options are available like non-conventional energy resources. We should concentrate more on this type of resources to protect our labourers, their families and on large extents entire community. To conclude government must think in all directions over this Indo-US nuclear deal.

REFERENCES

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