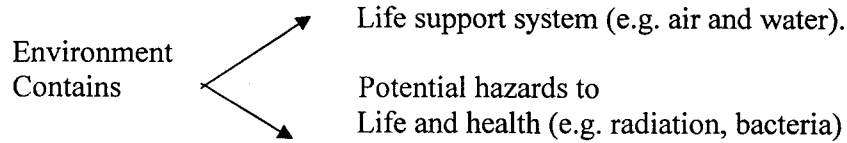


**ENVIRONMENT AND HEALTH IN SOUTHERN IRAQ:
FACTS AND FUTURE PROSPECTS****O. S. Habib***Dept. Community Medicine, Coll. Medicine, University of Basrah, Iraq***ABSTRACT**

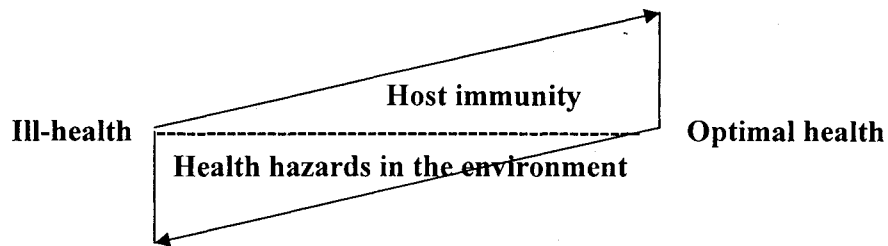
Health as a product of complex interaction of many factors related to host, disease agent and environment is some thing that can not be sacrificed for any other thing. Actually all other attributes in life may be sacrificed for health. Modern health care systems tend to emphasize high technology in diagnostic and therapeutic care, yet the overall burden of disease on humanbeing did not change a lot. One of the reasons why this did not take places the fact that most of ill health is related to ill environment. The effect of environment on health is neither well understood nor well invested in. In Iraq, it is believed and it can be seen that the environment has been so damaged that its repair is beyond the capacity of the Ministry of Health and the Ministry of Environment. Indeed, the repair of environment needs a total national effort. The marshes of southern Iraq as an important and unique ecosystem have been greatly distorted. The improvement of environment as a whole can not be imagined unless it encompasses the marshes situation. In this paper, we attempt to explore the main environmental problems concentrating on those related to health. Then we put a proposal to deal with specific aspects within an overall approach to monitor, rehabilitate and protect the environment in Iraq in the long run.

INTRODUCTION

Environment may be defined as the totality of elements, factors or conditions in the surrounding of man that can affect the human health and well being (Last, 1983, 1987). These might be physical, chemical, biological or social.



Environmental Health: All programmes, activities and procedures that are concerned with the creation and maintenance of good environmental conditions to promote health and prevent disease particularly communicable, malignant and occupational diseases (Last, 1987). These may be achieved through promoting immunity and decreasing hazards.



Environmental health is very closely related to the following disciplines:

- a. Public health engineering.
- b. Public health services.
- c. Economics.
- d. Social sciences.

And therefore, the handling of environmental conditions including those of the marsh areas in southern Iraq must consider these and other aspects in any effort to rehabilitate the area.

What is going on now seems, to me at least, non-comprehensive approach to the problem of distorted environment of marshes and marsh population.

Environmental problems facing people in the south including the marshes

FIRST: The lack of vision on the future of the marsh area

What is the future of the marsh area? is it going to be just an area covered with water? an agricultural area? a tourism sites or resources? or what? an issue for meetings and conferences ?

SECOND: Environmental health defects**Defects related to domestic water.**

Although safe water supply for domestic purposes is one of the principal requirements for healthy life in the modern world, the water supply in Basrah and in Iraq as a whole is very defected in many aspects. The quantity of purified water is inadequate; the quality is defected, with multiple sources used with all the implications of storage and contamination from:

- * Accidental leakage of sewage into drinking water.
- * Uncontrolled disposal of sewage and other wastes.
- * Industrial, agricultural and irrigation drainage.
- * Spreading of fertilizers.
- * Insecticides and pesticides.
- * Dumping of certain wastes at sea.
- * Spillage of liquids (oil) from ships.

In the core marshes area, no real domestic water supply is available

Disposal of wastes of different kinds.

Major deficiencies are facing the handling of sewage and wastes in Basrah and other populations:

- a. Incomplete coverage by sewage and other wastes disposal.
- b. Defected system if existed.
- c. Many areas of the cities are full of garbage and stagnant water.
- d. Accidental leakage of sewage into the pipes of drinking water is very common problem.
- e. All these are actual and potential sites for the living and breeding of rodents, insects and other unwanted creatures.

Prevalent water related and wastes related diseases.

a) Water born and water washed diseases are very prevalent. Childhood diarrhoea is one of the major health problems in Iraq despite enormous efforts to control such a problem. Cholera, a water born infectious disease, is never absent from Basrah over the last years. It follows an endemic pattern with epidemic fluctuations and always represents a threat to the health of the public. Inadequate and bacteriologically unsafe water and poor environmental and sanitary conditions are among the main factors associated with occurrence of cholera. Table (1) shows reported cases of cholera in Basrah over the period 1995-1999 (Al-Mudhaffar, 2000). A recent study revealed that many of the surface water sites are contaminated with pathogenic microorganisms including cholera (Al-Mayah, 2004).

Table 1- Reported cases of cholera in Basrah over the period 1995-1999 as an indication of contaminated water

Years	Number of reported cholera cases
1995	150
1996	23
1997	123
1998	421
1999	570

Source: Al-Mudhaffar (2000)

b) Water based and water vector-related diseases are still prevailing though at low level but potentially are likely to re-emerge.

Food and milk sanitation

Health inspection of imported or locally prepared foods and drinks is very limited. The risk of unsafe foods and drinks is very likely. Actually many of the malignant diseases, which show increasing trend, could be related to food.

Housing conditions: adequacy, Safety and health requirements

- a. Inadequate houses for decent living standards.
- b. A lot of housing units are insecure.
- c. Despite the enormous number of land pieces assigned for private housing, thousands of these land pieces are unused. Meanwhile many people exploited the weak governmental authority nowadays to construct poor quality houses in unplanned manner and occupying land, which is allocated for other purposes. These haphazardly constructed housing aggregations represent further distortion to the architecture of cities, further damage to the environment and water supply and they are insecure and of poor quality.

Defected control of insects and animal reservoir of infections.

Despite the great efforts devoted to the control of vector born infectious disease during the past fifty years, many of these diseases are still prevailing like malaria (Ali, 1992; Al-Batat, 2004) (Table 2). Some of them may actually be increasing such as visceral leishmaniasis (Al-Edan, 2001).

Very little is being done to deal with insects, rodents and stray dogs. Actually, rodents and stray dogs are complained of everywhere in residential areas and may endanger the health of the population.

Table 2- Reported cases of malaria in Basrah over the period 1964-2003

Years	Annual average number of reported cases
1964-	1211
1969-	1133
1974-	44
1979-	68
1984-	39
1989-	78
1994-	164
1999-2003	43
	42

Source: Ali (1992), Al-Batat (2003)

Occupational health.

Exposure to such undesirable environment may lead to the development of specific occupational diseases, the exacerbation of already existing diseases and a negative effect on productivity of workers and the over all production of a factory or any economic organization. Evidence from local research indicates that safety measures in most industrial enterprises are not adhered to either because of deficient equipment or ignorance by workers. Also, some occupational health hazards have been reported among workers such as respiratory and allergic diseases (Nima, 2003). Occupational cancer could not be ascertained, given the limitations of locally available data.

Violence

The risk of accidental death is very random (in the sense that every one is at risk) and very high in Iraq (crude death rate has doubled in the last year or so). In the marshes area, intertribal conflicts are common, associated with a high life toll and are expected to continue for some time. In one recent study, almost one out of every five deaths in the marshes area was due to intertribal conflicts (Muthanna *et al.*, 2004).

School environment

Although schools are supposed to have high standard environmental conditions in order to safeguard the health of children and to provide them

with examples of healthy living, it is exceptional to find a school with optimum services in Basrah (Ebrahim , 2005) (Table 3).

Table 3- Selected deficient components of school environment in Basrah 2002- 2004

Item studied	Number of schools studied	Number (%) of schools with deficiency
Cleanliness facilities	27	13 (48%)
School yard filling	27	13 (48%)
Drinking water	27	8 (28%)
Unsuitable latrines	27	8 (28%)
Inadequacy of latrines	27	15 (56%)

Source: Ebrahim (2005)

Air pollution

Definition: A condition where the atmosphere contains excessive concentrations of foreign matter, which adversely affects health and well-being of the individual and causes damage to property, animals and plants (Last, 1987; Anderson *et al.*,1993).

Sources of air pollution

Air may be polluted from the following sources (Last, 1987; Anderson *et al.*,1993; WHO, 1972).

- a. Incomplete combustion of different domestic fuels.
- b. Industrial activities such as chemical plants, refineries and phosphate fertilizer plants.
- c. Community activities and personal habits like smoking.
- d. Sewage systems
- e. Vehicle sources of air pollution: Today cars produce 60-80% less pollution than cars in the 1960s, yet motor vehicle sources are still responsible for major forms of air pollution because:
 - 1- Lead levels have been reduced but other types of air pollutant persist.
 - 2- More people are driving more cars more miles.
 - 3- Buses, trucks and trains haven't had to clean up their emissions.
 - 4- Pollution control devices work for 50,000 miles while the average car is driven 100,000 miles.

Significance of air pollution

- * Widespread exposure.
- *Potentially have very large impacts: causes thousands of premature deaths.

* Growing number of asthmatics

* Tens of thousands of hospitalization days of work and school lost.

Health effects of air pollution

Effects of air pollution on health can be summarized as follows (Last, 1987; Anderson *et al.*, 1993; WHO, 1972):

a. Most harmful effects of air pollution known are associated with irritant properties and most of the symptoms are related to the respiratory system and eyes.

b. Acute episodes of illness and death results occasionally from exposure to severe air pollution associated with unusual weather conditions when a mixture of smoke and fog (called Smog) is formed and very toxic.

c. Continuous and intermittent exposure to low concentration of some air pollutants causes irritation and discomfort but no clear evidence of permanent damage has been found.

d. Air pollution may contribute to or aggravate the symptoms and may be a factor in mortality of persons with preexisting chronic respiratory disease, cancer and cardiovascular diseases.

e. Poisoning as in case of CO accumulation in closed space.

f. Tuberculosis. Mycobacterium tuberculosis can remain suspended in air for hours and can survive for long period in dark, dusty places.

g. Unpleasant odours---annoyance.

3. Physical hazards in the environment

Ionizing radiation (x-ray, nuclear radiation). These are related to mutagenesis, carcinogenesis, teratogenesis and other effects such as cataract, infertility and skin problems. Depleted uranium is both a toxic chemical and a radioactive matter.

Non-ionizing radiation (ultraviolet). Related to malignant melanoma.

Microwave radiation (radar, microwave ovens) They may cause burns and interference with certain devices such pacemakers of the heart.

Laser. It causes retinal damage.

Video displaying terminals.

Heat. In a hot environment, the natural adaptation mechanisms are disturbed and temperature regulation is disturbed leading to heat exhaustion, and heat stroke.

Cold. Hypothermia.

Sound which affects hearing (do not hear or do not respond to warning signals and thus at higher risk of accidents.)

Pressure. Nitrogen narcosis and polycythemia.

4. What is special for Basrah and the south

The hot, dusty and humid weather which would help in carrying many pollutants like lead and microorganisms is very prevailing in Basrah, which itself is an industrial area. There are many huge industrial plants (Petrochemical, Iron & steel, Fertilizers, Paper Mill and electric Power generating plants), in addition to the oil refineries. Basrah was the battle field during the 3 major Gulf wars since 1980. This had the following effects:

a-Direct effect: The result of the exposure of the city to tons of bombs and other military weapons including the use of depleted uranium and probably other chemical weapons.

b- Indirect effect: This is through

1-The destruction of the factories, power plants, houses, ships, military equipments which led to the release of different chemical, biological and radioactive pollutants.

2- The infrastructure has deteriorated in almost every facility in the city.

3- The burning of oil wells.

5. Facts about depleted uranium

- a. Environmental radioactivity is due to both natural uranium and depleted uranium. The two can be distinguished from each other.
- b. Nearly 60% of the associated radioactivity is attributed to natural uranium.
- c. Plants do not store depleted uranium in leaves but may be in roots. The implication is that in contaminated areas, eating leafy vegetables and fruits might be safe but eating roots is not.
- d. More than 90% of ingested uranium may be excreted. Inhaled and injected uranium may settle in lungs and act as a source for internal radiation.
- e. Three types of emissions are possible: alpha particles, beta particles and gamma rays. Gamma is useful in measuring environmental contamination.
- f. Depleted uranium may settle in bones and is released from there as radioactivity.
- g. The Americans produced nearly one million tons of depleted uranium and used only 5% of it. The remaining is stored.
- g. Depleted uranium is known to be both toxic (chemical effect) and radioactive (ionizing radiation).
- i. Chromosomal aberration assay is sensitive and specific biomarker of exposure to ionizing radiation and might be a predictor of cancer risk.
- j. To incriminate DU in the increasing risk of cancer or other diseases, we need:
 1. Evidence of environmental contamination by DU.

-
2. Evidence of human exposure (indirect and direct measurements).
 3. Evidence of increased disease risk. Feasible but needs great efforts
 4. Evidence on association of disease risk and exposure to DU.

Perhaps this evidence is obtained from:

1. Animal studies.
2. In vitro studies but of limited value
3. Ecological studies
4. Analytical epidemiological studies (case-control and cohort studies)

6. Possible links between pollution and disease

Although it is difficult to relate noticeable increase in certain diseases in Iraq during the last decade or so to deterioration in the environmental conditions, epidemiological evidence suggests possible link between specific diseases and environmental conditions. Table (4) shows a marked increase in mortality from cardiovascular diseases and cancer over the period 1988-1997. Although, part of this increase reflect improvement in reporting and recording and part of it reflects population increase, significant part must reflect real increase in incidence and fatality (Abood, 1999; Hassan, 2003).

Table 4- Recorded mortality from cardiovascular diseases and all types of cancer in Basrah 1988-2002

Years	Number of deaths assigned to cardiovascular disease	Number of deaths assigned to all types of cancer
1988	111	34
1989	597	39
1990	657	131
1991	78	46
1992	299	105
1993	1094	189
1994	1321	373
1995	1608	454
1996	1338	354
1997	990	475
1998	-	452
1999	-	480
2000	-	579
2001	-	589
2002	-	610

Source: Abood (1999) and Hassan (2003)

7. The state-of-the art in Basrah (Iraq)

- a. People are frightened by the apparent substantial increase in cancer incidence and mortality.
- b. Incomplete picture of the disease risk. The registration of cancer cases is likely to be still inadequate.
- c. Incomplete picture of environmental pollution with depleted uranium and other pollutants.
- d. Cloudy indicators of association of cancer and other diseases with exposure to depleted uranium and other carcinogens (diet, infection, pesticides ..etc).

Evidence from local studies in Basrah/Iraq suggests:

1. Increase in the incidence rate of all cancers
2. Increase in cancer mortality rates, according to two studies, from 4/100000 in 1988 to 32/100000 in 2004 (Abood, 1999; Hassan, 2003).
3. There is a shift in cancer risk towards younger age groups (e.g., leukemia and breast cancer (Yacoub *et al.*, 1999).

At the current time:

1. No solid evidence on factors behind such increase in cancer is available.
2. The deterioration in environment during the last 20 years and the different crises facing the population may be implicated in the etiology of cancer.
3. Inadequate cancer registry and lack of technical capabilities hinders at least partially the overcoming of deficiencies

8. The future: Practical proposals for the next three years

It is evident from this review and data from the Iraqi Ministry of Health (Al-Alwan, 2004), that environmental conditions are deteriorating and appropriate interventions are urgently required. We may suggest the following proposals for the next three years. The proposed approach consists of four parts:

Part One: Improvement of health care provided to patients with cancer

The creation and equipment of a single care centre is highly recommended. The old building (Radiotherapy Centre) could be rehabilitated and expanded to meet the purpose of a modern care centre for cancer patients.

Part Two: Development of cancer registry

Certainly the provision of high quality care for cancer patients through one centre will attract more patients and enhance the process of case detection

and registration. The present project is intended to strengthen the current efforts as follows:

Objectives: To register all cancer cases which occur within the population of Basrah governorate.

Case definition: A cancer case is that which meets specified national and international criteria of diagnosis.

Sources of data: All hospitals, health centers and private practices including pathologists clinics.

Data collection: Data on each case are collected through the use of specific form and collected by contact in each hospital. Additional complimentary information may be obtained from death registries. The histopathological laboratories and clinics are vital source of information on diagnosed cases.

Documentation: data on cases are fed into a computerized system which may be used for periodical reports and scientific research under confidential terms of reference.

Collaboration with other partners

The project is unlikely to achieve its objectives without the understanding and active cooperation of all partners, particularly doctors.

Part Three: Conducting epidemiological research

The registry may be used for carrying out scientific research for different purposes:

a. Descriptive epidemiological studies to determine the distribution of morbidity, mortality and survival of cases among different population subgroups, time trends and spatial distribution.

b. Analytical epidemiological studies to test hypothesis regarding risk factors behind variation. A case control study is convenient in this situation.

Two separate case-control studies may be conducted; One on cancer in adults (all cancers or may be restricted to selected cancers) and the second is on cancer in children (may be restricted to leukemia and lymphomas)

Part Four: Environmental monitoring

The following are important areas of concern:

- (1) Heavy Elements (Lead, Chromium, Cadmium, ... etc.).
- (2) Phenols and Chlorophenols.
- (3) Oil and grease.
- (4) Radioactivity including depleted uranium.

I. Water Contaminants:

A- Tap Water and ground Water::

- 1) Heavy elements concentrations
- 2)oil and grease
- 3) Chlorophenols

B- Surface Water:

- 1) Heavy elements concentrations
- 2) Oil and grease.
- 3) Chlorophenols
- 4) Pesticides concentrations

II. Air contaminants:

- A) Solid particulate matters (SPM)
- B) Heavy elements concentrations specially Lead, Chromium, and Cadmium.

REFERENCES

- Abood, A.S. 1999. The geographical pattern of some chronic diseases in Basrah governorate. Ph.D. thesis, University of Basrah.
- Al-Alwan, A. 2004. Health of Iraq. A report by the Ministry of Health. Iraq, Baghdad. Al Adib Press.
- Al-Batat, A.S.J. 2003. Malaria again: An epidemiological study in Basrah. Diploma Report, Department of Community Medicine, College of Medicine, University of Basrah.
- Ali, I.A. 1992. Epidemiological status of malaria in Basrah during the last three decades. Diploma Dissertation, University of Basrah.
- Al-Edan, A.Y. 2001. Kala-Azar patients in Al-Fuhood subdistrict, Thi Qar governorate: Epidemiological, serological and with special emphasis on ecological aspects. M. Sc. thesis, University of Basrah.
- Al-Mayah, A.A. 2004. Ph.D. Thesis, University of Basrah.
- Al-Mudhaffar, A.H. 2000. Epidemiology of Cholera in Basrah-1999: A case-control study. M. Sc. Thesis, University of Basrah.
- Anderson, S.H, Beiswenger, R.E and Purdom, P.W. 1993. Environmental Science. Macmillan Publishing Company, New York 4th ed., Chapter: 191-219.
- Ebrahim, S.M. 2005. School health services in Basrah: Indicators of performance and avenues for improvement. Ph. D. Thesis. University of Basrah.
- Hassan, J.K. 2003. Cancer in Basrah: Pattern and determinants with emphasis on SCD and G6PD deficiency (A new hypothesis). Ph.D. thesis, University of Basrah.
- Last, J.M.A. 1983 Dictionary of epidemiology. IEA and WHO Publication. New York, Oxford University Press; P.32.

- Last, J.M.A. 1987. Public health and human ecology. USA, Appleton & Lange: Chapter 4, pp: 131-187.
- Muthanna, A.N.; Ahmed, Z, Abid, A.H and Sahib, M. 2004. The Marsh population: Health and sociodemographic evaluation. Unpublished Report, AMARicf, Basrah Office.
- Nima, M.A.S. 2003. The health effects of work environment on workers (pulmonary functions & haematological parameters) in State Company for Iron and Steel (SCIS). M. Sc. thesis, University of Basrah.
- WHO, 1972. Health hazards of human environment. World Health Organization, Geneva,. Chapter 1, pp: 19-46.
- Yacoub, A.A.H; Al-Sadoon I.A.; Hassan G.G. and Al-Hemadi M. 1999. Incidence and pattern of malignant disease among children in Basrah with specific reference to leukemia during the period 1990-1998. Medical journal of Basrah University. 17.

البيئة والصحة في جنوب العراق: الواقع والآفاق المستقبلية (المنظور المستقبلي)

عمران سكر حبيب

قسم صحة المجتمع - كلية الطب، جامعة البصرة - العراق

مستخلص

تعتبر الصحة نتاج تفاعل معقد لعوامل عديدة ارتبطت بالمضيف والعامل المرضي والبيئة. والصحة لا يمكننا التضحية بها مقابل أي شيء آخر ففي الواقع إن جميع الأمور يمكننا التضحية بها أو التهاون منها باستثناء صحتنا. فنظم العناية الصحية الحديثة تميل الى التأكيد على استخدام التكنولوجيا المتطورة جداً في التشخيص والعناية العلاجية ومع ذلك فإن العبء الكلي للمرضى على كاهل الكائن البشري لم تتغير كثيراً. وإن احد الأسباب الكامنة وراء هذا هو الحقيقة التي مفادها ان الصحة المعتلة ترتبط في معظم الأحيان بالبيئة غير الصحية ففي العراق هناك معتقد يمكن تلمسه وهو ان البيئة قد تضررت كثيراً بحيث أن إصلاح هذا الضرر قد فاق قدرة وزارتي الصحة والبيئة. حيث أن إصلاحه يحتاج إلى جهد وطني قد تشوه إلى حد كبير وإن تحسين البيئة ككل لا يمكن تصوره ما لم يتضمن واقع الأهوار وفي هذا البحث نحاول ان نستكشف المشاكل البيئية الرئيسية التي تخص تلك الجوانب المعنية بالصحة. وكذلك نطرح مقترح يعني بالجوانب الخاصة ضمن المدخل الجمالي ، لأجل رصد البيئة في العراق وتأهيلها وحمايتها مستقبلاً.