CHILD MORTALITY IN THE HATAY

Rezan Şahinkaya, Ph.D.* and Nermin Kalaycıoğlu, M.D.**

The Hatay region, which was returned to Turkey after the plebiscite of 1938, is favored with a mild climate and fertile soil and should, accordingly, have a higher standard of living than some other parts of the country. Unfortunately this is not the case. Living standards are quite low in the Hatay as a whole and most particularly so in the small villages.

Using literacy as one index of the standard of living it was found in a recent survey that the literacy level for people above school age in the Hatay was below the general rate for Turkey as a whole. In 1945 the rate for the Hatay was 21.6 per cent and for Turkey as a whole (63 provinces) it was 30.2 per cent. By 1950 the rate had risen to 25.7 per cent in the Hatay and to 34.6 per cent in the country as a whole. In both years, the number of literate people above school age was higher in 38 out of 62 provinces than in the Hatay (i.e. in 61.3 per cent) and lower in 24 (38.7 per cent) putting the Hatay well below the median for the country.[1] According to international standards[2] the level of education and the number of literate people are important criteria in determining the living level of a region. These figures gain additional importance with regard to the Hatay since, except for child mortality figures, they are the only statistics obtainable.

Census figures for Turkey reveal that the population has more than doubled in one generation. After the war of independence in 1922 the population was 13,600,000. By the time of the 1960 census it had risen to 29,000,000. This rate of increase is one of the highest in the world and it is all the more striking in view of the unfortunate fact that Turkey also has one of the world's highest infant mortality rates. Comparative figures for mortality in the first year of life show that the rate, according to the 1957 WHO epidemiological and vital statistics report, was 20 per 1000 live births in New Zealand, 21/1000 in Australia, 26/1000 in the United States, 31/1000 in

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* Assistant Professor, Department of Home Economics, University of Ankara.
** Pediatrician, Former head of the Antakya Lying-in Hospital.

Canada, 34/1000 in France and 117/1000 in Chile.[3] In Turkey the rate has been variously estimated as 206/1000[4] or 288/1000.[5]

The situation in the Hatay reflects the general picture for the country at large. An earlier study on child mortality[6] placed the death rate for children from 0 - 12 at 326/1000 for Turkey as a whole and at 300 - 350/1000 for the region which includes the Hatay.

Since there is such a dearth of statistical information in Turkey it was felt that an investigation of the kind undertaken by the authors in the Hatay would yield valuable results. Although the present study can only be considered a preliminary report on a subject of vast dimensions it is hoped that the material collected and the conclusions reached will prove useful in attacking the problem of child mortality in Turkey. A concerted drive, with the backing of both public and private institutions, will be needed to reduce the rate of infant and child mortality in Turkey from its present high levels.

Materials and Methods

Since there is no dependable data on the number of live births and child deaths in Turkey the material presented here had to be collected personally by the authors. As in most other parts of Turkey, it is a known fact that the peasants, who form the majority of the population in the Hatay, do not report the events of birth or death adequately. Many village births are recorded only at the time of marriage or military service and those who die before these occasions sometimes do so without ever having been reported alive. As a result their deaths are not recorded either.

Part of the material on which this study is based was acquired from mothers at the lying - in hospital in Antakya during 1958 and 1959 (with a follow - up in 1960). However, since many of these mothers came to the hospital only for the birth of their first children, we were not able to calculate the total number of live births, or the total number of living or dead children, for these mothers from the material in hand. Accordingly we established two groups in the study : one consisting of mothers who had reached the menopause, the other of younger mothers who were interviewed as to the number of live babies born during the three - year interval from 1958 - 1960 and the number of children who died during the same period. In choosing the group of mothers past the menopause it was felt essential to include only those whose husbands were alive (or who had been alive until such time as the mother reached the menopause) and whose marriages had been recorded.

Special care was taken to separate the data obtained in the villages from that obtained in cities. Although differences in standard of living between city people and rural people are noted in all countries, these differences are particularly acute in a country like Turkey which is predominantly rural. One of the authors (R.Ş.) made repeated visits to Antakya and its surroundings in order to explore the social conditions in the area as it was felt that any picture of child mortality would be incomplete without this background.

The study was planned by both authors and in the elaboration of the material the statistical techniques developed by Snedecor[7] were used.

Results and Discussion

In table 1 it can be seen that 47.54 per cent of the babies born in villages are girls and 52.46 per cent are boys. This means that 110 boys are born for every 100 girls. Analysis of this situation reveals that with a chi square value of 17.368 and one degree of freedom the P (probability) factor is less than one per cent,* leading us to believe that this variation from the 1 : 1 ratio of male to female births is statistically significant.

Among city people, however, 48.85 per cent of the babies born are girls and 51.15 per cent boys. Here, with $x^2 = 3.748$ and one degree of freedom, the P factor is greater than 5 per cent so that the deviation from the 1 : 1 ratio is not significant.

TABLE 1
DISTRIBUTION OF BIRTHS IN THE HATAY BY SEX

	VILLAGES		CITIES	
	Number	%	Number	%
Girls	3430	47.54	3505	48.85
Boys	3785	52.46	3670	51.15
Total	7215	100.00	7175	100.00

World literature indicates that on the average 105 - 106 boys are born for every 100 girls. The sex distribution however varies widely in different countries and among different groups and depends on many factors including the age of the mother. In one study it was

* A P factor of less than one per cent means that it is probable that such a variation would occur as the result of chance less than once in 100 times.

found that mothers between the ages of 18 and 22 produced 120 boys to every 100 girls whereas mothers between the ages of 38 and 42 produced only 90 boys to every 100 girls. A 1948 study of upper class American and German families showed that the preponderance of boys over girls had risen during the last 30 years to between 120 and 125 to 100.[8] At the other end of the scale, the rate in India is reported to be only 98.7 boys to every 100 girls.[9] Despite such wide variations the worldwide picture is one of a general excess of male over female births and in this respect our findings in the Hatay agree. However, should the theory that more girls are born to mothers whose standard of living is low during the prenatal period be substantiated, it would then appear that the standard of living in the villages of the Hatay is higher than that in the cities since the village mothers have a higher rate of male births. Since we know that this is not the case in the Hatay, we feel that this is a point that should be investigated further on a larger scale and with more material.

Turning to the number of confinements reported for village mothers and city mothers in the Hatay we find that in the group of mothers who had reached the menopause the results show a statistically significant difference between village and city (Table 2.).

TABLE 2

AVERAGE NUMBER OF CONFINEMENTS PER MOTHER (Live Births Only)

	M ± m	S	V	Max	Min	N
Villages	7.804±0.173	2.609	33.437	19.0	1.0	225
Cities	6.800±0.192	2.889	42.494	14.0	1.0	225

Among village mothers the confinements resulting in live births averaged 1.004 more than among city mothers. Subjecting this difference to statistical analysis (the t test) we find that $t = 3.876$ which with 448 degrees of freedom indicates a probability of less than 1 per cent and leads us to believe that the difference between the averages of the two groups is statistically significant.

TABLE 3

AVERAGE NUMBER OF CHILDREN PER MOTHER

	M ± m	S	V	Max	Min	N
Villages	7.928±0.199	2.986	37.667	32.0	2.0	225
Cities	6.893±0.190	2.860	41.490	16.0	1.0	225

Here the difference between village and city mothers is found to be 1.035 in favor of the village mothers. With a t value of 3.689 and 448 degrees of freedom, the P value is found to be less than 1 per cent showing that here again we have a statistically significant difference.

TABLE 4

INCIDENCE OF TWINS

	Confinements	Children Born	Twins (Per Cent)
Villages	1756	1784	1.594
Cities	1530	1551	1.372

It is obvious from table 4 that there were a number of multiple births among the village mothers since 28 more children were born to these mothers than there were confinements recorded. If we assume for the sake of argument that all of these 28 were twin births, then 1 in every 63 deliveries resulted in a twin birth. Using Hellin's formula for calculating the probable number of triplets in a given population from the incidence of twin births ($63 \times 63 = 3969$) we see that it is highly unlikely that there would be any triplets at all in our sample since only 1 in every 3969 births would normally be expected to be triplets. (The figure 3969 is the smallest figure for this group in which there would be a probability of triplets since if there were less than 28 sets of twins in the group the incidence would be less than 1 in 63 and the number of births in which a set of triplets could be expected would thus have to be higher.) Accordingly with only a slight margin for error, we feel justified in calculating the incidence of twins from the excess of births over confinements*.

By the same reasoning we have arrived at a rate of 1 in every 73 deliveries for twin births among the city mothers in our group. The incidence of twins is thus calculated to be 1.594 per cent of all births for village mothers and 1.372 per cent for city mothers. Although the incidence of twin births varies from people to people and is governed by many hereditary and environmental factors, the classical figure for the world as a whole is a one to two per cent incidence of twins. Our figures therefore are well within the expected range.

* In all our research we have encountered only one set of triplets.

TABLE 5

MOTHERS GROUPED BY NUMBER OF CHILDREN

	Villages		Cities	
	N	%	N	%
Mothers with 1-2 children	1	0.44	19	8.44
» » 3-5 »	36	16.00	53	23.56
» » 6-10 »	161	71.56	134	59.56
» » 11-15 »	25	11.11	18	8.00
» » over 15 »	2	0.89	1	0.44
TOTAL	225	100.00	225	100.00

In some of the works on child mortality[6] figures are based on the number of children per family. In our study, however, we have based our figures on the number of children per mother rather than per family to eliminate any confusion that might arise from cases in which one man had had more than one wife. Table 5 presents a breakdown of the number of children born to the village and city women in our study who had passed the menopause. The figures show that in both village and city the majority of women had from 6 to 10 children.

TABLE 6

AVERAGE NUMBER OF CHILD DEATHS PER MOTHER
(Excluding mothers who lost no children)

	M ± m	S	V	Max	Min	N
Villages	3.090±0.197	2.621	84.799	28.0	1.0	176
Cities	2.217±0.117	2.217	65.206	8.0	1.0	152

Table 6 reveals that 176 out of 225 village mothers past the menopause had lost one or more children between the ages of 0-15; only 21.78 per cent of all the village mothers (49 out of 225 mothers) had lost no children. In the cities the situation was somewhat better since 32.44 per cent, or 73 out of 225 mothers, succeeded in rearing all their children. The average number of child deaths per mother was 3.090 in the villages, 2.217 in the cities. The difference between these figures, 0.873, was found to be statistically significant with a probability of less than one per cent ($t = 3.657$, 326 degrees of freedom).

Table 6 shows the average number of child deaths per mother in the group that had lost children. Table 7, on the other hand, shows the average number of child deaths for the group as a whole including those mothers who had not lost children. Here again the rate in the cities is better than that in the villages, the difference between the two groups being 0.920 which with a t value of 4.479 and 448 degrees of freedom gives us a statistically significant P value of less than one per cent.

TABLE 7

AVERAGE NUMBER OF CHILD DEATHS PER MOTHER
(Calculated for the group as a whole)

	M ± m	S	V	Max	Min	N
Cities	2.418 ± 0.176	2.646	109.429	28.00	0.00	225
Villages	1.498 ± 0.105	1.573	105.355	8.00	0.00	225

In table 8 we present the figures from which we can draw the child mortality rate for the Hatay.

TABLE 8

CHILD MORTALITY

	Births	Deaths	Deaths / 1000 Births
Villages	1784	544	304.9/1000
Cities	1551	337	217.3/1000

The child mortality rate, calculated on the basis of deaths as a percentage of live births, was higher in the villages than in the cities and again the difference was sufficiently great to be of statistical importance ($x^2 = 23.873$ with one degree of freedom gives a probability of less than one per cent).

In a study of child mortality in 25 Turkish provinces, made by Dr. Niyazi Erzin,[6] the rate for all the provinces taken as a group was found to be 32.6 per cent and the Hatay was included in the group which ranged from 30 to 35 per cent. If we assume that the village population of the Hatay represents 70 per cent of the total population, then the rate for the Hatay as a whole in our study becomes 27.8 per cent or, in other words, 278 child deaths per 1000 live births. It must be kept in mind that our statistics are based on the group of mothers who had reached the menopause and thus refer to the generation of children preceding the present one by some 10 to 15 years.

TABLE 9

CHILD DEATHS GROUPED BY AGE AT DEATH

	Age of children at death						
	0—1	1—2	2—3	3—4	4—5	5—6	6—7
Villages %	52.58	20.59	9.75	3.86	3.86	2.02	2.21
Cities %	55.49	18.10	7.12	3.86	3.27	3.27	1.78

	7—8	8—9	9—10	10—11	11—12	12—13	13—14	14—15
Villages %	1.47	0.18	1.10	0.37	1.47	0.18	0.18	0.18
Cities %	1.19	1.48	1.78	0.00	0.89	0.59	0.59	0.59

The distribution of child deaths by age groups is set forth in table 9. In both villages and cities more than half of all child deaths occur in the first year of life. The mortality rate during this first year is 160/1000 live births in villages, 120/1000 in cities and 148/1000 for the region as a whole (on the basis of village population representing 70 per cent of the total). A further 92/1000 village children die between the ages of 1 and 3, and another 53/1000 between 3 and 15; the comparable city figures being 55/1000 between 1 and 3 years of age, 42/1000 between 3 and 15.

As noted above, these figures reflect conditions of 10 - 15 years ago since they were obtained from the group of mothers who had already reached the menopause. Since conditions in Turkey are changing rapidly we felt that it would be wise to contrast this group with a group of younger mothers in order to get some indication of the current rate of child mortality. Accordingly in 1960 a group of 207 city and 267 village housewives were questioned as to the number of children born to them during the past three years and the number of children who had died during the same period. The results are set forth in tables 10, 11 and 12.

In table 12 we see that 92 village children died during the 1958 - 60 period under discussion. During the same three years, 395 children were born giving us a child mortality rate for village children of 233/1000 live births. Among city children, 42 died and 304 were born giving a mortality rate of 138/1000. Applying the chi square test we find that the difference between the village rate and the city rate is statistically significant ($x^2 = 7.578$, 1 d.f., P = less than 1 per cent).

TABLE 10

MOTHERS GROUPED BY YEARS OF MARRIAGE

	Villages		Cities	
Years of Marriage	Number of Mothers	%	Number of Mothers	%
1—4	49	18	44	21
5—8	62	23	63	31
9—12	62	23	50	24
13—16	52	20	29	14
17—20	20	8	8	4
21—24	16	6	11	5
25—27	6	2	2	1
	267	100	207	100

TABLE 11

AGE OF MOTHERS

	Villages		Cities	
Age Group	Number of Mothers	%	Number of Mothers	%
16—19	15	6	10	5
20—23	47	18	54	26
24—27	71	26	53	26
28—31	56	21	42	20
32—35	44	16	27	13
36—39	21	8	18	9
40—43	13	5	3	1
TOTAL	267	100	207	100

TABLE 12

CHILD DEATHS IN THE HATAY
1958 — 1960

	Number of Children Born	Death							
		Age 0—1		Age 1—2		Age 2—15		General	
		No.	%	No.	%	No.	%	No.	%
Villages	395	58	15	22	6	12	3	92	24
Cities	304	36	11	4	2	2	1	42	14

According to the last statistical bulletin the population of the Hatay is now 363,631 of which 129,341 are city dwellers and 234,290 are villagers. This means that the present proportion of village people to the total population has dropped to 65 per cent and, taking this into account, the present child mortality rate for the Hatay can be estimated as 204/1000. This contrasts favorably with the rate of 278/1000 which we arrived at for the preceding generation.

Most of the child deaths in this group (1958 - 60) occur during the first year of life in both villages and cities. Sixty - three per cent of all child deaths in villages occur during the first year and 86 per cent of child deaths in cities. Between the ages of 1 and 2 we find 24 per cent of the mortality in villages and 10 per cent in cities, and over the age of 2 the figures drop to 13 per cent for villages and 4 per cent for cities.

Figured on the basis of child deaths per 1000 live births we find that the infant mortality rate in the villages of the Hatay is 147/1000 and in cities 118/1000. Estimating village population at 65 per cent of the total this gives an overall rate of 137/1000. Compared with the rate of 148/1000 which we arrived at for the preceding generation this shows a measure of improvement, however, there is little room for encouragement since the rate still remains far in excess of that in more highly developed countries.

Turning to the death rate among children past the age of one, we see that there has been real improvement as shown by the considerable drop in the death rate of children beyond the crucial first year. The reasons for this may be at least in part the progress that medicine has made in general combined with an increased confidence in doctors on the part of the people. When we consider, however, that the greater part of this child mortality is caused either directly or indirectly by malnutrition we realize that an attack on this problem cannot be separated from the overall question of improving the standard of living.

Summary

1. In the villages of the Hatay the ratio of boys to girls was found to be 110 : 100 in a group of 7215 recorded births. This departure from the 1 : 1 ratio is considered to be statistically significant.

2. In the cities the preponderance of boys was found to be 105 : 100 in a group of 7175 births. This was not considered to be of statistical significance.

3. In the villages, mothers who lived with their husbands until reaching the menopause had an average of 7.804 ± 0.173 confinements resulting in live births and produced on the average 7.928 ± 0.199 live babies. Nearly three - quarters of these women (71.56 per cent) had from 6 - 10 children, 0.44 per cent had from 1 - 2 and 0.89 per cent had more than 15.

4. In cities married women living with their husbands until the time of menopause averaged 6.800 ± 0.192 confinements resulting in live births and produced an average of 6.893 ± 0.190 live babies. Of these mothers 59.56 per cent had from 6 - 10 children, 8.44 per cent had 1 - 2 and 0.44 per cent had more than 15.

5. The case of one woman was found to be of interest and worth including in the literature since she was a «maximal» case with a record of 19 confinements and 32 live births (13 of which were twins). Unfortunately 28 out of the 32 died before the age of one.

6. The incidence of twins in villages was found to be 1.594 per cent and in cities 1.372 per cent. Both these rates are in accord with world literature.

7. Only 21.78 per cent of village mothers and 32.44 per cent of city mothers lost no children. Among the mothers in the group who had lost children, child deaths averaged 3.090 ± 0.197 per mother in the villages and 2.217 ± 0.117 per city mother (based on children dying before the age of 15.).

8. Child mortality in general for the Hatay was found to be 305/1000 live births in the villages and 217/1000 in the cities. More than half of these deaths, in both villages and cities, occurred before the child reached the age of one year. The rate for infant mortality in the villages was found to be 160/1000 live births and in the cities 120/1000. (These figures reflect the conditions of some 10 - 15 years ago since they are based on mothers who had already reached the menopause at the time of the study).

9. A smaller survey in 1960 indicated that there had been some improvement with regard to child mortality. In this study the rate of child deaths was found to be 233/1000 in the villages and 138/1000 in the cities which was prorated on the basis of village population equalling 65 per cent of the total population of the region and a general rate of 204/1000 was arrived at. In the villages, 63

per cent of the deaths occurred in the 0 - 1 year age bracket and in cities 86 per cent were found in this age group. The infant mortality rate was thus found to be 147/1000 live births in the villages, 118/1000 in the cities, prorated for a general rate of 137/1000.

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