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Effects of Nutrition on Infant and Maternal Mortality and Other Vulnerable Groups in Special Developing Areas

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Introduction

One of the basic aims of health and medical sciences throughout the centuries have been to prevent early deaths and thereby increase the life-span of human beings. In order to reach this objective, intensive work has been done on the causes of death and mortality rates. Especially, the prevention of diseases and death of early age and vulnerable groups has been the subject of interest. Nowadays causes of death and mortality rates are accepted as good indicators of the effectiveness of public health services in many countries of the world.[1]

Malnutrition significantly increases the rates of maternal, infant, toddler and other vulnerable groups mortality. Since it is considered to have an indirect role, malnutrition is neglected in many cases. However, nutritional deficiencies are known to be the main causes of latest diseases ending with death. In developing countries, bronchopneumonia and gastrointestinal disturbances (diarrhea) are among the main recorded causes of death. Many individuals with nutritional deficiency suffer from such diseases, which account for increased mortality. On the other hand, people receiving a balanced diet and sufficient food intake build up a considerable resistance to such diseases.[2, 3]

Death Rates and Causes of Death

Death Rates: The presence of a correlation between the state of nutrition and maternal, infant and toddler death rates have been shown by many investigations and surveys. Infant death rates are much higher

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in the countries of insufficient infant nutrition than those of developed countries.[1] Infant death rates in some developed and developing countries are compared in Table I. In particular, it is accepted that there is a significant correlation between insufficient feeding and the high infant mortality rate between the ages of 6-12 months. In some areas, even though environmental factors and public health measures are at desired levels, the infant death rates do not show a decrease unless the nutritional status of the infants is adequate. The Department of Community Medicine of Hacettepe University in Turkey has been providing Etimesgut, a rural district of 50,000 inhabitants, with modern public health services for the last decade. In 1967, the infant mortality rate in this district was 142 per thousand live-births. This district received preventive and curative services (MCH works, vaccination, child-care, periodical check-up as well as environmental sanitation) in addition to public health education and family planning activites provided every year on an increasing capacity. In spite of all these services mentioned above, the infant mortality rate could only be lowered to 94.5 per thousand in 1974.[4,5] The nutritional status of people, particularly those of infant, toddlers and pregnant mothers in this district is not satisfactory. Table II and Table III show the nutritional status and food consumption levels of people in this district.[6,7] It is estimated that the death rates could further be reduced to 40 per thousand in this district, if services are provided for a better understanding and application of sufficient nutrition for pregnant mothers as well as infants.[8]

TABLE I

INFANT, TODDLER (1-4 AGE GROUPS) AND MATERNAL MORTALITY RATES IN SOME DEVELOPED AND DEVELOPING COUNTRIES (1968)

Countries	Mortality Rates per 1000 live birth		
	Infants	Toddler	Maternal
Netherlands	12.6	3.51	0.26
Sweden	13.0	2.29	0.09
United Kingdom	18.3	3.27	0.24
France	20.4	3.46	0.32
Italy	32.7	4.59	0.70
Spain	32.0	3.74	0.44
Greece	34.4	4.16	0.5
Yugoslavia	58.6	10.14	1.0
Bulgaria	28.3	4.38	0.23
Egypt. Arab. Rep.	131.3	119.4	0.90
Srilanka (Ceylon)	50.3	50.3	2.20
Turkey	153.0	44.5	1.3
(Etimesgut district)	111.0	5.9	0.55

TABLE II

FOOD CONSUMPTION LEVEL OF PEOPLE LIVING IN ETİMESGUT - ANKARA

Food	Percent of Calories	
	1966 (Sept-Oct.)	1972 (July)
Cereals	62.1	65.1
Sweets and sugars	5.6	4.8
Pulses	1.6	0.7
Meat and Poultry	4.1	2.4
Milk and dairy products	4.8	8.3
Fresh vegetables	3.4	4.3
Fruit (including melon)	4.4	1.3
Fats and oils	13.0	11.7
Others	1.0	1.5

TABLE III

CALORIE AND PROTEIN CONSUMPTION LEVEL OF PEOPLE LIVING IN ETİMESGUT - ANKARA

Daily Energy and Protein Consumption Per Consumer Unit	Percentage of Families	
	1966 (Sept-Oct.)	1972 (July)
Over 3000 Cal	54.0	43.0
2501 – 3000 "	21.0	23.0
2001 – 2500 "	18.0	23.0
Less than 2000 Cal	7.0	11.0
Less than 50 g. Total Protein	5.0	7.0
Less than 10 g. Animal Protein	36.0	39.0

Fişek[8] studied the mortality rates of certain age groups in Turkey and Sweden. His results are presented in Figure 1. The mortality rate of the 0-4 years age group in Turkey is 15 times higher than that of Sweden. However, this difference drops to 2.7 times for the 15 years age group. Thereafter, the difference increases significantly for women in Turkey, but it levels off after the 45-50 years age group in male and female populations of both countires. The big difference for infants and pre-school age is no doubt due to insufficient nutrition, particularly PCM and rickets; and the difference for women in the child bearing age is due to protein malnutrition, anemia and obesity.

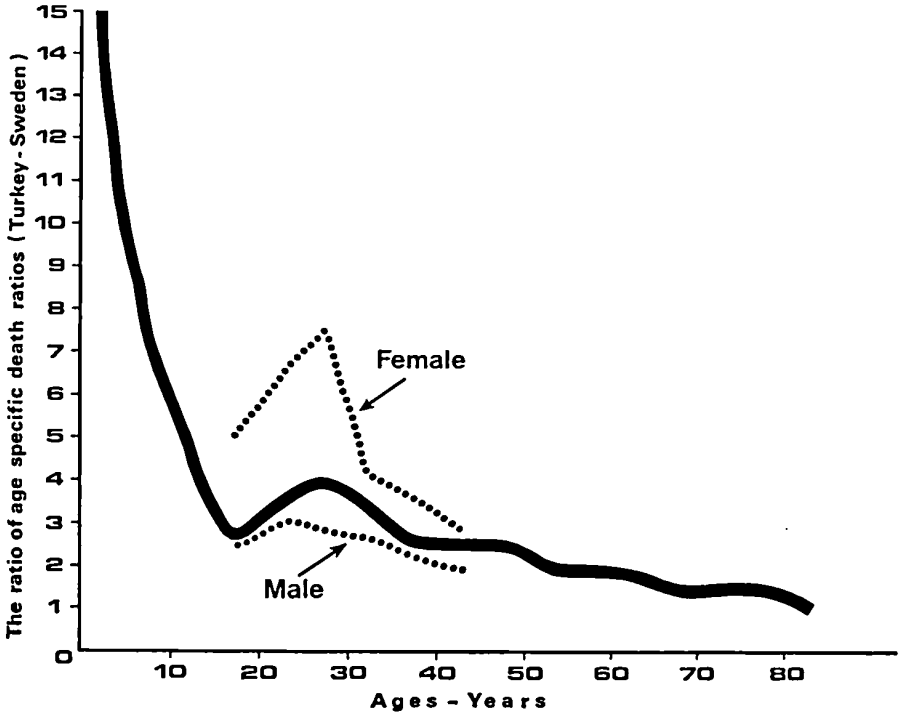

Figure 1
Comparison of age specific death ratios of Turkey and Sweden.

Growth and development and the nutritional status of infants who died in the 1-12 months age bracket, and infants who lived up to 12 months, were investigated through a survey conducted by the Department of Community Medicine in the Etimesgut district of Ankara. The results are given in Table IV. Two groups (dead and surviving infants) have been matched with regards to several aspects which may affect their nutritional status. About 17.6 percent of infants surviving 12 months showed growth retardation, whereas infants who died within 12 months had a growth retardation of 33.3 percent. Retarded growth and development ratio among the infants who died is at its peak in the 6-12 months age bracket. Although retardation among the surviving infants of the 1-6 and 7-12 months bracket was 14.1 and 23.4 percent respectively, the figures for the dead infants in the same age bracket were 27.1 and 56.5 percent. These findings indicate that malnutrition among infants who died between 7-12 months was more prevalent.

The nutritional status of pregnant mothers affects the infant birth-weight and maternal mortality rate.[9] Premature birth ratios at Ankara Etimesgut Hospital was calculated as 6.5 percent of total live-births in 1973-1975 inclusive. Maternal mortality rate is closely related to the nutritional status of the mother before and during pregnancy. Maternal mortality rates are particularly affected by rickets which leads to pelvic deformations during the childhood of mother and by nutritional anemias and obesity before and or during pregnancy.

The maternal mortality rate in the Etimesgut district of Ankara is 0.65 per 1000 live-births. This ratio in Turkish cities and towns is 1.3 per 1000 live-births. About 11 % of mothers who delivered in maternity hospitals in Ankara needed intervention for birth. Pelvic deformations are considered as one of the main factors for intervention.

Causes of Mortality

In developing countries, the majority of children suffering from malnutrition do not generally receive proper medical care. These children are brought to medical centers only when they suffer from respiratory or gastro-intestinal system disturbances in addition to apparent malnutrition. In such cases, malnutrition, the main reason for death, is not recorded as the cause of death, but the secondary diseases leading to death are recorded. On the other hand, there are few medical centers capable of pointing out the main or associated causes of death in many developing countries.

In the Etimesgut district of Ankara the causes of death have been recorded with proper care in the last ten years. Table V depicts 5 main causes of mortality among the 0, 1-4 and 5-14 age brackets in 1974 in this district.[5]

In developing countries, malnutrition begins to rise among children after the first six months, and reaches its highest level during 2-3 years of age and after the third year it starts to decline. In the Etimesgut district of Ankara, the malnutrition ratio among children is as follows.[9, 10]

Age (Months)	Malnutrition (% of children)
0–16	13
7–12	18
13–25	39
25–36	38
37–60	22

As seen in Tables IV, V malnutrition in this district and death rates due to enteric-diarrhea and bronchopneumonia which could be related to malnutrition, shows an increasing parallel to the increased morbidity rate due to malnutrition.

TABLE IV

GROWTH AND DEVELOPMENT STATUS OF DEAD AND SURVIVING INFANTS IN ETIMESGUT, ANKARA (1972 - 1975)*

Age Groups (Months)	Number of Dead Infants	Status of Growth				Number of Surviving Infants	Status of Growth			
		Normal		Retarded			Normal		Retarded	
		N	%	N	%		N	%	N	%
1 – 6	85	62	72.9	23	27.1	78	67	85.9	11	14.1
7 – 12	23	10	43.5	13	46.5	47	36	76.6	11	23.4
1 – 12	108	72	66.7	36	33.3	125	103	82.4	22	17.6

* Dead and surviving infants are matched with regard to various factors affecting growth and development.

TABLE V

THE MOST IMPORTANT CAUSES OF DEATH OF VULNERABLE GROUPS IN ETIMESGUT, ANKARA (1974)

Order of Importance	Age Groups and Code Number of Diseases					
	0 – 12 months		13 – 60 months		5 – 15 years	
	N	%	N	%	N	%
I. (First)	64 (A.92)	37.0	11 (A.92)	36.7	4 (AE.138)	22.2
II. (Second)	31 (A.135)	17.9	5 (A.65)	16.7	4 (AE.145)	11.1
III. (Third)	20 (A. 5)	11.6	4 (AE.138)	13.3	1 (A.65)	5.6
IV. (Fourth)	15 (A.65)	8.7	3 (A. 5)	10.0	1 (A. 5)	5.6
V. (Fifth)	6 (A.130)	3.5	3 (A.25)	10.0	1 (A.111)	5.6
Total Number of Deaths	173		30		18	

Code number of diseases:

A.92 = Bronchopneumonia
A.130 = All other congenital anomalies
A.135 = All causes of perinatal mortality
A.5 = Gastroenteritis and other diarrheal diseases
A.65 = Avitaminosis and other nutritional deficiency
AE.138 = Mother vehicle accidents
A.25 = Measles
AE.145 = Accidents
A.111 = Other diseases of genito-urinary system

As a factor among the causes of mortality, how much is malnutrition responsible for maternal and other vulnerable groups mortality, has to be investigated. Determining the share of rickets causing pelvic deformities, nutritional anemias and obesity and emphasizing the importance of taking preventive measures is particularly necessary.

Conclusion

Malnutrition has an important place among the causes of death in infant, toddler, and other vulnerable groups. In developing countries, there is an increase in the prevalance rate of malnutrition. Deaths are causing huge economic losses and lowering the development rates of these countries. The number of births are high in countries where infant and toddler mortality is high. Birth rates show a decrease as the infant and toddler mortality rates decline. Keeping infant and maternal mortality rates low will help family planning services to be successful. Proper infant, toddler and mother nutrition will influence population growth in a positive direction. A good balance between food production and population growth could be brought about in this way. The problem of malnutrition could be overcome more easily with this balance and the aid of other necessary measures.

There is no doubt that almost all public health personnel and administrators believe and agree that malnutrition affects and in creases the rate of mortality of vulnerable groups. But this fact should be referred to at every opportunity in order to make the public more aware of the problem.

Students of medicine, agriculture, home economics, teacher training and economics should given such information during their formal education. Politicians, administrators, policy makers, educators, economists and journalists should also have these facts brought to their attention.

From the public health point of view, the most important health problem to which priority should be given is determined by the following criteria:

- The problem that is most prevalant in the country,
- The problem which causes a high mortality rate and results in disability,
- The problem that is preventable,
- The problem that is curable.

According to these criteria malnutriton is one of the most important health problems in many countries. Therefore in national development plans for formulation of "food and nutrition policy" should be considered seriously. It should be remembered that the first and most important human right is to live until and not to die before the time appointed by God.

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