Chapter VI

Affect of
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A better human health is a combined outcome of the human adjustment to the ecological conditions and the accord with the nature. It is a lithe status of the human body wherein a person sways from the peak of physical and mental gratification with regards to the environment. According to the WHO (1976:4), 'Health is a state of complete physical, mental and social well being and not merely an absence of disease or infirmity'. Thus any study of the human health basically involves the dynamic relationship between the changing environmental condition and man's well being.

Environmental health refers to the holistic attitude towards the sustainability of the environment and people's adaptation towards the variation in the environment. There is a dynamic equilibrium between the social organization patterns, like urbanization and industrialization, and the state of the environment. Researches in various fields suggest that there is a high degree of correspondence between the social attributes of urbanization and human health. It is therefore required that the physical attributes of the environment must be in acquiescence with the human survival, taking into account the socio-economic aspect. The rapid
rate of unplanned urbanization has deteriorated the city life and the universal health of the populace. Slums, squatter settlements are the results of such unplanned settlements and the continuous influx of migrants, thereby depleting the city's social health.

The WHO’s expert committee well thought-out the subsequent aspects on the environmental and human health and proposed the following (WHO, 1948),

(a) Waste water treatment and controlling water pollution, including collection, treatment and disposal of domestic sewage and other water borne wastes and the control of the quantity of the surface water and ground water.

(b) Solid waste management, including sanitary handling and disposal.

(c) Vector control, including the control of the alternative host of diseases.

(d) Food hygiene.

(e) Control on air pollution.

(f) Radiation control.

(g) Radiation control.

(h) Occupational health, in particular the control of physical, chemical and biological hazards.

(i) Noise control.

(j) Housing and its immediate environment, in particular the public health aspects of residential, public and institutional buildings.

(k) Urban and regional planning.

(l) Environmental health aspects of air, sea and land transport.
Sanitation measures associated with epidemics', emergencies, disasters and migration of population.

Preventive measures required ensuring that the general environment is free from risk to health.

Liaison of Solid Waste and Human Health

Improper solid waste disposal and public health have a close relationship. The evidences of this close relationship are well distributed in the human account. The outbreak of 'Foot and Mouth' disease in the developed world was mainly due to the practice of hog feeding on municipal waste, which was later discontinued. The spread of 'Gastrointestinal' diseases in Delhi, during 1988, leading to hundreds of deaths was also due to the insanitary conditions. The latest in the country's history was the outbreak of 'Plague' at Surat and adjoining cities in 1994 was due to the improper collection and disposal municipal waste. These unhygienic conditions are serious impediments towards achieving a better urban health. The unimpeded influx of migrants and the natural increase in the population of the city dwellers are creating an unbearable pressure upon the existing urban infrastructure and the health of the city. The sanitary condition of the city is the most visible attribute, becoming awful from worse. With the ever-increasing consumption of resources due to increasing per capita demand, the
generation of municipal waste also increases, thanks to the ‘Use and Throw’
economic pattern of production and consumption.

A study conducted by Dr. Feachem of the London School of Tropical
Medicine indicts the relative importance of various components of sanitation,
wherein the excreta disposal carried 25 points, water quality 11 points, water
availability 18, excreta treatment 15, personal and domestic cleanliness 18,
drainage and sludge disposal 6 and food hygiene carried 7 points weightage in the
sanitation basket of 100 (Hindustan Times, 1992).

An extensive search of medical literature has indicated a close association
between solid waste and about 22 human diseases (Leepedes, 1974). With the
average waste generated by each urban resident (350-100 grams) reaching new
heights every day coupled with the civic efficiency of collecting and disposing
only 2/3rd of the total generation, the cities are heading towards a ‘Waste Crises’.
To complement to the deteriorating urban health, one fourth of the total population
living in the urban areas of the country lives in slums and squatter settlements, and
the overall lack of civic sense among most Indians add to the ever increasing
mounds of garbage. According to the UNICEF, nearly three lakh urban children
die annually of diarrohoea, mainly in slum areas. In a countrywide survey covering
686 slums in 1991, the National Institute of Urban Affairs (NIUA) recorded infant
mortality at 123/1,000 live births. The major causes were diarrohoea, diphtheria,
tetanus and measles, most of which are the results of poor sanitary conditions.
According to the Voluntary Health Association of India, 2.5 million die of
diarrhoea alone. After each monsoon Gastro-enteritis is the most common ailment across the country (India Today, 1994).

Unplanned urban structure alone cannot be blamed for the deterioration of the city's environs; planned cities like Chandigarh also have the similar problems of unattended solid waste and consequent diseases. Le Corbusier while designing a plan for Chandigarh thought of planning a city for 5 lakh people, a population figure supposed to reach by the year 2000, but the city had a population of 7.7 lakh during 1994, half of which were migrants and slum dwellers.

After every monsoon the most common disease that spreads up in any city of India is Gastro-enteritis and Jaundice which largely due to water contamination by sewage and solid waste. Around seventy per cent of the populace of the country receives pipe water thereby increasing the chances of water born diseases. In most of the cities, as in the study area, pipelines containing water run in close proximity to the sewer lines and leakages in the water pipelines is the hallmark of the India cities thereby the water getting contaminated. This contaminated water when comes in contact with organic waste, which has a considerable ratio in the urban waste of the country, provides a conducive media for disease causing bacteria and viruses. With the continuous increase in the population of all the cities of the country and the lack of authoritative resolve to enhance the existing deterioration of the urban environmental health the consequences are palpable. Gastro-enteritis and cholera alone claim around 500 lives every year in Uttar Pradesh and 3,500 persons in Bihar. At least 50 persons are admitted to the hospitals everyday in
Kolkata suffering from Cholera while 70 per cent of the total population in Bihar suffers from dysentery (India Today, 1994).

The traditional methods of municipal waste collection and disposal in India have become archaic. The so-called sanitary land filling practiced by the civic authorities of the country is no way close to the standard of sanitary land filling as it was advocated. With little or no understanding of the ground water geology the landfill sites are chosen by the civic authorities, the result, leachates pass on to the ground water thereby polluting it. The age-old practice of burning the municipal waste as is done by the civic authorities, not only in the study area but most of the cities of the country, pollutes the local environment and adds to the air pollution at a much wider scale.

In general, the relationship of unattended solid waste and human health can be summarized as follows.

1. The organic content of refuse putrefies and favours vector breeding.
2. The eatable in the waste attracts rodents.
3. The vectors spread pathogens to the human populace.
4. High possibility of ground water contamination, through leachates, affecting the human population in the form of water born diseases.
5. Air pollution and possibility of fire in the landfill through methane gas leakage.
6. Aesthetic deterioration of the city, leading to the overall decline of the urban health.
Health Tribulations in Varanasi City

The increasing population has a positive liaison with the amount of waste being generated, and the study area is no omission to this universal rule. The generation of municipal waste, from 1,721,00 metric tones in 1992 to 2,00,750 in the year 2002, has increased manifolds during the last few years. This may largely be attributed to the increasing population and the cultural importance of the city. Out of the daily generation of 550 metric tones of waste the municipality is able to clear only 400 metric tones and the remaining 150 metric tones lie as backlog that is removed after three days. The organic content of the municipal waste in Varanasi is 49.20 per cent (CPCB, 2000), and with the remaining 150 metric tones if waste which the civic authorities are not able to collect and dispose of on a daily basis putrefaction of waste is obvious.

The layout of the city is characterized by congestion, with the sewer facility slowly dying out due to increasing population and less available land, the waste generated in the alleys of the city stay behind to rot. During the monsoon season the unattended waste not only putrefies but also chokes the drains, the result, the whole city becomes a disease procreation ground. A major percentage of the city's population suffers from water born diseases, jaundice, cholera, and ameobiasis are quite common ailments the city’s most people suffer from and these become much aggravated in the rainy season. Most of the pipelines carrying ‘potable’ water of the city run in close proximity to the sewer lines and leakages in the water
pipelines is the hallmark of the city, wherein there is a high possibility of water being contaminated. It is important to note that none of the water borne diseases have a single cause but are linked with overall pollution and deterioration of the urban health. The awareness of the general populace towards the health hazards of the municipal waste was examined using 800 persons from different cross sections of the society wherein they were asked to write on disease they thought unattended solid waste causes. The result of the questions asked is summarised as follows

What are the diseases you think unattended waste can cause?

The most important result that the researcher found out was that the respondents, regardless of their educational status, well understood that diseases are never caused due to a single attribute of pollution (Table 6.1 and Fig.6.1).

Table 6.1: Diseases Caused by Unattended Solid Waste

<table>
<thead>
<tr>
<th>Diseases</th>
<th>No. of Respondents</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jaundice</td>
<td>265</td>
<td>33.125</td>
</tr>
<tr>
<td>Gastro-enteritis</td>
<td>310</td>
<td>38.75</td>
</tr>
<tr>
<td>Diarrhoea</td>
<td>170</td>
<td>21.25</td>
</tr>
<tr>
<td>Respiratory disease</td>
<td>55</td>
<td>6.875</td>
</tr>
<tr>
<td>Total</td>
<td>800</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Source: Personal Survey, 2002

The respondents in one way or the other did understand the severity of unattended solid waste, around 33.125 per cent of the respondents suggested that Jaundice is caused when the garbage comes in contact with potable water. A
<table>
<thead>
<tr>
<th>Disease</th>
<th>No. of Respondents</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respiratory disease</td>
<td></td>
<td>100%</td>
</tr>
<tr>
<td>Gastro-enteritis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diarrhoea</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jaundice</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Perception Towards Diseases Due to Unattended Waste**

**FIG. 6.1**
majority of the respondents (38.75%) felt that Gastro-enteritis could be caused while 21.25 per cent of the respondents felt that Diarrhoea is the disease caused due to insanitary conditions.

The persons directly attached with solid waste handling in essence, the civic staff engaged in collection and disposal of the municipal waste are the ones who are most prone to the ailments caused by the waste. The Varanasi Nagar Nigam has employed 2,200 for the collection and disposal of the municipal waste and it is these people who are most affected. There are nearly 20,000 odd rag pickers in the city, who collect the recyclables from the waste, usually below fifteen years of age and are also affected by the wastes.

To assess the state of health enjoyed by the municipal staffs a questionnaire survey was conducted (Table 6.2) involving 500 of the total 2,200 members and the results of it were quite expected by the researcher and the alarming conditions of these workers were noticed.

*The first thought towards solid waste?*

The responses to this question are presented in table 6.2 and figure 6.2. It is evident from the table that despite their paltry educational status the staff workers do feel affected by the waste. 42 per cent of the respondents felt that waste to them is unbearable foul odor, while 35.6 per cent of them felt that it is unaesthetic, for which they had their own reasons to place. The most encouraging result of the
First Thought Towards Unattended Waste

![Graph showing the distribution of respondents' first thoughts towards unattended waste. The graph is divided into categories: Bad odor, Bad look, Disease carrier, and Total. The percentages and number of respondents are indicated for each category.]

FIG. 6.2
questionnaire survey was that, though a small percentage, 22.4 per cent of the respondents did acknowledge that unattended waste is a disease carrier.

**Table 6.2: What do you first think of Solid Waste?**

<table>
<thead>
<tr>
<th>Problems</th>
<th>No. of Respondents</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bad odor</td>
<td>210</td>
<td>42.0</td>
</tr>
<tr>
<td>Bad look</td>
<td>178</td>
<td>35.60</td>
</tr>
<tr>
<td>Disease carrier</td>
<td>112</td>
<td>22.40</td>
</tr>
<tr>
<td>Total</td>
<td>500</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Source: Personal Survey, 2002

**What is the problem (broadly) faced while handling waste?**

As evident from table 6.3 and figure 6.3, majority of the workers (65.4%) engaged in collection and disposal of municipal waste suffer from psychological problems while handling waste. 31.6 per cent of the respondents said that they were physically affected while handling waste. The respondents, who thought they were unaffected, amounted to only 3.0 per cent. Despite the concern about their

**Table 6.3: Attitude during Handling Waste**

<table>
<thead>
<tr>
<th>Problems</th>
<th>No. of Respondents</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Psychological</td>
<td>327</td>
<td>65.4</td>
</tr>
<tr>
<td>Physical</td>
<td>158</td>
<td>31.6</td>
</tr>
<tr>
<td>Unaffected</td>
<td>15</td>
<td>3.00</td>
</tr>
<tr>
<td>Total</td>
<td>500</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Source: Personal survey, 2002
Problems Faced by Persons Engaged in Collection and Disposal of Waste

FIG. 6.3
health that these workers do acknowledge, they are contended with the fact that at least someone has to do the job.

Perhaps the most affected fraction of the population with solid waste are the rag pickers, who are 20,000 in numbers scattered throughout the city collecting the recyclables from the municipal waste and get 15 to 20 rupees per kilogram. They are mostly below 15 years of age having no education and consequently no concern about the state of their health. It was therefore required to assess their cognition regarding the ill effects of waste on health, wherein 70 of them were asked just one question, ‘Whether handling solid waste causes any disease?’ Almost all of them were unaware of any disease that they thought that the waste they handle causes, though they did acknowledge that some of them are suffering from Tuberculosis and frequent coughing but did not think that these were due to handling waste.

Inhabitants look upon society not as an environment but as a common organism of which he or she is an element. The health of a country is the sum total of the health of its inhabitants, communities, settlement and the overall environmental setting in which they reside. Indian urban population is increasing rapidly and is anticipated to reach 550 million, which is as high as 30 per cent and is likely to go to 33 per cent by 2010 or over 40 per cent of the total population in the coming 20 years (Employment News, 2003). India is presently spending about 3 per cent of the GNP on health care, while the developed nations are spending 6-12 per cent of their GNPs for the same. The yearly cost of environmental
degradation to the economy is nearly 5 per cent of the GDP, of which 60 per cent is due to water pollution and 15 per cent due to air pollution. The ever increasing population in the urban areas, people living on slums and squatter settlements having no pure and wholesome water supply, no provision of waste disposal are prone and the source of communicable diseases like malaria, tuberculosis, diarrhoea, respiratory disorders.

**Medical Facilities in the Study Area**

The city has a fair amount of medical facilities and hospitals, keeping in view its congestion and population. Most of the hospitals are located in the center of the city. The total number of hospitals and nursing homes together, is 76, lying within the city limit. Some important hospitals of the city are, Shiv Prasad Gupta Civil Hospital, Ballabhram Satyaram Mehta Hospital, Marwari Hospital, Mata Anandmai Hospital, Shri Bhagwan Avdhodh Ram Leprosy Hospital, Ishwari Memorial Hospital for Women, Tuberculosis and Leprosy Sanatorium, Infectious Disease Hospital, Mental Hospital, P.A.C. and Police Hospitals etc.. Despite the increase in the number of hospitals, hospital beds, medical practitioners, nursing homes, private and 'Corporate' hospitals etc., the lack of proper maintenance, lack of staff and equipments in the government hospitals is on the deteriorating side. This is basically due to the ever increasing population of the city and improved economic conditions of the rural population in the hinterland. The private hospitals
are providing good medical facilities, as they have the latest and costly medical equipments and perhaps the best doctors the city can boast of. But all this at a price that is far beyond the reach of the lower middle class and the poor are better not talked of.

Of late the city has witnessed the rise of certain corporate hospitals wherein the names of Heritage Hospital and Singh Medical Research Center are worth mentioning. These two provide the best medical facility to the local populace and patients coming from outside the city and states but at a cost that is not affordable to every one. The municipal corporation has divided the city into 9 health wards (Table 6.4), wherein the corporation runs five allopathic hospitals/dispensaries.

<table>
<thead>
<tr>
<th>Table 6.4: Hospitals run by the Municipal Corporation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adampura</td>
</tr>
<tr>
<td>Bhelupur</td>
</tr>
<tr>
<td>Chetganj</td>
</tr>
</tbody>
</table>

Within these wards besides, private hospitals and nursing homes, the corporation runs certain allopathic hospitals / dispensaries of which, the Infectious Disease Hospital in Adampura, Sikraul dispensary, Benia maternity Hospital and Veterinary Hospital in Chetganj are worth mentioning. Besides, the allopathic hospitals / dispensaries and nursing homes, the city harbours many registered Ayurvedic and Unani dispensaries of which the Ayurvedic Hospital at Sampurnanand Sanskrit University is doing a great job in the field of Indian medicines.
Last, but in no sense the least the Sir Sunder Lal Hospital in B.H.U., which is basically a educational and research faculty caters to the maximum number of patients, both local and patients coming from nearby districts and states. Since, it basically is an educational and research faculty, the medical facilities here are almost free of charge and it has the best possible doctors in eastern Uttar Pradesh and western Bihar, hence the Hospital draws up the maximum patients from all around.

Hospital Wastes

The waste generated in the process of treatment can also cause malady if not properly disposed off, and the very initiative of treatment becomes oblivious as it becomes more or less of a 'Package Deal' wherein besides getting cured of one ailment a person receives other infections free of cost.

Hospital waste basically includes the pathological wastes consisting of tissues, organs of body parts etc, parental kits and radioactive materials derived from 'Invitro' and 'Invivo' testing. The ignorance at the part of hospitals, nursing homes and pathological institutes to properly dispose off the waste generated in their respective institutes takes away the glory of painstaking research and development evolved in centuries for the betterment of human society. The average rate of Bio-Med wastes in India ranges from 1kg to 5 kg per bed per day coupled with the fact that an average hospital stream contains around 10 per cent
of potentially contagious agents (Environment and People, Jan-Feb 2001). Studies have revealed that about 2 per cent of a typical hospital waste are pathological in nature and do not need incineration. According to Dr. U.V.N.Das, Residential Medical Officer, Apollo Hospital, Hyderabad, good segregation programs can reduce the hospital waste stream by less than 8 per cent. He has also estimated that the amount of unregulated infectious waste per day per bed varies between 8,000 grams to 11,000 grams, which upon regulation can be reduced to 50 grams to 1,500 grams per day per bed.

Government intervention in proper handling and disposal of hospital wastes is the need of the hour, the Supreme Court has directed all hospitals having 50 and above beds to establish incinerators or any other method under their managerial control. As always the administrative ignorance delayed the Supreme Court’s ruling in this regard and the guidelines for the enforcement of standards in hospital waste and Bio-Med wastes rules under Sections 6, 8 and 25 of the Environmental Protection Act, 1986 was passed only in 1998. In 1994, Dr. B.L.Wadhera filed Public Interest Litigation in opposition to the dumping of Hospital waste from Safdarjang Hospital in Delhi, to which the Apex Court imposed a deadline to the Hospital to scientifically dispose off the waste by 30th November 1996. It also directed that the CPCB should regularly inspect different Hospitals to monitor the waste disposal practices.

Despite these rulings, the untreated hospital waste usually finds its way in the municipal waste in most of the Indian cities and similar is the case in the study
area also. The hospitals, nursing homes and pathological centers throw their wastes in the community bins provided by the civic authorities for municipal waste. The wastes coming out of these institutions are not even treated. The city’s Nagar Nigam, have issued notices to the various hospitals, nursing homes and pathological centers to treat their wastes and dispose it off themselves, but even then the wastes coming out of these institutes usually finds its way into the community bins. It is then left for the civic staffs to collect and dispose the hospital waste together with the municipal wastes, without proper segregation it ultimately lands up in the low lying areas of the city and outside the municipal limits. The civic staffs engaged in the collection and disposal of the municipal wastes do not even have gloves and gum boots to wear, thus the risks the handle every day while collecting the municipal waste containing even hospital waste is well understood.

The objective of a better human and environmental health therefore can only be achieved when all communicable diseases will be eradicated. To achieve the said objective all aspects of sanitation ought to be integrated, starting from solid waste to personal and environmental; (community) hygiene.

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