

The Impact of Environment on Child Health

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"Our planet must be preserved, in order to nurture our children, equally, our children must be better nurtured to preserve our planet"
UNICEF Executive Board, 1992

Before conception, and even before fecundation takes place, "the child" in the form of a gamete is affected by the environmental factors surrounding him, as a result of the close and constant relationship he builds with his environment, during development and throughout life. Although genetic traits play an essential role in determining the physiology and biochemical make-up of an individual, and in shaping his external appearance (height, hair and eyes color) and probably his mental capacity genetic elements (DNA) are not the only factor responsible for the development of the fetus, since the environment plays an essential role.

During pregnancy and despite the protective effect played by the placenta and the uterus, the "child" is affected by external factors and one of the determining criteria for a child's survival, namely, weight at birth, is affected to a great extent by environmental factors. Research has indicated that 60 percent of the

variations in birth weight could be attributed to reasons and factors related to the environment in which the fetus lives (Ebrahim, 1982). The nutritional status of the mother, her activities, irrigation of the placenta are all determinants of the child's development. If a mother is malnourished, or exhausted or in bad health, the child will be negatively affected.

Weight at birth is one of the important determinants in the survival and development of a child. The proportion of low birth weight babies (below 2.5 kg) depends on the health, social and educational status of the mother, as well as the socio-economic profile of the community in which they are born. A study conducted by the American University of Beirut (Zurayk and Armenian, 1985) has revealed a strong relationship between the educational level of the mother and child birth weight, as shown in the following table.

Age at marriage is also an important factor affecting weight at birth, whereby it was found that the proportion of low birth weight babies is 25 percent among mothers aged 15-19 years, while that proportion is only 6.3 percent among mothers aged 30-34 years (UNICEF, 1991). On the other hand, a study conducted by UNICEF in 1990 found significant regional disparities in terms of the rates of low birth weight, whereby the proportion of infants below 2.5 kg in the peripheral

regions of the North, Beqaa, South and suburbs of Beirut is two times higher than that of Beirut and Mount Lebanon (UNICEF and AUB, 1990).

On the other hand, many studies indicate that cancer and many congenital malformations are related to the exposure of the mother to toxic agents during pregnancy. Twenty five percent of congenital malformations among children are caused by genetic factors (divided into four parts: radiation, viruses, drugs, chemical agents) are responsible for around 10 percent of these malformations. The remaining 65 percent are probably caused by an interaction of genetic factors and environmental agents (Kruzel and Centrullo, 1981; Kalter and Darkary, 1983).

If we were to compare wealthy and poor societies, we should find that in wealthy societies, most of the infant deaths during the first year of age are due to congenital malformations, genetic defects, and birth complications while in poor societies most of them are due to factors related to the environment such as malnutrition, infectious diseases e.g. diarrhea, respiratory infections and measles, in addition to lack of awareness among parents, mainly mothers.

After birth, and during the first months of life, the infant stays close to his mother, who, in addition to the family and the home, forms the direct environment with which the child interacts.

Relation Between the Educational Level of the Mother and Weight at Birth

Weight at birth	Illiterate	Some elementary	Completed elementary some secondary vocational	Completed secondary/vocational. some university	Completed secondary and/or higher studies
	%	%	%	%	%
Low	14.7	7.5	9.2	5.4	5.0
Normal	47.1	83.0	79.9	84.9	85.0
Over weight	14.7	9.4	8.7	7.5	7.5
Undetermined	23.5	0.0	2.2	2.1	2.5
Total	100.0	100.0	100.0	100.0	100.0

The situation of mothers, including her social and educational status and her role in economic production is perhaps the most important variable in the infant and child mortality equation, their survival and development. Numerous studies undertaken in Lebanon and elsewhere indicate that factors related to the situation of the mother, i.e. her age at marriage, her level of education, her socio-economic status, her access to ante-, intra- and postnatal care, her breast feeding pattern, her access to family planning, the family size and household work burden she has to bear, as well as her information and practical knowledge about child health, all have a direct and dramatic impact on the level of infant and child mortality and morbidity.

As the child grows, the environment with which he interacts starts expanding into wider circles until it includes the large-scale environment as a whole. In this context, it is worth noting the severe environmental deterioration that has occurred over the last two years in Lebanon, as a result of the war. Destruction affected almost all regions, especially those that gave Lebanon a distinct and famous role; the uncontrolled development in

construction, the improper disposal of waste and the pollution of water, food and air, as well as deforestation have negatively affected the environment.

It is worth noting the deteriorating condition of drinking water, in terms of both its quantity and its quality. The average quantity of water received by the Lebanese decreased 60 percent from its average in 1975. In addition, it was found that around 70 percent of water sources are exposed to bacteriological contamination (AUB and UNICEF, 1992). These high levels of pollution are also revealed in the increase of incidence of epidemics resulting from diseases of water or food origin, which has occurred in all regions of Lebanon, but especially in the under-served regions at the periphery and the suburbs. The annual incidence of diarrhea episodes for every child under five was reported to be four episodes per year, which is 30 percent higher than the average of 3 episodes found in developed countries (MPH and UNICEF, 1990).

The chemical contamination of water is wide and varied. However, it is worth noting one such type, namely Nitrate contamination, which is found

in the surface or ground wells water used for drinking or domestic purposes. This contamination is caused by the use of fertilizers and animal manure. The Nitrate by itself is not harmful. However, the bacteria present in the digestive system transforms the Nitrate into a toxic substance, the nitrite. This disease appears whenever the proportion of Nitrite is 90 mg/liter and the proportion allowed by WHO is 45 mg/liter (WHO, 1977). On the other hand, the Nitrate interacts with the amino acids compounds to form Nitrosamine, which were proven to be a carcinogen among animals.

Scientific studies have confirmed the relationship between air pollution and the incidence of respiratory infections and pulmonary diseases among children e.g. allergy such as Rhinitis, asthma, and respiratory infection such as pneumonia (Goren and Hellman, 1988). It is worth mentioning here the results of a study that was conducted in 1992 about the incidence of acute respiratory infections among children under five, who suffered from six episodes per year (MPH and UNICEF, 1992). The study also found a positive correlation between crowding at home and the incidence of cough. This is

illustrated in the following table.

Number of persons/Room Proportion of Children with Cough

- One person = 51.03
- 2 = 54.60
- 3 = 58.46
- 4 = 60.00

Studies indicate that Lebanon suffers from a habitat crisis and crowding at home. The national average of persons per room is 1.73, while more than half of the Lebanese live in homes with more than three persons per room (MPH and UNICEF, 1992).

Smoking affects also directly the pollution, since it exposes the child to CO₂, Cadmium, Cyanidric acid, Nicotine and many aromatic substances that can pass through the placenta.

Studies have proven that children born to smoking mothers have a lower birth weight than those born to mothers who did not smoke. The proportion of

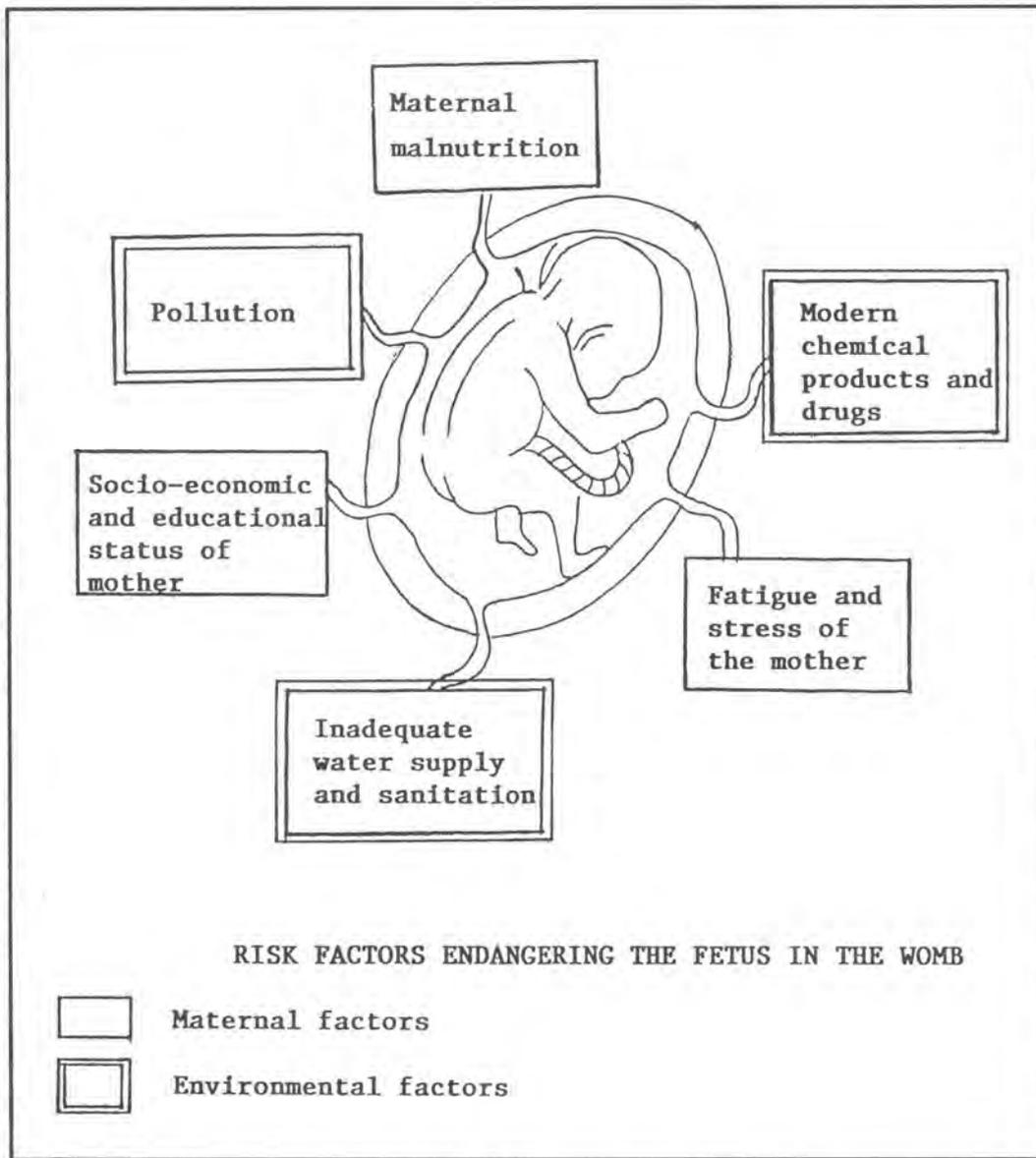
abortions and premature births, as well as prenatal mortality is higher among smoking mothers (Meberg, 1979). Moreover, the higher the number of cigarettes, the worse the effect on the

is two times higher among smoking mothers. In case the mother smokes and drinks alcohol, the results are far worse. On the other hand, studies indicate negative effects on the child's health, when the mother lives with smokers (passive smoking) without smoking herself (Hirayana, 1981; Leaderer et. al., 1984).

The child living with smoking parents is exposed to pneumonia (one of the main causes of infant and child mortality) two times more. Many studies conducted in the United States have proven that smoking is a contributing factor to sudden death which is the cause of one out of every

400 child deaths in Europe and the United States (Newland, 1981).

Studies done in Lebanon indicate a rise in the proportion of smoking mothers. In a study conducted in 1992, we found that the smoking average among



child's health. The prenatal mortality reaches 22 percent if the mother smokes up to 20 cigarettes per day, while it reaches 44 percent if she smokes more than one pack daily (Norwood, 1980). The proportion of low birth weight (less than 2500 grams)

mothers was 35.5 percent among mothers who have children under five years of age. the proportion of houses in which both fathers and mothers smoke is 28 percent, without taking into consideration the air pollution caused by heating and cooking (MPH and UNICEF, 1992). All these factors lead to air pollution inside the house with CO₂, formaldehyde and carcinogenic agents such as Benzopyrene. this situation is not confined only to urban areas but extends to the poor rural regions of Akkar, Baalabeck, and Hermel.

Accidents, reflecting an aspect of the child's environment, affect directly children's well being and survival. The 1990 national study found that accidents accounted for 4.62 percent of child mortality below five years (MPH and UNICEF, 1990). Almost three percent of deaths below five years of age one year and that 90 percent of poisoning cases occur below five years of age, we conclude that poisoning becomes responsible for quite a high proportion of deaths (Haddad and Hudson, 1975).

While studying the impact of the environment over the child health, we should consider (even if briefly), the effects of the war over children in Lebanon. In this context, it is worth noting that until World War I, the ratio of civil and military deaths was one to ten. Today, and especially in civil wars, the ratio has become between three and ten civilians against one military. This was the situation of Lebanon during the last war, from which children suffered from most. The war killed them, maimed them and shut down their schools. It is estimated that around 40,000 children below the age of fifteen were killed during this war. All this left a detrimental effect on their growth, health and future. For

every dead child, we have many others who stay alive with deep war traumas and disturbances which prevent them from leading a normal and productive life, especially disabled children (estimated at 100,000).

What I have presented here is only a preliminary study of a vital topic that needs more research for in-depth understanding of the relation between children and environment in the specific situation of Lebanon.

If we consider children to be the future of our country, then guaranteeing their development and survival will depend a great deal on our ability to provide them with a proper and "healthy" environment, both at the micro-level, formed by the mother and the family, and at the macro-level, formed by the social milieu in which children live ●

References

- 1) American University of Beirut and UNICEF. 1992. The National Survey on characteristics of Potable Water Sources in Lebanon.
- 2) Brayce, Jennifer. 1986. Cries of Children in Lebanon. Beirut, Lebanon.
- 3) Ebrahim, G.J. 1982. Child Health in a Changing Environment. London: Macmillan.
- 4) Goven, A. and S. Hellmann. 1988. Prevalence of Respiratory Symptoms and diseases in School Children Living in a Polluted and in a Low Polluted Area in Israel. Environmental Research 45:28.
- 5) Haddad, N. and W. Hudson. 1975. Accidental Poisoning in children. Lebanese Medical Journal 28:447.
- 6) Hirayama, T. 1981. Non-Smoking Wives of Heavy Smokers have a Higher Risk of Lung Cancer: A Study from Japan. British Medical Journal 282:183.
- 7) Kalter, H. and J. Warkary. 1983. Congenital Malformations. New England Journal of Medicine. 308:423.

- 8) Kurzel, R.B. and C.L. Cetrulo. 1981. the Effect of Environmental Pollutants on Human Reproduction, Including Birth Defects. Environmental Science and Technology. 15:626.
- 9) Leaderer, B.P. et. al. 1984. Ventilation Requirements in Building II. Particulate Matter and Carbon Monoxide from Cigarette Smoking. Atmospheric environment. 18:99.
- 10) Meberg, A. et. al. 1979. Smoking during Pregnancy: Effects on the Fetus. Acta Paediatrica Scandinavica 68: 547.
- 11) Ministry of Public Health and UNICEF. 1992. National Study on Acute Respiratory Infections.
- 12) Ministry of Public Health and UNICEF. 1990. National Study on IMR EPI/CDD.
- 13) Newland, K. 1981. Infant Mortality and the Health of societies. Worldwatch Paper. No. 47.
- 14) Norwood, C. 1980. At Highest Risk. London: Penguin Books.
- 15) 16) UNICEF and American University of Beirut. 1990. The Patters of Breast feeding in Lebanon.
- 17) World Health Organization. 1977. Critere d'Hygiene de l'Environment No.3 Plomb. Geneva: World Health Organization.
- 18) Zurayk, H.C. and H.K. Armenian. 1985. Beirut 1984: A Population and Health Profile. Beirut: American University of Beirut.
- 19) Zein, Ali. 1993. Situation Analysis and Surveys on child Health in Lebanon. Lebanon: UNICEF.

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