

MODULE 26 - ENVIRONMENT AND HUMAN HEALTH

OBJECTIVES

By the end of this session students will be able to-

1. To facilitate the evaluation and monitoring of the standard of water quality, sanitation and health care risk waste management and disposal for the people.
2. To develop understanding of the effects of biological, chemical and physical hazards in the environment on human and ecosystem health, and the means of managing these hazards.
3. To conceptualize, design, implement, and evaluate programs and policies to protect and promote environmental health.

SUMMARY

This program deals with environment & human health, climate change & human health and role of IT in environment & human health.

- Environmental hazards such as toxic emissions and contamination of air, water and food have been known to be detrimental to human health, particularly during prolonged exposure and for more vulnerable groups like children or the elderly. Social conditions such as poverty and unemployment may worsen physical health and especially hard on mental health and general well-being.
- Climate change affects the fundamental requirements for health – clean air, safe drinking water, sufficient food and secure shelter and strongly affect water-borne diseases and diseases transmitted through insects, snails or other cold blooded animals.
- Technology has played a key role in the development of human society. Modern technologies such as information technology have changed the human lifestyle. Information technology also plays a key role in human health. It helps the doctors to monitor the health of people of that area. The information regarding outbreak of epidemic diseases from remote areas can be sent more quickly to the district administration to take corrective measures.

TRANSCRIPTION

Environment and Human Health

Today we are to discuss about the environment and the human health, the Climatic Changes and human health, the Role of Information Technology in Prevention and Care during Environmental Health Hazards. If I talk about one individual, the individual is born with a genetic constitution in which the parents have given the genes and these genes are showing its effects through the body contour, the faces, the look, the nature and all the attributes that the little child has. But however, these all changes which the parents have given, will again have an effect of environment, as soon as the child is born out and these environmental effects make the environmental constitution of this person and make

this as an individual. If the effects are very good and environment is well tuning, in that condition, there is an overall growth of this individual but if sudden bad effects do occur, in that condition, there is an mal adjustment & problems in life. The problems in life here, to be discussed, are about the health only. However the solutions will be similar, the solutions are: either the person change the environment. That means if a person is working in the cement industry and is having allergy with the cement or some disease pattern, an occupational disease in that condition, the person will have to change the occupation and the environment is changed. 'OK', the person will get well. This person may change the environment in the sense that he may quit the environment and 'run away'. That means a person living in Indore for example, he's not getting tuned with the environment may go and live at Mumbai where there are lesser extremes of weather and similarly the person may acquire safety measures, that means as, we wear woolen clothes in winter and we avoid woolen clothes in summer. Similarly the person as the third measure may go for the adaptation. It is said that when some when some problem is inevitable, it's better to relax and enjoy it. Coming to health and environment we have two types of environment usually for every individual it is micro environment in which the person lives that means his eating habit, his sleeping habits, his other habits and that those of the addictions that we want to address, that means may be alcohol may be tobacco may be other things that the person is used to and the person will quit them and get healthy. Next is the macro environment, This is the holistic community picture when whole of the community is getting affected in certain cases, see for example, there is an epidemic of the disease. Epidemic is broad scale occurrence of the disease. Endemic is a small scale occurrence of the disease in a limited population pattern and Sporadic is a cluster here and a cluster there but these all disease patterns do occur because of change and variations in the macro environment of the individuals. Environmental hazards may occur, which are, usually we say that it is quarter of the total burden of the disease worldwide and one third of the disease burden among the children worldwide. They appeal and they are particularly through diarrhea, lower respiratory tract infections various forms of unintentional injuries. Unintentional injuries do not only mean road side accidents but they even be say for example radiation injuries, say for example injuries through the smoke, say for example the injuries that occur through the vectors, may be rodents , may be mosquitoes and others and malaria is the dreaded one of them in whole of the world. The disease burden is much higher in the developing world, is a well known fact but however, in the developed countries the non communicable diseases like cancers, cardio-vascular diseases, or diabetes, the disease burden is more. We need well targeted interventions and that is the only way, that we can prevent the thirty million deaths which are occurring every year in the world.

The environmental health addresses two types of environment that is the natural environment and the built environment. Particularly when we talk about the air quality, it includes both the indoor pollution and the outdoor pollution, that means, within the home when the pollution occurs, outside.

Indoor air pollution: this may occur through the smoke that is produced by the hearth in our own household and the most of the women and children are more susceptible to it because they have to sustain inside, more time with this hearth. Passive smoking is not to be forgotten however, because those who smoke tobacco they think I'm polluting myself

only but no this person is damaging the health of all household people that are residing there, particularly in the overcrowded house and certain other places.

Body art safety like tattooing, body piercing, permanent cosmetics, they may lead the chemical injury that is to be addressed. Climatic change we know that wherever the climate is different climate & as soon as we enter a different climate say for example a dove from Switzerland may not survive on the equatorial regions, so we can understand how the climatic change affects their life and that particularly the human beings which are affected by the climate. The disaster preparedness we know that we are burning away the fossils fuels, we are depleting the earth of the ground level water and certain other things & in that conditions we are prone to disaster. Are we prepared for the disasters? Can we respond to whenever disaster occurs? Food safety is again one thing to be addressed, safe food through safe agriculture, safe transportation, safe processing of food and whole sale and retail distribution so that at least every person get it's what the person needs that means the unprivileged sector is also not undernourished. The hazardous materials management is to be taken care of, where the hazardous waste are generated particularly, say in the hospitals, in the pharmaceutical industries and another places.

Housing: wherever the substandard houses and housing is there, say for example in the jails, prisons or in the unprivileged sections of the society where many people have to reside within the single room or two rooms or so in that condition naturally the overcrowding leads to communicable diseases which spreads from one person to other. Childhood, lead poisoning is also a global issue but however not to be addressed here. Land use planning and smart growth is may be, one of the ways through which we can get through.

Liquid waste disposal, if every industry of ours, every hospital of ours has an effluent treatment plant, recycling of water, the re-use of water and avoiding the wastage along with the infections that prevail, the pollution of water that prevails, this can be reduced to minimal. We can have septic tanks, chemical toilets so that the water pollution minimizes away. Medical waste management: nowadays every country is taking care of, but the Pollution Control Board yet have to take strict measures.

Noise pollution control: yet we have certain places, though awareness is spreading in the urban sector, rural sector is not having that much of noise pollution but however we know that even there are malls, there are places, there are public places, where noise is to a very great extent out of the audible ranges,

Occupational health in the industries & industrial hygiene is very important. Radiological health when we are spreading radiation and ionizing radiation. Similarly, Safe Drinking Water, arrangement of safe drinking water and solid waste management is something to be addressed upon.

Now if I talk about environment in general what human being is doing to the environment, I start from underground level, we are depleting the underground water, we are depleting our earth out of the minerals, we are depleting the earth out of the fossil fuels, ultimately what we are leading to tsunamis, cyclones, hurricanes and may be earthquakes drought situations and other such calamities which may occur over the human beings & ultimately the human health is at stake. Are we prepared for these disasters? Similarly we are felling the trees away creating the jungles of architecture, ultimately we are warming the globe and this global warming has addressed to the glaciers that are getting melted out and the water level in the rivers is rising. What is it ultimately going to address? We are felling out

the trees and that the depletion of the ozone layer and it is creating that “black hole” with this black hole ultimately ultra violet radiations are entering in & our skin is getting tanned away. Then, ok, ultraviolet rays are essential, say for e.g.: it produces Vitamin – D3 in body and without ultraviolet we cannot sustain that is a different issue but however that much of ultra-violet radiation which is generating cancers is not good.

We need vector control, including the control of mosquitoes, rodents, flies, cockroaches which generate the pathogens we have to control the vectors also. The one thing that is usually not being addressed or rather it is two; One is ionizing radiation: whatever was buried into the earth by the nature, ‘the radioactive chemicals’, we have brought them out for the sake of human energy development and the energy that we need to sustain.

For this, we are using the radioactive chemicals may be for the medicinal use, may be for the other uses but however we are producing radiations & this radiation is getting hazardous for very many people.

Then again the Electromagnetic Waves: everybody is carrying mobile phone in his pocket, electromagnetic waves have to be radiated. We have several gadgets and the technology is advancing. What we are going to witness in next world we do not know.

Climate and Human Health

Now we’ll discuss, the effects of climate on health, when the change of climate is there and we see that there are extreme temperatures, we have addressed, we have been knowing about the deaths due to extreme temperatures, extreme cold, extreme hot and these temperatures again create a very many health problems like waterborne diseases in summer condition and sudden respiratory and viral conditions and the winter and the extremes of weather events say e.g.:- it is a damp climate continuing for 2-3 months in that condition the damp climate usually leads to viral infections and epidemics do spread. And then the health effects of more variable precipitation patterns that precipitate out many of the disease patterns, the rising sea levels, the retracting glaciers, the food insecurity. Rather food insecurity is one thing to be explained or clarified in that, we have protein energy malnutrition has a worldwide problem, particularly in developing and undeveloped countries where the protein and energy is less and in that condition due to under nutrition many children and the fives die, there is, even there is intra uterine growth retardation that is the fetus within the womb, does not develop properly because of protein energy malnutrition of the mother and the all these conditions. If we address the unprivileged population of the world we can say it is under nutrition the people are not getting enough food to eat but when it is well versed people, they are having enough, they know, but they are so choosy to choose the fast foods not the nutritious diet.

The next thing to be addressed is the vector bond diseases, we know how much disease pattern, the plague another diseases are been spread by their rodents, how much of that is being spread by the mosquitoes. Mosquito spreads malaria, filaria, dengue and other such diseases. The other health effects may be because of the cockroaches, may be because of the flies. The vibrio cholera spreads through the flies. Increasing global temperatures are leading to global warming, these global warming effects are leading to dessertation of the world and in that condition, what will help? everybody can understand. Again we have to address the ozone depletion because of the climatic effects, green house warming & ultra violet radiation, that is damaging the people. What responses can

we generate? One thing is, as we initially say it adaptation, but adaptation is a something like temporary measure that we can adopt to a situation, but when we say it is mitigation, mitigation is the long term process years long to go, naturally, for the sake of protection but this protection is a sustained protection. If we plant a thousand trees today in a particular environment in that condition we are sure that environment is going, air is going to be under polluted. This air will be free & fresh at a particular level of time say 10 years later, say 20 years later. But however, we are doing something and this mitigation will lead to less of the soil erosion and less of the desertation, less of the global warming more of the rains, less of the drought, less of the other calamities that may occur.

The main determinants of the communities' adaptive capacity are economic wealth, technology, information, and skills, infrastructure, institutions and equity. If they all are used, if they all are collaboratively used, for the sake of mitigation, they will help a lot. Public health in India has garnered worldwide attention & as a result has prompted massive public health initiatives and knowledge networks throughout the India in past 10 years.

Role of Information Technology in Environment and Human Health

Talking about the role of IT the first and the foremost thing to address is 'Remote Sensing'. We through the remote sensing, through our satellite we are having every information about the weather say for tomorrow, say for a month later, say for a year later and if we can understand through the remote sensing what all is going to happen in the weather & the climate in that condition, we can take protective measures, perfect protective measures so that most of the community is protected. The database a vast quantum of information that is generated through the database, it is going to help the doctors to monitor the patients, to monitor the conditions, to monitor the awareness programme and other things and the patients can seek help of super specialized doctor placed as the far of the distance through tele-medicine. Similarly our hospitals are taking expert opinion first expert opinion or second expert opinion, even through video conferencing technique. Mapping is one of the tools through which the environment health mapping is been done through geographic information system, GIS. This is the division of specialized information service of the United States National Library of Medicines through which the data is generated and this gives a very good mapping and helps to release the burden of the disease. As we earlier addressed the indoor air pollution and through the indoor air pollution we can have respiratory disease risk & other risks, these risks can be minimized. It is good. World Health Organization is having a programme on it. WHO has a program on indoor air pollution which focuses on research and evaluation capacity building and evidence for policy makers, so when we are going to generate some evidence naturally IT is been used; Information Technology is been used and we are doing research and evaluation. Capacity building naturally is a human resource function, where, we train our man power to build their capacity & be able. Talking about outdoor air pollution, naturally, we are using combustion devices, motor vehicles, Industrial facilities for as fires & certain other things through which the pollutants, the carbon monoxide, Ozone, Nitrous-oxide, Sulphur-dioxide, and certain other pollutants. They are polluting the air. The WHO is running a programme about urban outdoor air pollution database, again, enabling 'IT'.

International Programme on the Chemical Safety is been run. WHO is working to establish the scientific basis for 'sound management of chemicals' & to strengthen the National Capabilities & Capacities for chemical safety.

The Global Plan of Actions for Children Health in Environment: The Third WHO International conference and children health & the environment in Bussan republic of Korea June 2009 had addressed draft global plan of action which was designed to give us the millennium development goals which are related to reducing the infant mortality (that is MDG4) and ensuring the environmental sustainability (that is MDG7), Millennium Development Goals 7, programme. It was recognized that successful implementation of this global plan for action requires strong partnerships & closed networking and naturally the collaboration of WHO, UNICEF, UNEP and other National and other Regional organization is highly required. They should acquire collaborative activity for environmental protection, climatic change adaptation, primary health care, specialized hospital based health emergency response, disaster risk reduction, school activities, housing initiatives and many other activities. The global plan for children's environmental health 2010 - 2015 addresses the acute respiratory infections. Usually 1.6 million children under the age of 5 are killed because of the acute respiratory infections. The diarrhoeal disease, in which 1.5 million children every year are getting killed & nearly 1 million children under age of 5 they die because of malaria. So these 3 diseases are to be addressed highly. WHO program usually focuses on National profiles, CEH indicators, which again want IT in it, capacity building that is HRD functions, guidelines, good practices and tools and research.

The next attribute to be Addressed is electromagnetic Fields, all the populations are now expose to varying degree of electromagnetic fields because the technology is advancing. As a part of its charter to protect public health and in response to public concern, the World Health Organization (WHO) has established the International standards of EMF Project in 1996 to assess the scientific evidence of possible health effects of EMF in the frequency range from 0-300 giga-hertz. The EMF project is open to broad participation.

The health impact assessment is being done: and one of the things is to be addressed is the transport. Transport is the major factor in traffic injuries, air pollution, and Noise and in Agriculture, the Fertilizers and the Pesticides that we are using, that are proving hazardous. The health impact assessment is means of assessing the health impacts of policies, plans & projects in diverse economic sectors using quantitative, qualitative, and participatory techniques. Housing & Health, the international guidance on healthy housing should be developed to help, prevent the wide range of diseases and un-intentional injuries that can be effectively addressed through better housing. One of the injury again, I shall address is passive smoking.

WHO's Programme for Health and Environment

The World Health Organization-WHO programme focuses on experts call for international guidelines. Health in the green economy is one more concern. Many strategies to reduce climatic change have large immediate health benefits, others may pose health risks or trade off. Examined systematically a powerful new dimension of measures to address climatic change emerges.

Health & Environmental Linkages Initiatives *HELI* is a global effort by WHO and UNEP to support the action by developing countries and their policy makers on environmental threats to health. It encourages the countries to address health & environmental linkages as an integral to economic development. It supports the valuation of eco-system services and the climatic regulations to prevent replenishment of air, water, food, energy source & generally, healthy living and working conditions. The activities of HELI include: country level pilot projects & promoting better access to knowledge & tools, again through IT. The healthy settings which are developed usually by the World Bank: the health is created & lived by people within the settings of their everyday life, where they learn, work, play and love, it is multidisciplinary methods of using the healthy settings & holistic system approach is to be used. The healthy settings: the key principle includes community participations, partnerships empowerment & equity. The healthy cities programme is also being run by WHO since 1986 and the healthy cities in which, usually, not only the building but other things which are required by the environment are been created in the city. Addressing the ionizing radiation that we were talking about, the WHO's ionizing programme is running the radiation and environmental health programme within the WHO sustainable development & healthy environment clusters. It evaluates the health risks & public health issues, it looks for the solutions out & for the promotion, it promotes research also. To promote the improvement of working conditions of the workers in the industries it also acts there. WHO has developed the global work plan in collaboration with WHO network of collaborating centers based on objectives of GPA for 2009-2012, the work plan organizes the activities of collaborating centers into 14 priority areas. Quantifying the environmental health impacts, when I say quantification, that does means that how much is the environment affecting & how much is the person willing to survive in good condition, there's one abbreviation DALY, when I say DALY it is "Disability Adjusted Life Years" this does mean that when, say for an example :- A person of 20 years has got affected foot for an amputated foot. In that condition, either this person may opt to survive without a leg & be not much productive, as this person can be or, the other way, this person can have a prosthesis of the limb, a different limb made of prosthetic material & apply it over the body & then person is more productive & working.

If this person survives say for 60-80 years more, this 20 years old guy in that condition the disability adjusted life years without a prosthesis, that this person leads is almost 60-80 years. So this adjustment of the life years is very important, which is to be reduced all over the globe & it is to be addressed very well.

Additional Information: we have for the rational development of the policies by the health sector, the effectiveness & cost effectiveness of the interventions the availability of resources & the type of the policy environment. This all again is generated through information & technology.

The Ultraviolet Radiation that we initially address to for skin cancers, the eye problems, this is been addressed to by WHO, & WHO is doing for it through the 'INTER SUN' programme.

For the water sanitation and health, which is very important for the sake of health, WHO is working on the aspects of water sanitation & hygiene, where the health burden is high, where interventions could make a major difference & where the present state of knowledge is poor, our work is divided into 6 core activities:

- one is drinking water, quality management,

- second is water supply & sanitation monitoring,
- third is cholera surveillance & prevention (because cholera is the dreaded disease)
- sanitation in different settings, then
- water resource management
- miscellaneous activities.

However, we have protocols for assessing community excellence in environmental health, it is named as PACE-EH & it is NACCHO based project which is been run through WHO & environmental public health performances standards that are been evaluated through the role of information & technology.

Finally I would like to conclude that the environment has a vast effect over human health that has been addressed through not only the water, not only through the air, not only through the light. Light pollution again is one of the big things to be addressed now a day's & not only through the sound pollution & not only through the felling of the trees, not only through the depletion of the earth resources but however we are getting affected through the ionizing radiation and Electro-Magnetic fields which are all to be addressed & people are to be made aware because & when we want to make them aware, naturally Information Technology is going to give us a wide difference, that is information technology can be propagated even in India, the gram panchayats also have an access to IT, so this access to IT & access to internet has helped a lot & this will continue to be. And I wish, the health of India, now, will be blossoming & every person will be productive in future.

GLOSSARY

Advocacy : *to raise awareness that climate change is a fundamental threat to human health.*

Epidemiology : The study of the occurrence and causes of health effects in human populations. An epidemiological study often compares two groups of people who are alike except for one factor such as exposure to a chemical or the presence of a health effect. The investigators try to determine if the factor is associated with the health effect.

Endemic disease - a disease that is constantly present to a greater or lesser degree in people of a certain class or in people living in a particular location

Diabetes: *Diabetes (diabetes mellitus) is a metabolic disorder.* Metabolism is a chemical process, occurs in all living cells or organisms, consumed food is broken down to yield energy and other substances necessary for life. It, furthermore, expels the waste let-out by this metabolic process.

Environmental health is the branch of public health that is concerned with all aspects of the natural and built environment that may affect human health. Other terms that concern or refer to the discipline of environmental health include **environmental public health** and **environmental health and protection**.

Medical waste: **Medical waste**, also known as **clinical waste**, normally refers to waste products that cannot be considered general waste, produced from healthcare premises, such as hospitals, clinics, doctor's offices, veterinary hospitals and labs.

Filaria : Filaria is a long, thread that lives as a parasite in the bodies of human beings and animals. The male worm is shorter than the female and it has a curved tail. This is mainly found in Central Africa, Asia and the Southwest Pacific.

GIS: A **geographic information system** is a system designed to capture, store, manipulate, analyze, manage, and present all types of geographical data. In the simplest terms, GIS is the merging of cartography, statistical analysis, and database technology.

WHO : WHO is the directing and coordinating authority for health within the United Nations system. It is responsible for providing leadership on global health matters, shaping the health research agenda, setting norms and standards, articulating evidence-based policy options, providing technical support to countries and monitoring and assessing health trends.

Hazard : A hazard is a situation that poses a level of threat to life, health, property, or environment.

FAQs

1. What is environmental health?

Ans. Environmental health comprises those aspects of human health, including quality of life, that are determined by physical, chemical, biological, social, and psychosocial factors in the environment. It also refers to the theory and practice of assessing, correcting, controlling, and preventing those factors in the environment that can potentially affect adversely the health of present and future generations

2. What do people in environmental health do?

Ans. Environmental health professionals protect human health and safety by:

- Maintaining a safe supply of food and drinking water;
- Discovering the mechanisms of environmentally related diseases such as insects, rodents, and other animal carriers of disease;
- Treating and disposing of solid and toxic waste;
- Reducing air, water, food, and noise pollution; and,
- Ensuring safe schools and workplaces by identifying, recognizing, and controlling hazards.

3. What are the common environmental hazards?

Ans. Environmental exposures of concern for children include biological, chemical, and radiological hazards, such as:

- Pesticides
- Lead
- Mercury

- Arsenic
- Allergens
- Carbon monoxide
- Solvents
- Diesel exhaust
- Sun exposure
- Second-hand tobacco smoke
- Drinking water contaminants
- Indoor and outdoor air pollutants

4. What are the risks to human health?

Ans. High concentrations of air pollution can cause irritation to the eyes and cause a slight cough. Air pollutants can damage airways to the lungs, causing inflammation and breathing difficulties. These risks are greater for individuals with asthma or chest complaints. Pollutant particles may cause breathing and circulatory problems and high levels of pollution can cause premature death amongst those with pre-existing lung and heart disease. However, levels of pollution need to be very high to cause these problems.

5. What is the impact of climate change on health?

Ans. Although global warming may bring some localized benefits, such as fewer winter deaths in temperate climates and increased food production in certain areas, the overall health effects of a changing climate are likely to be overwhelmingly negative. Climate change affects the fundamental requirements for health – clean air, safe drinking water, sufficient food and secure shelter.

6. What is the WHO definition of health?

Ans. Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.

7. What is the Role of IT in human health?

Role of IT in in

- ☐ IT can be used for audio, visual and data communications for medical consultation, diagnosis, treatment, nursing and medical education.
- ☐ IT is used for testing of DNA, creating DNA database and genetic information about population. Medical records and finger prints which are used by investigating agencies to identify missing persons and criminals.
- ☐ IT helps in spreading awareness about endemic, epidemic and communicable diseases. With the help of Remote Sensing and GIS there is identification of several infested areas which are prone to some diseases like malaria etc. based upon mapping of such areas