

CHAPTER - X
HEALTH

10.0 Introduction

Environmental health hazards include traditional hazards of poor sanitation and shelter, as well as those due to agricultural and industrial contamination of air, water, food and land. These hazards have resulted in a lot of health impacts ranging from catastrophic direct effect (e.g. cholera epidemic in Latin America and chemical poisoning outbreak in Bhopal, India), to chronic effect (e.g. Minamata, Japan). There are undeniably countless examples of environmental disease outbreaks, some of which are not easily detectable on macrostatistical level. Over a billion people in the world lack access to safe drinking water (WHO 1992) and over 600 million are exposed to ambient levels of sulphur dioxide that well exceeds recommended level. The health problems caused by occupational and environmental hazards are particularly acute in developing countries, where well established methods of hazard control are less likely to be applied because of limited public awareness, low political priority of health and environment matters, limited resources or lack of appropriate occupational and environmental health management system. The World Health Organisation (WHO) estimates occupational health risks as the tenth leading cause of morbidity and mortality. The burden of disease from selected occupational risk factors amounts to 1.5 % of global burden in terms of DALY (Disability Adjusted Life Years). Occupational factors and their impact on health is described in **Box-1**.

Box-1
Occupational Factors and their Impact on Health

(i) Physical

Physical Agents	Hazards
Heat	Reduced mental alertness increases errors, absenteeism, accidents, heat exhausters, cramps and heat stroke, heart, kidney and brain diseases.
Light	Accidents increased refractive errors, miners nystagms, cataract due to infrared radiation.
Noise	Noise induced hearing loss, chronic headache, high blood pressure, heart diseases, impotency etc.
Ionising Radiation	Acute: radiation sickness, apalstic anemia etc, Chronic: Cancer of skin, blood, bone etc.
Vibration	Raynaud’s phenomenon (uncommon in tropical countries)

(ii) **Chemical**
A. Dust and its health Impacts

Type of Dust	Main Health Impact	Target Organ
Free crystalline silica	Silicosis (Lung fibrosis) COPD, Lung Cancer	Lungs
Coal Dust	Coal workers pneumoconiosis, Restrictive lung disease, Heart failure.	Lungs, Bronchial tree and alveoli
Asbestos	Asbestosis, Lung cancer	Lungs, bronchial passage
Lead Dust	Systemic intoxication, blood, CNS problems, Gastric problems, Anaemia	CNS, Circulatory system
Manganese	Secondary parkinsonism	Nervous System
Wood Dust	Nasal cancer	Nasal airways
Cotton Dust	Byssinosis, C.O.P.D	Lungs
Dried Sugar Cane Dust	Bagassosis	Lungs
Cement Dust	Dermatosis, Lung Cancers	Skin, lungs
Natural Dust	Restrictive lung disease, C.O.P.D, asthma, Heart failure etc.	Alveoli, Lungs Respiratory system
Chromium Dust	Lung cancer, blood cancer, Bronchial asthma, C.O.P.D, kidney problems, Dermatitis, Chrome Ulcer	Lungs, kidney, blood stream
Bauxite Dust	Pneumonitis	Respiratory system

10.1 Pressure

Like many developing countries, India is going through the process of industrialisation. The current burden of occupational health diseases in India is estimated to be at around 18 million cases with incidence of around 5,75,000 cases of MSD's, 4,50,000 cases of chronic respiratory diseases and about 3,00,000 cases of dermatitis and noise induced hearing loss as the major causes of occupational health.

Orissa is witnessing rapid industrialisation and urbanisation during past two decades. Increase in demand for mineral resources have attracted many industrialists around the globe since Orissa has got abundant deposits of iron ore, Coal, Chromite Manganese, Graphite, bauxite, dolomite, lime stone etc.

Contamination of water by microorganisms, chemicals, industrial or other wastes, or sewage, deteriorates the quality of water and renders it unfit for its intended uses.

The demand for fresh water has increased continuously in Orissa with population growth, and withdrawals from rivers, lakes, reservoirs and other sources have increased fourfold. At the same time human waste has also increased contaminating these sources. With the accelerated industrial growth in the State, various types of water pollution problems have occurred with the release of untreated chemical and hazardous wastes into the river and other water sources. Underground water pollution occurs by the substances leached from refuse and spoil heaps, from fertilizers spread over land.

Indoor air pollution is associated with combustion of biomass fuels. When these fuels are burnt in simple cooking stoves, the indoors get heavily polluted with smoke that contains toxic pollutants like carbon monoxide, oxides of nitrogen, polycyclic aromatic hydrocarbons, sulphur dioxide and respirable particulate matter, which leads to different health problems.

10.2 State and Impact

10.2.1 Major Air Pollution Related Diseases in India are listed in *Table 10.1*.

TABLE: 10.1
Major Air Pollution Related Diseases in India

Sl.	Disease	Death %	% of NBD	Remarks
1.	Acute Respiration Disease	12	13	Indian acute respiratory infection in children under 5 is responsible for more than 2% of the entire GBD.
2.	Chronic Obstructive Pulmonary Disease	1.5	0.9	
3.	Lung Cancer	0.4	0.1	
4.	Asthma	0.2	0.5	
5.	Tuberculosis	8	5	Largest in the world.
6.	Perinatal	6	5	Largest in the world.
7.	Cardio Vascular	17	5	
8.	Blindness	0	1	Largest in the world.

NBD/GBD: National / Global Burden of Disease.

Source: Kirk Smith, Proceedings of the Second Fogarty Indo-US Workshop on Diesel Particles, October, 2000.

10.2.2 Birth and Death Rate

The annual average growth rate of population of the state during the 1991-2001 decade was 1.49% as compared to 1.95% at the all India level.

The crude birth rate (CBR) in Orissa during 2001 was 23.4, which decreased to 23.1 in 2002. The crude death rate (CDR) and infant mortality rate (IMR) of the State have also decreased from 10.2 to 9.8 and 90 to 87 respectively during the same period. During 2002, the infant mortality rate was 87 in Orissa, followed by Madhya Pradesh (85) and Uttar Pradesh (80) while Kerala was having the lowest (10). Similarly, the birth rate was highest in Uttar Pradesh (31.6) followed by Bihar (30.9), Rajasthan (30.6) and it was lowest in Goa (14.0) shows the crude birth rate, crude death rate and infant mortality rate of Orissa and all India.

TABLE: 10.2
Birth Rate, Death Rate and Infant Mortality Rate of Orissa and All India

Sl. No.	Year	Orissa			All India		
		C.B.R.	C.D.R.	I.M.R.	C.B.R.	C.D.R.	I.M.R.
1	1981	33.1	13.1	135	33.9	12.5	110
2	1991	28.8	12.8	124	29.5	9.8	80
3	1995	27.8	10.8	103	28.3	9.0	74
4	1996	27.0	10.8	96	27.5	9.0	72
5	1997	26.5	10.9	96	27.2	8.9	71
6	1998	25.7	11.1	98	26.5	9.0	72
7	1999	24.1	10.6	97	26.1	8.7	70
8	2000	24.3	10.5	96	25.8	8.5	68
9	2001	23.4	10.2	90	25.4	8.4	66
10	2002	23.1	9.8	87	25.0	8.1	64

C.B.R. - Crude Birth Rate, C.D.R. - Crude Death Rate, I.M.R. - Infant Mortality Rate
(Source: Department of Health, Government of Orissa-2003)

10.2.3 Status of Waterborne diseases

Water borne diseases are the largest single category of communicable diseases contributing to infant mortality in developing countries and second to adult mortality with one million death per year. The status of water borne diseases in Orissa is given in **Table 10.3**.

TABLE: 10.3
Water Borne Diseases in Orissa
(Total No. of existing of Institutions in the State - 1701,
Total No. of institutions reported - 423)
Acute Diarrhoeal Diseases Including Gastroenteritis and Cholera

YEAR	OPD		INDOOR		DEATHS	
	Male	Female	Male	Female	Male	Female
1999	4,16,811	289510	38984	17353	138	70
2000	344223	228948	21692	16116	112	73
2001	218983	140472	11808	9445	70	38
2002	285223	190363	20151	15093	76	41
2003	222981	155287	27886	15711	57	45

Enteric (Typhoid) Fever

YEAR	OPD		INDOOR		DEATHS	
	Male	Female	Male	Female	Male	Female
1999	19836	12401	2443	1504	46	19
2000	17635	10757	2145	1542	17	06
2001	11903	8485	1183	786	10	08
2002	13327	8135	2019	1266	06	04
2003	8623	7359	1220	1129	24	18

Viral Hepatitis

YEAR	OPD		INDOOR		DEATHS	
	Male	Female	Male	Female	Male	Female
1999	5866	3370	720	382	91	55
2000	8523	4307	784	387	70	37
2001	4364	2405	501	247	28	11
2002	338	175	133	69	35	12
2003	1282	810	264	131	27	12

Malaria Incidence and Death

YEAR	POSITIVE CASES	DEATH
1996	458554	362
1997	421928	377
1998	478056	349
1999	483095	399
2000	469350	442

(Source: Health Department Govt. of Orissa 2003)

In spite of different malaria eradication programme undertaken by Government of India and different agencies the incidence of malaria/brain malaria in Orissa is at an alarming stage. It is mostly due to improper sewerage system, water stagnation and lack of awareness among public and migration of malaria-affected persons.

10.2.4 Respiratory Infections

The data furnished by the state health department, Orissa on institutional treatment cases and deaths due to respiratory tract infections for last five years given in *Table-10.4*.

TABLE: 10.4
Acute Respiratory Infections

Total No. of existing of Institutions in the State - 1701

Total No. of institutions reported - 423

YEAR	OPD		INDOOR		DEATHS	
	Male	Female	Male	Female	Male	Female
1999	726465	528027	11922	8083	28	119
2000	666042	645529	18613	7978	148	102
2001	419573	282123	36776	5028	84	48
2002	547143	420407	28278	24858	134	66
2003	493959	342712	67038	36289	36	18

(Source: Department of Health, Government of Orissa 2003)

Above data, reveals that the total number of outdoor patients are declining. This is due to rapid growth of private hospitals and doctors in the different part of the state and the patients preferring private institutions for better medical attention and no data is available from private institutions. Further, the total numbers of indoor patient have gone up every year indicating the severity of respiratory diseases needing hospitalisation. Increase in intensity of air pollution is one of the main causes attribute to this severity.

10.2.5 Health Impacts of Air Pollution

Pollutants and their derivatives can cause adverse effects by interacting with and impairing molecules crucial to the bio chemical or physiological process of the human body. Three factors influence the risk of toxic injury related to these substances: their chemical and physical properties, the dose of the material that reaches the critical tissue sites and the responsiveness of these sites to the substance. The adverse health effects of air pollutants (**Box-2**) may also vary across population groups; in particular, the young and the elderly may be especially susceptible to deleterious effects. Persons with asthma or other pre-existing respiratory or cardiac diseases may experience aggravated symptoms upon exposure (WHO 1987).

Box-2 Toxic Gaseous Chemicals and its Health Impacts

1. **Sulphur Dioxide:** Aggravates heart and lung disease. Increases risk of chronic bronchitis asthma, pulmonary dysfunctions, emphysema., Increase risk of cancer.
2. **Oxides of nitrogen:** Increase risk of viral infection, Pulmonary Fibrosis and emphysema, Airway resistance, chest tightness and discomfort. Eye burning, headache.
3. **Ozone:** Reduces effectiveness of immune system. Reduces mental activity. Headache, eye irritation and chest discomfort. Chronic lung disease like asthma and emphysema. Lung damage through face radicle, nasal mucous, membrane damages.
4. **Carbon Monoxide:** Headache, nausea, dizziness. Ringing in the ears. Poor reflexes reduced working capacity. Drowsiness, Cardiac arrhythmia's, Cardiac arrest, Coma and death.
5. **Particulate Matters:** Respiratory disease like chronic bronchitis, bronchial asthma, emphysema. Aggravate heart disease.
6. **Lead:** Kidney damage. Reproductive system damage. Brain dysfunction and altered neurophysical behaviors. Anorexia, abdominal colic, vomiting, constipation.
7. **Benzene:** Eye irritation. Nose and throat irritations. Central nervous system—headache, nausea, loss of coordination, confusion, drowsiness and unconsciousness, Carcinogen effect.

10.2.6 Noise Induced Impact

Noise is an inescapable by-product of the industrial environment, which is increasing with advances in industrialisation and urbanisation of the State. Even in non-industrial areas, noise from such activities like, transport, printing, auto repair, grinding affects those living in immediate surroundings.

Considering the impact of noise pollution on human health and quality of life, the intensity of noise in question, its duration and the time and place at which it is heard should be taken into account. Sound intensity is usually measured on the logarithmic decibel (dB) scale. The threshold level for human ear is between 3-45 dB. Continuous noise level in excess of 90 dB can cause loss of hearing, irreversible changes in nervous systems.

10.2.7 Health Impacts of Water Pollution

Microbial Pollution: An estimated 80% of all the diseases and over one third of deaths in developing countries are caused by consumption of contaminated water and on an average one tenth of each persons productive time is sacrificed to water related diseases (UNICEF-1992).

10.2.8 Impact of Chemical Pollution

The health problems associated with chemical substances dissolved in water arise primarily from their ability to cause adverse effects after prolonged periods of exposure. Nitrates, cyanides can cause adverse health effects at certain threshold concentration. According to present scientific thinking, there is no threshold level which could be considered safe in case of synthetic organics, chlorinated organic micro pollutants, pesticides etc. Any amount of the substance ingested contributes to increase in cancer and other serious health problems. Presence of elements like fluoride, iodine and selenium in water is essential and excess and deficiency of it can cause serious health problems.

10.2.9 Economic Impacts

The economic impacts of water pollution can be severe due to its effect on human health. The economic disease burden can be expressed not only in costs of treatment, but, in loss of productivity. In India, there was about 73 million work days loss due to primary disabling disease Diarrhoea.

10.2.10 Health Impacts on Mining Workers:

The health status of the workers in 59 mines operating in Barbil-Joda-Koira areas of Keonjhar district. Carried out during 2000-2003 are given in *Table 10.5, 10.6 and 10.7.*

TABLE: 10.5
A Study on impact of Air Pollution on Mining Worker’s Health
Study Results (Data in numbers and %)

Sample	Chr. Bronchitis, Chr. Bronchial Asthma and COPD	Pulmonary T.B	Abnormal Pulmonary Function Test	Pneumococcosis	Lung Cancer
4590	232 , 5 %	57,1.24 %	520,11.32 %	10 , 0.27 %	15 , 0.32 %

(Source: DGMS Statuary Medical Examinations of Barbil-Joda-Koira Sector 2000-2003)

TABLE: 10.6
Study Results on impact of Noise Pollution on Mining Worker’s Health

(Data in numbers and %)

Persons Examined	Audiometry abnormality	Percentage of abnormalities
4590	253	5.5%

TABLE: 10.7
Other Diseases of Mine Workers

Sl	Disease	Number	%
1.	Tumour	12	0.26
2.	Heart Diseases including High B.P	262	5.70
3.	Diabetes Malletus	25	0.54
4.	Chronic Malaria	110	2.39
5.	Kidney Diseases	58	1.26
6.	Hydrocele	52	1.13
7.	Eye Problem	31	0.67
8.	Skin Diseases	21	0.45

(Source: DGMS Statuary Medical Examinations of Barbil-Joda-Koira Sector 2000-2003)

A total number of 4590 cases, both male, female, temporary and permanent mining workers underwent this mandatory test. Complicated cases were referred to statutory medical board and better hospitals for

further management. However, no conclusion on this health study could be reached due to the following constraints:

1. For diagnosis of occupational diseases, base line data i.e. Initial Medical Examination at the time of employment were not done which were to be compared with Periodical Medical Examination once every year as per Factories Act, 1948 and once in every five years as per Mines Rule, 1955, in order to diagnose particular type of occupational health hazards arising out of their occupation.
2. There was no scope to carry out a control study of the normal population with which this study could have been compared with. However, the data collected from this survey now can be treated as the base line data and can be compared with periodical medical examination after five years.

10.3 Response

(Economic Survey, 2005-06, Government of Orissa).

Water borne diseases being the largest single category of communicable diseases, access to safe drinking water and improved sanitation play a major role in the overall well being of the people. In order to address this issue, a number of drinking water schemes/programmes viz. Accelerated Rural Water Supply Programme (ARWSP). Special Central Assistance projects for KBK districts, Sector Reform Projects and Swajaladhara etc. are being implemented in the rural areas of the state.

As per 2001 census, percentage of households with access to safe drinking water at all India level was 77.9% (90% urban and 73% rural households). The corresponding figure for Orissa is 92.7% (97.5% urban and 92% rural). Out of 1,41,368 habitations in the rural Orissa, 1,00,669 were fully covered, 12,528 partially covered and 28,171 were not covered under supply of drinking water schemes, by March 2003. During 2003-04 and 2004-05 it was targeted to provide safe drinking water to 4,721 and 4,099 rural primary schools in Orissa. By the end of 2004-05, 1196 number of schools remained to be covered.

Centrally Sponsored Scheme “Accelerated Urban Water Supply Programme” (AUWSP) is in operation in the state with 50% funding from the Central Government. 35 schemes have been sanctioned under this programme. Some special activities in the KBK districts are being undertaken under the Revised Long Term Action Plan (RLTAP), under which preliminary proposal for 16 urban water supply schemes in 7 KBK districts of the state have been approved.

To ensure greater accessibility to basic health care services, mobile health care units have been introduced in 80 blocks in the KBK districts in a phased manner. For better health care at the primary and secondary level, the state is implementing a number of Central Planned and Centrally Sponsored Planned Schemes. They include the Revised National Tuberculosis Control Programme, National Filaria Control Programme, National Programme for Control of Blindness, National Iodine Deficiency Disorder Control Programme, National Leprosy Elimination Programme, and the National AIDS Control Programme.

The World Bank assisted the Orissa Health system Development Project is being implemented in the state since 1998 with the objective of improving efficiency in the allocation and use of health resources and rejuvenating the existing health care system through improvements of the quality, effectiveness and coverage of health services.

Total sanitation campaign is being carried out in all the districts of the state (92.30% of households in Orissa did not have access to basic sanitation facility as per 2001 census). Sulabha International Social Services Organization, a non-profit voluntary organization, has been associated with implementation of sanitation programmes in both urban and rural areas.

The Employee's State Insurance (ESI) scheme is an integrated social security scheme catering full medical care to workers and to their family members covered under the scheme. All the expenditures under the scheme are initially borne by the State Government and subsequently shared between the state Government and ESI Corporation in the agreed ratio of 1:7 within the ceiling as fixed by the ESI Corporation from time to time. At present 5 hospitals and 50 dispensaries are functioning under the Directorate of ESI Scheme with 200 doctors and 297 hospital beds. During 2004-05, 9.51 lakh patients were treated in these hospitals and dispensaries.