CHAPTER III

MICRO ENVIRONMENT
Some epidemiologists have used the term macro environment to the general environment to which an individual is exposed, e.g. water, air, food etc.; and the term micro-environment to personal environment which includes the individual's way of living and life-style.\(^1\) It is also customary to speak about occupational environment, socio-economic environment and moral environment. Micro environment is the specific environment of specific organisms that may signify the immediate environment of an organism.

To a traditional geographer it is synonymous with natural environment, to a sociologist it means only the social environment, and to an anthropologist it is largely cultural milieu. In medical geography it consists of all the physical and cultural phenomenon which combine to form a total environment in which men and all other animate beings live together. Environment consists of organic and inorganic phenomena. The inorganic elements are temperature, humidity, wind, light and trace elements in soil and water. The organic elements are men and animal life including the micro organism. Both the elements play an important and deciding role as to the suitability or unsuitability to the health of men. Man is so inexcusably linked with the earth he inhabits, that he can not escape from the natural patterns existing on it. This being the case, man's health at least in part is

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determined by this very natural environment.

Environmental health is that aspect of public health that is concerned with those forms to life, substances, forces, and conditions in the surroundings of man that may exert an influence on man's health and well being. This definition includes other people as part of man's surroundings that contribute to the status of environmental health.¹

Micro environment is supposed to involve water, air, food etc. In other words it can be called external environment to which man is exposed after conception. It has a direct impact on the physical and mental well being of living persons. Pollution is a major factor in environment by which more than fifty per cent health troubles are prey to fall mainly due to air, contaminated water, sewage and drainage, dust, gases and unnatural habits.

MAN MADE ENVIRONMENT AND HEALTH HAZARDS

Man himself makes a charming environment to enjoy the life and exists in it and also moulds. It includes the physical, socio-cultural and biological aspects. "Changes in the number of mankind, growth or decline, and the movement of persons from one place to another, produce constantly shifting relationship between man and environment. The result in environmental changes on the one hand, and changes in the structure, as well as the genetic and socio-cultural

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characteristics of populations on the other.\textsuperscript{1}

Man has brought great development and changes in his daily life. He has made his life comfortable and secure but he pollutes the environment which affects the health of mankind. Digestive disorders, skin diseases, respiratory diseases, virus infections are the main troubles which are directly or indirectly related to water and air pollution. Both are the main responsible factors for various types of health hazards.

Water pollution is a serious factor caused by human activities such as industrialization and urbanization. Sewage and wastes are the main sources of pollution which contain leaves, straw, paper, vegetable, animal matter and organic and partly inorganic matter. Man himself also pollutes the water through bathing, clothes and utensils washing and also uses for animals. Hepatites, poliomyelitis, typhoid, dysentery and diarrhea, worms diseases etc. are mainly due to the use of polluted water.

Air pollution is another important aspect which affects directly human being and animal. Dust, smoke, gases etc. are found in air and are responsible for illness. Generally this type of pollution is found in cities where many types of industries have sprung up and cold, air and fuel are used. The diseases currently suspected of being related to air

\textsuperscript{1} Indra P. Singh & S.C. Tiwari (1980) \textit{Man and His Environment}, Concept Pub., Delhi, p. XI.
pollution are various types of health hazards mainly troubles of respiratory system and eyes.

Over crowded area especially in urban centres, sex ratio and the density of population are directly associated with the disease pattern. Ignorance and poverty in many cases is the most important cause of malnutrition particularly in the case of children whose mother do not know how to feed them properly. Generally females are ignorant of the cooking methods and they prepare the food for taste or for satisfying the hunger and not for health. Standard of living, occupation, housing condition, dietary pattern, food habits, dress habits etc. are determined by the purchasing power. Customs, tradition, beliefs, family size, marriage concept, treatment system, educational level etc. also play a vital role as far as diseases incidence cases are concerned.

WATER SUPPLY

"Water is the most important factor in the life of an organism as it is the major constituent of the protoplasm. The water becomes available to the organism in the form of rainfall. It affects all life processes directly."

Water in quality and quantity is essential for good health. We get water from rain. Adequate uncontaminated water for drinking is very essential for every one, both in

SAGAR DIVISION
Availability of Piped Drinking Water
1986

source: PHE Division office, Sagar.
rural and urban places. As far as study region is concerned only 36 habitat, have pipe-line water supply. People of other places have to collect water from contaminated sources such as well, tank, nala and/or river, from where other human domestic activities also take place. In tap water besides quantity, regularity of water supply is also important because in the absence of regular water supply people are bound to store water in unsanitary containers which create the possibilities for contamination, water borne diseases are reported in large number in the entire area in both urban and rural places. Adequate safe water is very essential for each and every body. The consumption of water depends upon the standard of living and habit of the people. As far as area is concerned people get water from various sources and these sources are also different from place to place.

In our country only 77.7 per cent of the towns and cities and 31 per cent rural people have adequate supply of drinking water. "There are 37,017 villages in India which do not have even a single source of drinking water. More than half of the total villages in India have only limited drinking water facilities, i.e. only one source of water supply. Out of about 2.31 lac problem villages identified in 1980, about 1.92 lac of them were provided with atleast one source of safe drinking water by the end of the six plan period."

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Name of towns</th>
<th>S. No.</th>
<th>Name of towns</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Chhatarpur</td>
<td>135</td>
<td>Tendukheda</td>
</tr>
<tr>
<td>2.</td>
<td>Khajoraho</td>
<td>90</td>
<td>Tikamgarh</td>
</tr>
<tr>
<td>3.</td>
<td>Nowgoan</td>
<td>90</td>
<td>Jatara</td>
</tr>
<tr>
<td>4.</td>
<td>Maharajpur</td>
<td>90</td>
<td>Niwari</td>
</tr>
<tr>
<td>5.</td>
<td>Bakswaha</td>
<td>45</td>
<td>Baldeogarh</td>
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<tr>
<td>6.</td>
<td>Dhuwara</td>
<td>45</td>
<td>Orchha</td>
</tr>
<tr>
<td>7.</td>
<td>Harpalpur</td>
<td>90</td>
<td>Prithvipur</td>
</tr>
<tr>
<td>8.</td>
<td>Bada Malhara</td>
<td>40</td>
<td>Patera</td>
</tr>
<tr>
<td>9.</td>
<td>Satai</td>
<td>45</td>
<td>Sagar</td>
</tr>
<tr>
<td>10.</td>
<td>Panna</td>
<td>70</td>
<td>Rahatgarh</td>
</tr>
<tr>
<td>11.</td>
<td>Amanganj</td>
<td>40</td>
<td>Banda</td>
</tr>
<tr>
<td>12.</td>
<td>Kakrati</td>
<td>45</td>
<td>Khurai</td>
</tr>
<tr>
<td>13.</td>
<td>Pawai</td>
<td>45</td>
<td>Bina</td>
</tr>
<tr>
<td>14.</td>
<td>Ajaygarh</td>
<td>45</td>
<td>Garihakota</td>
</tr>
<tr>
<td>15.</td>
<td>Damoh</td>
<td>50</td>
<td>Shahpur</td>
</tr>
<tr>
<td>16.</td>
<td>Hatta</td>
<td>50</td>
<td>Rehli</td>
</tr>
<tr>
<td>17.</td>
<td>Patharia</td>
<td>40</td>
<td>Deori</td>
</tr>
<tr>
<td>18.</td>
<td>Hindoria</td>
<td>40</td>
<td>Shahgarh</td>
</tr>
</tbody>
</table>

The availability of water supply in Sagar town has the highest facilities, i.e. 350 litre per capita per day and the lowest is in Rahatgarh, it has 25 litre per head daily. Other towns have 40 to 50 litres per day (Table 3.1). In rural areas a majority of villages have one source i.e. well or river for drinking water. Some villages are generally located at a distance of one or more than a kilometre from the place of water. This problem becomes more during summer, in urban as well as in rural areas.

**PROBLEM VILLAGES**

On approach to the Public Health Engineering Department (PHE) the scholar has been aprised of the fact that in the study unit there are as many as 3,963 problem villages. A village can come under the category of problem village if it is, as drawn by the PHE, covers the following laid down conditions:

(i) If the quantitative yield of open well is insufficient to meet the standard demand.

(ii) If the distance of water facility is not within a radius of 1.6 Km.

(iii) If the water available in the village is chemically harmful.

(iv) If the water is capable of causing water borne diseases.

The Table 3.2 also shows that there are 473 such villages which have no water facility and where manual efforts
### TABLE 3.2

**PROBLEM VILLAGES**

(1985)

<table>
<thead>
<tr>
<th>S. No.</th>
<th>District</th>
<th>Total village</th>
<th>Problem village</th>
<th>Complete or partial facilities</th>
<th>Difficult village</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Chhatarpur</td>
<td>1077</td>
<td>456</td>
<td>417</td>
<td>39</td>
</tr>
<tr>
<td>2</td>
<td>Damoh</td>
<td>1156</td>
<td>694</td>
<td>543</td>
<td>151</td>
</tr>
<tr>
<td>3</td>
<td>Panna</td>
<td>932</td>
<td>533</td>
<td>494</td>
<td>39</td>
</tr>
<tr>
<td>4</td>
<td>Sagar</td>
<td>1856</td>
<td>1379</td>
<td>1284</td>
<td>95</td>
</tr>
<tr>
<td>5</td>
<td>Tikamgarh</td>
<td>881</td>
<td>901</td>
<td>752</td>
<td>149</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>5902</td>
<td>3963</td>
<td>3490</td>
<td>473</td>
</tr>
</tbody>
</table>


have failed to have water due to the rocky region, typical topography, and the lowest level underground.

### POLLUTION

Pollution is that which contributes to the deterioration of the environment, and it is mainly due to increasing industrialization, multiplying population, ever growing cities, motorization etc. when material or energy introduced by human activities, itself becomes harmful to man's health, his well being or his resources, directly or indirectly, it is termed as pollutant.¹ If the standard properties of nature

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are unfavourably changed, it falls upon the general health conditions of living beings. For example decomposition process produces many gases which are migrated in the natural air and destroys its rich qualities and make it unhealthy to the people breathing it. Another example of pollution is dust blown in the wing which is harmful to human beings, likewise many substances are useful in small quantities but harmful in excess. In this way pollution creates many chances in determining the environmental health hazards.

In the study area important substances of pollution are additives to food, fuels and alloys, appliances and furnishing, clothing and building material and solid wastage. Apart from these the drainage system is widely known to be responsible for pollution. The contaminate or the pollutants produce localised effects on human body at the place of contact or entry chiefly to the respiratory and the alimentary systems, the skin and the eyes on which some of these may produce harmful effect after absorption and distribution inside the body. Some of these pollutants are very harmful if entered the body in excess, but it is very difficult to decide as to what may create serious health hazards. Much of ill health is due to unhygienic environment.

AIR POLLUTION

Air (since it constitutes oxygen) is very essential for life and it is one of the main component of our living environment. Polluted air is very harmful to man. Dust, smoke, toxic,
gases and chemical vapours etc. are mainly responsible for the air pollution. Air pollutants may be gases mixed in the air or small solid or liquid particles dispersed in the air. Wind plays a major part in the dissemination of air pollutants. If the wind is weak and calm, pollutants concentrate; if they are strong and turbulent they disperse. When the rate of pollution becomes too high or when the cleaning process becomes infective, it constitutes health hazards.

Air pollution in the rural area of the study unit is comparatively negligible except in few industrial places. There are no stone cutting machine, fume producing industries, coal mining, nor motor vehicles found in large numbers. In urban places of the area, carbon monoxide and the volatile hydrocarbons are the main polluting agents of the atmosphere.

Automobiles are a major source of air pollution in the study area which concentrates of primary exhaust products, decreases with increasing distance and air pollution is found in the towns particularly on main roads. Motor vehicles, trucks etc. contribute to air pollution by emitting hydrocarbon, carbon, monoxide, lead, nitrogen, oxide and particular matter. Combustion of fossil fuels in the automobiles, industry and in the domestic use produce many gases which are truly mingled with the natural air. These gases are a mixture of carbon, monoxide, nitrogen oxides and hydrocarbons. Large quantities of carbon particles and lead are also emitted during combustion. These gases are dispersed in the atmosphere
and dilute their concentration in an unnoticeable quantity. The carbon monoxide is very harmful to human beings being highly poisonous, reduces the oxygen carrying capacity of the blood. Emissions from automobiles also cause eye irritation and are also responsible for impaired pulmonary function in decreased persons.

There are 32 towns in the study unit (1981) where small scale, large scale and cottage industries are carried on in general. For example, Diamond Cement Industry, Narsinghgarg (Damoh district), Extra Board Industry Esharwara (Sagar district) and, Diamond Mining Industry, Majhgawan (Panna district) are the main heavy industries. There are many small scale industries like chemicals such as soap, ink, fume candle, drugs and pharmaceuticals etc. Others are floor mills, dal mills, saw mills, bakery and rice mills which are the main air polluting elements.

In the study area dust is one of the major components of environment, particularly in summer season, mixed with the air in the season, it serves as a pollutant in the natural air and causes many diseases to human life - such as irritation in the eyes, trachoma, and also imbalance in the respiratory system.

In study unit where the cement factory is located it is observed that throughout the year around the environment is dusty. The dust floats over an area of at least ten kilometres radius. It is personally observed that there are layers of
dust lying on the green trees and crops. The deposits of dust add to the green trees the possibility to become dry and the crops to yield less. Even the water pots if lying without cover over the top receive the dust inside and make the water polluted. The small ponds, in the area are no exception to such exposure to dust and the water used both for bathing purpose by inhabitants is harmful to the skin, and for drinking purpose for the animals is also harmful to them.

In the Diamond Mining Industry the stone cutting is done on large scale. As a result dust is caused to float in the air and it spreads to a long distant area. It not only affects the human beings but cattle and agriculture also. The people working in the factory area fall prey to diseases like gastric trouble, lung damage, gallbladder etc. oxide harmful ingredients, which are being continuously added to the atmosphere and are also responsible for the respiratory troubles. Besides these, in urban centres, the flour mills, dal mills, saw mills machines also cause dust which affects the general health of working labour.

Straw Board Works, Isharwara locally known Puttha Mill causes decomposition. The accumulation of raw material in the adjoining open space mill is kept for the process of decomposition for manufacturing purpose. The decomposition causes stinking smell which is directly inhaled by men and animals of affected area and that causes various health hazards.
Living surrounding environment may be polluted due to bakery, flour mills, shoe-making, bidi making. There are some of the important small scale and household industries. It is physically observed that the use of wood for fire in the bakery causes respiratory disorder to the workers and the atmosphere is confirmed only to almost negligible extent involving the health of nearby inhabitants.

WATER POLLUTION

Generally water is never pure in a chemical sense. Without safe water supply there is no health and well-being. Its impurity is dissolved by gases, minerals, sand, mud and microscopic plants and animals. These are natural impurities derived from the atmosphere, catchment area and the soil. Water is also polluted by human activity such as urbanization and industrialization. The most important source of water pollution is human waste. Main sources are as follows:

(i) Sewage: Organic matter.
(ii) Industrial waste: Metal salt, and organic chemicals.
(iii) Agriculture: Fertilizers and pesticides and
(iv) Physical: Heat and radioactive substances

Wells and rivers are the main sources of drinking water. Both the people of urban and rural areas take polluted water particularly in summer season when the wells, tanks, rivers and other sources of water dry up. It is found in rural places that often people take brackish which is not potable.
Some villages have ground water sources containing excess iron, musty and is muddy colour. These polluted water provide the enteric diseases (water borne).

Water borne diseases are generally reported in summer and in the beginning of the rainy season. Generally 80 per cent diseases are caused by polluted or contaminated water. Dysentery and diarrhoea are major symptoms of diseases caused by polluted or unfiltered water. In summer season when the sources of water are dried people use the other sources which may be muddy or soily. Infectious hepatites are also due to contaminated water. Intestinal worms, poliomylitits, guinea worm are also the infectious diseases. The persons who are attending the patients suffering from any of these diseases are liable to be infected and to get the disease. Typhoid is a fever caused by the germ. The organisms of the disease are present in the stool and also may be in urine. They can be carried by water and contaminated food. Their spread through water can give rise to several epidemics. Other diseases like malaria are also associated with the water resources. development due to lack of water.

Women are the primary users of water resources and are the primary influence on family habits. Since women are traditional water carriers, they spend a lot of time upto 2-3 hours a day hauling water. By virtue of their predominant functions at home, women are particularly vulnerable to water borne diseases, which accounts for 80 per cent of all
illnesses. In cities and towns where the pipe line water supply facilities are available, the pipes play an important role for water pollution. The pipes are empty for a lot of times. There is negative pressure as bacteria, foul gases.

The water let-out of industrial plants are so harmful that the factory flows the polluted water through the drains and the drains are mixed in the river. In the study zone concerned head quarters, Sagar has a big lake in the centre of the city, besides this, Damoh, Chhatarpur and Panna also have a tanks, people use this water for bathing, washing and drinking for animals. The washermen also wash the clothes there and pollute the pool water. In Sagar pool mostly drainage of the western and northern parts of the city are joined in and street water is also mixed in it. The Defferin district hospital's drainage is also included in pool and pollutes the water more.

Another main source for drinking water particularly in the rural areas is well. Wells are of two kinds shallow and kachcha which are notoriously liable to pollution from neighbouring sources of contamination such as drains and collections of manure. Pucca-well is built of stones and a few wells have steps. Some people may even wash their faces, hands and feet which is a common custom. Guinea worm disease may develop where steps wells are in use.

Rivers provide a dependable supply of water. Mostly rivers of nallas of the study unit are seasonal; it is turbid
during rainy season and may be clear in other season particularly in summer season. The impurities of river water are derived from surface washings and sewage. The customs and habits of the people like bathing, animal washing add to the pollution of water. River water needs purification before it is used for drinking purpose.

In the study region the PHE Department has provided a number of tube-wells to reduced the deficiency of water in the year 1986. But the scholar has found at least 50 per cent of this installed pumps to have gone in complete disorder. On enquiry it was reported that due to lack of proper maintenance and indiscriminate use by people, 50 per cent of them have replaced into total disorder exposing the affected village to go back to the old deficiency stage. On the remaining 50 per cent there comes, almost no water or scanty water in summer season because of insufficient digging and shallow depth.

SOLID WASTES DISPOSAL

Soil pollution is caused by the disposal of solid wastes generated from domestic, industrial and agricultural sources. Bhide also supports that the first apple core that hit the garden of Eden can be said to have started pollution of the natural environment.¹ In the cities solid waste disposal is called refuse. It is conglomeration of dust, ash,

vegetable, paper and packings of all kinds, rags and other fabrics, glass and many other combustibles. Refuse reflects the living conditions of the people. It also varies from season to season and from locality to locality. Human waste has always been a problem wherever urine and fecal matter have not been put to use productively. With the domestication of animals the disposal of animal waste also becomes a problem. The manufactured goods after their usefulness is exhausted whether buried, burned or dumped in water. There are strong possibilities of environmental contamination resulting from these disposal practices.

There is a waste collection in the cities. The waste material excreta thrown on the road and in the lanes the whole day which create the nuisance in the environment. The municipal services are only in the morning but the refuse is left on the roads. The flies and other infectious insects grow there and the smell of the refuse spreads in the atmosphere the whole day and causes infections.

In the villages, grass, leaves, waste discharge, cattle and night soil are collected in the open space at the back of the houses which is spread away by dogs, cats, pigs etc. The waste daily water of the house also collects there. At such places rats, insects, flies make their resting place and grow; all these infect the food and water.
SEWAGE AND DRAINAGE

Sewage or water carriage implies collection transporting of human excreta and waste water from residential, commercial and industrial areas, by a underground pipes called sewers. It is waste water from a community containing solid and liquid excreta, derived from houses. Sewage resembles dirty water with an unpleasant smell. Waste water does not contain human excreta e.g. from kitchen and bath rooms. The amount of sewage that flows in the sewers depends upon the habits of the people. If people use more water, there will be more sewage does not flow uniformly throughout the day. It is subject to variations depending upon the availability of water.

Sewage and drainage are the source of pollution. In sewage many disease producing micro organisms (germs) originate and grow in a particular habitat. These germs are sprayed in the air and directly or indirectly affect the health of man. Man as a factor to spread the diseases by means of contact. The germs spread the infectious diseases such as viral fever, viral malaria, dangu etc. which have been reported in a particular place and time.

In the urban areas, generally in the morning, when people tend to use more water there is a greater quantity of flow in the sewage. It depends upon the habit of the people. It varies from 50 to 100 litres per capita. The refuse also collects in the drains whose smell affects the health of the people living in such places.
The villages of the study unit have no facilities of drainage system. There are small holes through the wall where dirty water is drained, and, flows in the back of the houses and on the streets. A few household store the waste water in a hollow. The smell and germs grow there and spread many infectious diseases. The urban centres have the drainage system on the main roads only. The condition of the inner part of towns and cities is the same as that of villages.

PERSONAL POLLUTION

Personal habits elevate and keep safe health from adverse effects of environment and other agents. "Clean habits are basic to good health. This is because the environment in which man lives is full of harmful agents, and unless contact with them is avoided, one is likely to suffer from the ill-effects resulting from such agents." ¹

Personal habits of the people like smoking, drinking, chewing tobacco and such other unnatural habits pollute the living environment. Environment in which man lives is full of harmful agents such as dust, fumes etc. Cleaning habits of the human being are necessary such as daily bathing, wearing clean clothes, washing hands every time before taking food, cleaning teeth in morning and again before going to bed, cutting the nails short etc. for good and healthy health. Smoking and drinking are definitely harmful to health and

create many health troubles like lung cancer, high blood pressure, constipation, etc. Personal pollution does not only have poor health but also a shorter life.

IGNORANCE AND POVERTY

Ignorance and poverty are generally found together in rural and urban areas of the study region. It is far more than a single lack of money and knowledge. It is a well known fact that poverty leads to sickness and sickness to poverty. Most of the infections and nutritional deficiency diseases are found due to poverty and may called 'disease of poverty'. These can be prevented through proper provision of health care facilities.

Literacy is an important and responsible factor for many defects. The average literacy in the region is 25 per cent and the percentage of female literacy is lower than the man literacy.

The average literacy in the region is 25 per cent and the percentage of female literacy is lower than the man literacy. Most of the families belong to traditional culture and beliefs. Generally it is observed in rural areas that parents are not interested to send their children to school. Generally women are made to work like male members in the field but they are seldom consulted in the time of taking important decisions. Ladies are confined to the fore walks of the houses and are expected to manage the household but
their ignorance hinders their abilities resulting in to the adverse effects on the health of the family members.

TREATMENT SYSTEM

The treatment system of the family in rural areas is much different from the present facilities. The thought and physiology of the people are influenced by beliefs, religions and tradition for treatment system. The majority of rural population diagnoses - the causes of diseases themselves. They believe that certain diseases are due to the wrath of some god, and, try to remove by prayer to god. People take help of the doctors in serious conditions of patients. Local treatment like jadutone, jharaphooki, fasting etc. are the main ways to cure diseases.

State government provides five types of treatment system for health care such as Bio-chemic, Ayurvedic, Unani, Homoeopathic and Allopathic. These are found in urban and rural areas of the State. Some places of the entire area have Allopathic and Ayurvedic facilities whereas all district head quarters have all types of types of medical facilities. The majority of population of the area comes within the range of low income. So people may afford the treatment that comes within their limit i.e. that costs less. The choice of treatment are influenced by their own belief in the system. Generally government hospitals are found in district and tahsil head quarters and block development centres. Mini PHCs and dispensaries are also found in large villages that provide the
treatment facilities free of cost.

OTHER ASPECTS

High rates of migration to urban settings produce environmental health and economic strains on the urban areas. Unemployment, growth of slums, density of population etc. are the burning problem which create the nuisance and are responsible indirectly for many types of health hazards.

Impure air, inadequate water supply and improper sewage disposal are the major problems prevalent in the slums. They have endangered the health of not only slum dwellers but also the residents in the neighbourhood. The slums are infected with diseases caused by congestion and excessive smoking and chewing, poor ventilation and lack of natural light. Deficiency diseases, viral infection, water borne diseases etc. are generally reported in the study area.

Majority of people residing in slum areas is accustomed to crimes and bad habits. The younger generation that comes in their contact is influences by them and also takes up to those habits resulting into health hazards.

Food poisoning is an acute gastro-enteritis caused by ingestion of food or contaminated drink. In food and water there may be bacteria or toxins and poisons derived from plants and animals. The toxin is heat resistant. It can remain in food after the organisms have died. The toxins act directly on the intestines and on central nervous system.