ASIAN POPULATION STUDIES SERIES
NO. 76

MORTALITY AND HEALTH ISSUES

The Trends and Patterns of Mortality and Health in the Republic of Korea

by
Kwon Tai-Hwan

Report of a study undertaken in the Republic of Korea
under the project on
Analysis of Trends and Patterns of Mortality
in the ESCAP region

ECONOMIC AND SOCIAL COMMISSION FOR ASIA AND THE PACIFIC
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PREFACE

The ESCAP secretariat with financial support from the United Nations Fund for Population Activities, initiated in 1984 the project "Analysis of trends and patterns of mortality in the ESCAP region". The first expert meeting under the project held at Bangkok in November 1984. Six researchers from the countries selected for indepth study (Bangladesh, China, Indonesia, Pakistan, Republic of Korea and Thailand) and several scholars from various research institutions and international agencies participated. The meeting reviewed the mortality situation in various countries of the region and prepared and adopted a study design for conducting the country studies. It was agreed that each country should follow a common design, which could be supplemented where appropriate with additional material, and that the basic source of information should be national compilations of data.

To achieve a reasonable degree of uniformity in the presentation, the country agreed to adopt, to the extent possible, the following structure for the study reports:

1. Country background
2. Mortality trends, age and sex patterns
3. Differential mortality
4. Causes of death and major health problems
5. Economic development and mortality change
6. Nutrition and health
7. Health services
8. Development of health and population policies
9. Health and mortality prospects
10. Bibliography, references

A series of meetings thoroughly examined different parts of the reports and made suggestion for amendments as required. Professor Lado T. Ruzicka, of the Australian National University and Ms. Penelope Kane, representing the International Union for the Scientific Study of Population (IUSSP), provided valuable assistance for the improvement of the reports. The volumes (listed below) prepared under the project present rich sources of information concerning mortality and health issues of the participating countries:

Analysis of Mortality Trends and Patterns in Bangladesh (ST/ESCAP/444)	Ashraf Uddin Ahmed Institute of Statistical Research and Training Dhaka University
Mortality Patterns and Trends of Population in China (ST/ESCAP/447)	Liu Zheng Institute of Population Research People's University of China
Mortality Transition in Indonesia 1950-1980 (ST/ESCAP/448)	Budi Utomo and Meiwita B. Iskandar Faculty of Public Health University of Indonesia
Mortality Trends and Patterns in Pakistan (ST/ESCAP/457)	Mohammad Irfan Pakistan Institute of Development Economics
The Trends and Patterns of Mortality and Health in the Republic of Korea (ST/ESCAP/449)	Kwon Tai-Hwan Department of Sociology Seoul National University
Levels and Trends of Mortality in Thailand (ST/ESCAP/456)	Yaowarat Porapakkham Faculty of Public Health Mahidol University

The important findings of these studies and their detailed analysis from the regional perspective along with a set of recommendations, will be disseminated to and form the basis of discussion among health and social planners of the region in the Seminar on Mortality and Health Issues to be held at Beijing from 22 to 27 October 1986.

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I. COUNTRY PROFILE

1. LOCATION AND WEATHER

The Republic of Korea occupies the southern half of the Korean peninsula, situated at the far eastern part of the Asian continent. The peninsula, which is largely mountainous, separates the Yellow Sea on the west from the Sea of Japan on the east. On the south it is bounded by the Korea Strait and on the north the Democratic People's Republic of Korea shares its border with China and the USSR.

The Republic of Korea has a continental, monsoon climate which is characterized by four distinctive seasons and seasonally variable temperatures and winds. Summer is very warm and humid, while severe cold prevails during winter due to the influence of Siberian high pressure. In autumn and spring, the country has pleasant, beautiful weather. Total yearly precipitation is relatively high, 1,200 mm on the average. About 70 per cent of the total precipitation is concentrated in the three month period from late June through mid September with a rainy season of one month which usually starts in the last week of June.

2. POPULATION GROWTH AND DISTRIBUTION

The Republic of Korea is one of the most densely populated countries in the world. According to the census, there were 40,467,000 people in a land area of 99,117 square kilometres in 1985, a density of 408 people per square kilometre. Extreme population pressure is indicated when population density is calculated using only arable land as its basis: 1,878 persons live on a square kilometre of arable land

As shown in table I-1, Korea entered the initial stage of demographic transition in the 1920s owing to the adoption of new public health measures and the expansion of the western medical system. During the 35 years of the Japanese administration, the population of Korea increased at an annual rate of 1.05 per cent, from 17,427,000 in 1910 to 25,120,000 in 1944. The country also witnessed a large exodus of population to Manchuria and Japan during the period due partially to the deterioration of the agricultural economy. After 1945 the country was divided into two parts with separate political jurisdictions. Between 1945 and 1960 the Korean peninsula underwent a period of extreme turmoil in every aspect of life. The creation of two Koreas and the Korean conflict took place in these years, and the economy was almost completely destroyed. A typical population phenomena developed along with the changing political situation. With the liberation and division of the country, the Republic of Korea experienced historically unprecedented rapid population growth as a result of a heavy repatriation of Koreans from Japan and Manchuria and a large influx of refugees from the north (Kwon T-H, 1977: 176-180). During the Korean conflict, 1950-1953, the death rate rose sharply, but the loss of population was offset by a second surge of refugees from north to south. After the conflict, the country saw a baby boom during the period 1955-1960. In the early 1960s, the Republic of Korea entered the second phase of demographic transition, that is, the process of population restabilization with declining fertility, prompted by the initiation of a national family planning programme in 1962. As a result, the annual rate of population growth has declined continuously since 1960. For instance, the national growth rate was reduced from 2.8 to 1.5 per cent in the twenty year period between 1955-1960 and 1975-1980.

According to the 1925 census, only a marginal proportion of the population lived in twelve cities all across the country including what is now the Democratic People's Republic of Korea. Since then, the share of urban population has increased steadily. In 1944, the number of cities reached twenty-four and the proportion of urban population increased to 12.1 per cent. This urbanization process during the period of Japanese administration is largely explained by two factors, increasing population pressure in rural villages due to declining mortality and pressure for agricultural production (Kwon T-H, 1977:187-188). The 1949 census revealed that 17.1 per cent of the total population resided in fifteen cities in the southern half of the Korean peninsula. (Population information from the Democratic People's Republic of Korea since 1945 has rarely been divulged). By 1960, the number of cities has risen to twenty-seven and the proportion of urban population to 28 per cent. This rapid urban population growth during the period 1945-1960 is largely ascribed to the repatriation and refugee movement mentioned in the above.

The 1960s marked the Republic of Korea's take-off from a traditionally stagnant economy and society. With economic development and modernization, there was a mass migration from rural villages to big cities, particularly to Seoul. Since 1970, however, the stream of migration has been diversified, resulting in substantial population gains through migration to most cities. This trend of internal migration accounts for a major part of urban population growth after 1960. As is clear from table I-3, the contribution of migration to urban population growth was most noticeable during the period 1965-1970 and dwindled thereafter. Excluding the urban population growth due to a redefinition of the administrative status of areas and boundary

Table I-1. Population growth in Korea and the Republic of Korea, 1900-1985

			Annual rate (per 1000) of		
	Number (in 1000)	Density per Km	Natural growth	Migration	Total growth
A. For All Korea					
1900 (1 October)	17 082*				
1900-1910			2.0	–	2.0
1910 (1 October)	17 427*				
1910-1915			4.0	–1.4	2.6
1915 (1 October)	17 656*				
1915-1920			7.0	–2.3	4.7
1920 (1 October)	18 072*				
1920-1925			12.0	–1.8	10.2
1925 (1 October)	19 020	86.1			
1925-1930			18.7	–4.3	14.4
1930 (1 October)	20 438	92.5			
1930-1935			20.2	–3.6	16.6
1935 (1 October)	22 208	100.5			
1935-1940			20.6	–8.9	11.7
1940 (1 October)	23 547	101.1			
1940-1944			20.2	–2.2	18.0
1944 (1 May)	25 120	113.7			
B. For the Republic of Korea					
1945 (1 September)	16 136*				
1945-1949			18.9	41.9	60.8
1949 (1 May)	20 167	205.1			
	19 904*				
1945-1955			7.9	6.6	14.5
1955 (1 September)	21 502	218.4			
1955-1960			28.4	–	28.4
1960 (1 December)	24 961*	253.6			
1960-1966			27.4	–	27.4
1966 (1 October)	29 160	296.1			
1966-1970			18.8	–	18.8
1970 (1 October)	31 435	319.2			
1970-1975			20.5	–0.9	19.6
1975 (1 October)	34 679	356.8			
1975-1980			15.9	–0.9	15.0
1980 (1 November)	37 436	384.8			
1980-1985			16.7	–0.9	15.6
1985 (1 November)	40 467	408.3			

Sources: GGK (A-1925 to 1944); NBOS (A-1949 to 1980); Kwon T-H and others (1975: 7); NBOS (1986a).

* Estimated by the author. The figures for 1900-1920 are calculated based on the results of 1925 and 1930 censuses and the observed trend of population in the late Chosun Dynasty. The second figure for 1949 is the population adjusted for the 1955 census boundary. The 1960 estimate is for Koreans only.

Table 1-2. Number and population of cities, 1925-1985

	No. of cities	Population (in 1000)	Percentage of city population
A. All Korea			
1925	12	608	3.2
1930	14	889	4.4
1935	17	1 245	5.6
1940	20	2 377	10.1
1944	24	3 038	12.1
B. For the Republic of Korea			
1945[a]	15	2 082	12.9
1949	15	3 458	17.1
1955	25	5 263	24.5
1960[b]	27	6 997	28.0
1966	32	9 780	33.5
1970	32	12 929	41.1
1975	35	16 770	48.4
1980	40	21 409	57.2
1985	50	26 458	65.4

Sources: Same as table I-1.

[a] Estimated by the author; [b] Foreigners included.

Table I-3. Decomposition of urban population growth, 1955-1980

	Total growth (in 1000)	Total growth[a] (per cent)	Per cent growth due to		
			Migration[b]	Natural growth	Boundary change
1955-1960	1 710	24.4	9.3	11.4	3.7
1960-1965	2 338	26.9	11.1	7.6	8.2
1965-1970	3 594	27.8	21.0	6.8	–
1970-1975	3 841	22.9	11.8	8.7	2.4
1975-1980	4 554	21.4	11.8	7.6	2.0

[a] Populations at the end of each period are used as denominator.

[b] Births occurred to movers after migration are included.

Sources: NBOS (A-1955 to 1980); Kwon T-H (A-1975, A-1978 and A-1983).

changes of cities, the share of natural urban population growth has gained more importance in recent years.

Individual city characteristics have also changed parallel with the rapid urbanization which has occurred since 1960. Large cities have grown into metropolises or megalopolises. Most 'eups' (township areas) which were rightly classified as rural areas at the end of the 1960s, began to show more urban than rural characteristics (ESCAP, 1980:6). Disregarding the administrative definition of cities or urban areas, we may conclude that about 50 per cent of the Korean population was living in urban areas by the end of the 1960s. The rapidity of urbanization in terms of population growth and concentration in the 1960s is clearly shown by table I-4 which presents the share of population by population size of an administrative area. The table clearly demonstrates that larger areas have increased their share of population more than smaller ones. During the 1970s, satellite cities around Seoul and new industrial cities showed the most marked growth. In sum, the Republic of Korea has been reshaped completely during the last 25 years; its pastoral atmosphere of the early 1960s was entirely replaced by crowded disorderly urban scenes. According to the 1985 census, 65 per cent of the population lives in fifty cities and the urban population is expected to reach 75 per cent if 'eup' (township) areas are included as urban regions.

The age-sex composition of the Korean population has been affected significantly by the population phenomena described above. The major changes since 1960 include continuous proportional declines in the population aged 0-9 due to rapid drops in fertility, an increasing proportion of aged population, though minor, due to a continuous decline in mortality and fertility, and proportionate increases in the population at ages 15-29 during the period 1960-1975 and at ages 20-34 during 1975-1980 reflecting the age shift of the post Korean conflict baby boom generation and the demographic trends since 1960. The most distinctive changes in the age-sex composition can be seen when the urban and rural populations are examined separately. Because of migration selectivity, which was characterized by concentration in adolescent and young adult age groups, rural area has

Table I-4. Rate of population growth for Metropolitan, city, town and county areas, 1960-1980

Population as of 1975	Annual intercensal rate (per cent)			
	1960-1966[a]	1966-1970[a]	1970-1975[b]	1975-1980[b]
Seoul (6,889,000)	6.53	9.37	4.37	3.82
Busan (2,454,000)	2.90	6.85	5.32	4.98
Daegu (1,311,000)	5.10	6.12	3.82	3.98
Shis (cities)				
500,000-999,999	5.18	5.20	4.06	4.97
100,000-499,999	3.01	4.85	6.92	5.42
Other Shis	2.80	3.02	2.68	2.56
Eups (towns)	2.03	2.01	1.0	
Myuns (sub-counties)	1.47	–1.69	–0.8	–1.77[c]

Sources: Yu E-Y (1978: 75): NBOS (A-1960 to 1980).

[a] For 1970 census boundaries.

[b] For 1975 census boundaries.

[c] For eups and myuns.

Table I-5. Age sex composition for urban and rural areas, 1960, 1970 and 1980

(in percentage)

	Whole country			Urban area			Rural area		
	Total	Male	Female	Total	Male	Female	Total	Male	Female
A. 1960*									
0-14	42.8	44.2	41.4	41.4	42.7	40.1	43.3	44.8	41.9
15-29	25.6	25.7	25.5	28.2	27.6	28.9	24.6	24.9	24.2
30-44	16.2	15.7	16.7	17.9	18.0	17.8	15.5	14.8	16.2
45-64	12.1	11.7	12.5	10.2	10.2	10.3	12.8	12.3	13.3
65+	3.3	2.7	3.9	2.2	1.5	2.9	3.8	3.2	4.4
B. 1970									
0-14	42.1	43.4	40.8	37.9	39.1	36.7	45.1	46.4	43.7
15-29	24.8	25.2	24.6	31.1	30.6	31.6	20.5	21.4	19.7
30-44	17.6	17.2	17.9	18.8	19.1	18.5	16.7	15.9	17.4
45-64	12.2	11.7	12.7	10.1	9.8	10.4	13.6	13.0	14.2
65+	3.4	2.5	4.0	2.1	1.4	2.8	4.2	3.3	5.0
C. 1980									
0-14	33.8	34.9	32.8	32.4	33.8	31.1	35.7	36.3	35.0
15-29	30.4	30.9	29.9	34.0	33.4	34.6	25.6	27.6	23.5
30-44	18.4	18.7	18.1	19.9	20.6	19.2	16.3	16.1	16.5
45-64	13.5	12.6	14.3	11.1	10.5	11.6	16.8	15.6	18.1
65+	3.9	2.9	4.8	2.6	1.7	3.4	5.6	4.4	6.8

Sources: NBOS (A-1960; A-1970; A-1980).

* Ages given in the 1960 census reports are approximately converted into ages at last birthday by subtracting one from the ages presented.

shown a rapidly decreasing proportion of working age population and increasing proportions of the old and dependent young population since 1960s. Also, selective female rural to urban migration at early marriageable ages has recently caused a severe sex imbalance in the rural marriage market. In other words, the sex ratio (or the masculinity ratio) has increased in rural areas, particularly for the young adult working population.

3. ECONOMY

With the initiation of the First Five Year Economic Development Plan in 1962, Korean economy began a shift from its traditionally stagnant agriculture based economy. The economic structure was totally altered with an increasingly rapid economic growth during the Second and Third Five Year Economic Development Plan periods. These were accompanied by an overall development of Korean society such as urbanization, modernization of the social system and changes in value orientations. All these processes have been interrelated, but economic growth is usually evaluated as the most crucial factor in this overall societal transformation since 1960.

As shown in table I-6, the per capita gross national product was 82 U.S. dollars in 1961, and rose to 285 dollars in 1971 and 1,735 dollars in 1981. The growth in the 1970s was exceptional, 610 per cent growth in current U.S. dollar terms. This tempo has slowed down substantially since 1980 with a change in policy priority from growth to stability in the Fifth National Development Plan and changes in the international economic situation as well as non-economic internal factors. There was a break-through in the GNP growth rate during the First Five Year Development period. It exceeded 10 per cent per annum in the second and third plan periods 1967-1976, and annual per capita income increased more sharply because of the declining population growth rate due to fertility transition as is shown in table I-1.

The rapid growth of the economy has inevitably been accompanied by changes in the industrial structure. During the period 1954-1961, primary industry contributed 44 per cent to the GNP and secondary industry, composed of manufacturing and mining, contributed only 12 per cent. The primary industry share has continuously declined since then, and the opposite is true for secondary industry. The share of tertiary industry,

which consists of social overhead capital and other services, increased gradually until 1970 and declined slightly thereafter. As a result, the share in 1984 was 15.1 for primary industry, 32.3 for secondary industry and 52.6 per cent for tertiary industry. The total contribution to GNP growth by secondary industry was, however, relatively minor due to its small share in total industry in the First Five Year Economic Development Plan period, but its contribution has risen sharply with the rapid growth of secondary industry, and so it became to account for 53 per cent of total growth during the third plan period 1972-1976. In a word, Korean economic growth has been led by secondary industry since the early 1970s.

The labour force participation rate of the population aged 14 or older increased very gradually between 1965 and 1980, as indicated in Table I-8, but the changing pattern of labour force participation differs greatly in terms of sex and between the agricultural and non-agricultural sectors. In the case of men in the agricultural sector, the rate of participation shows a continuous decline although the degree is minor. On the other hand, there was very little change in the rate of labour force participation between 1965 and 1980 for men in the non-agricultural sector. There has been a declining trend only recently. In the case of women, the proportion of economically active population increased quite consistenly from 1965 to 1980 in both sectors. The increase is particularly noticeable for women in agriculture; for example, it rose from 41 in 1965 to 53 per cent in 1980.

Such pattern changes in the agricultural sector can be understood if the age-sex selectivity of rural to urban or agricultural to non-agricultural migration is considered. Rural areas experienced a labour shortage due to a heavy outward movement of young working age people, but the problem was eased partly by the increasing economic activity participation of women. Also, the rise in the proportion of the

Table I-6. Gross national products and per capita GNP, 1961-1984

	GNP in current US dollars		GNP in 1980 constant Korean Won		Per capita GNP in US dollars	
	In million	Annual growth rate (per cent)	In billion	Annual growth rate (per cent)	In current value	Annual growth rate (per cent)
1961	2 103		8 209		82	
		11.1		7.5		8.4
1966	3 671		11 962		125	
		18.7		9.5		16.5
1971	9 367		18 797		285	
		22.4		9.2		20.6
1976	28 680		29 804		800	
		17.0		5.6		15.5
1981	67 191		39 509		1 735	
		6.3		7.3		4.7
1984	81 073		49 180		1 998	

Source: Compiled and calculated from EPB (1984: 6-7).

Table I-7. Percentages of GNP by industry, 1961-1983

	Agriculture, fishery and forestry	Manufacturing and mining			Social overhead capital and others		
		Total (mining manuf.)			Total (CET. others)		
1961	39.1	15.5	1.9	13.6	45.4	9.2	36.2
1966	34.9	20.5	1.9	18.6	44.7	10.3	34.4
1971	26.7	22.2	1.3	21.0	51.0	12.9	38.1
1976	23.5	28.4	1.2	27.2	48.1	11.9	36.2
1981	15.8	29.5	1.5	28.0	54.7	17.4	37.2
1983	13.9	28.8	1.4	27.4	57.3	19.0	38.3

Source: EPB (1984: 9).

CET stands for construction, electricity and transportation.

aged and late working age population resulting from this migration pattern selective of young people seems to explain the gradual drops in the labour force participation rate for men in the agricultural sector. On the other hand, the proportional increase of female participation in the non-agricultural sector has apparently been caused by increased employment opportunities in urban areas for the young unskilled female migrants from rural areas in the process of industrialization during the 1970s.

4. EDUCATION AND LITERACY

Most Korean social surveys have identified the level of educational attainment as the major factor in differentiating the socially significant behaviours of individuals. Further, it is usually treated as the major indicator of a person's social status. In addition, that Koreans value education very highly since they believe that education provides prestige and respect and is the most important means for achieving success. High aspirations for education prevailed even in traditional Korea and are actually rooted in the traditional culture.

According to the 1955 census, the rate of illiteracy for the population aged 20 and over was 26.3, but it was reduced to 14.8 per cent in 1970. The proportion of illiterate people showed a rapid drop, however, with the decline of age, and they were concentrated among females. It can also be observed that illiteracy was more prevalent in rural areas than in urban areas in all age brackets regardless of sex. Table I-9 indicates that a rapid drop in illiteracy was facilitated by the introduction of compulsory six year primary school education after 1945 and the continuous expansion of the educational system thereafter. This phenomenon has been accompanied, as expected, by a rise in the average educational level in every sector of the population. For example, the average years of schooling were 7.9 and 4.5 for male and female populations, respectively, at ages 30-39 in 1966, while it was 10.1 and 7.9 in 1980. The rise in the educational level in recent years has been greater for females than for males, as is shown in table I-10. The rate of primary school enrollment became 100 since 1970, and the rate reached 95 for middle school, 70 for high school and 16 per cent for college education. The corresponding figures for 1966 were

Table I-8. Rates of labour force participation (LFP) and unemployment for agricultural and non-agricultural sectors by sex, 1963-1984

(in percentage)

	Agriculture				Non-agriculture			
	Male		Female		Male		Female	
	LFP.	Unem.	LFP.	Unem.	LFP.	Unem.	LFP.	Unem.
1963	77.6	3.3	40.9	2.1	74.6	16.5	30.2	16.3
1966	76.4	3.9	42.1	1.7	76.7	13.3	29.3	11.5
1971	75.0	1.7	48.9	1.2	73.5	8.1	30.6	5.7
1976	74.5	1.2	55.3	0.6	74.7	7.7	33.7	3.4
1981	72.1	1.1	53.4	0.5	73.7	7.9	35.4	3.8
1984	68.8	0.9	50.1	0.6	69.6	6.0	36.1	2.9

Source: Complied and calculated from NBOS (B-1963 to 1985).

Table I-9. Percentages of illiterate persons by age group and sex, 1955 and 1970

	1955			1970		
	Both sexes	Male	Female	Both sexes	Male	Female
20-29	11.5	5.5	16.5	1.7	1.0	2.5
30-39	18.5	8.0	28.8	5.7	1.8	9.6
40-49	29.1	14.8	44.1	15.6	5.7	24.8
50-59	43.1	25.4	60.1	29.1	14.3	44.8
60+	59.7	38.0	76.4	54.8	31.9	70.8
Total (20+)	26.3	14.1	37.4	14.8	6.7	22.6

Sources: NBOS (A-1955; A-1970).

42, 28 and 10 per cent respectively. In other words, virtually every child in the Republic of Korea receives at least nine years of in-school education nowadays.

5. FERTILITY

The Republic of Korea entered its period of fertility transtion in the early 1960s. Although the estimates of fertility differ significantly, all indicate a very high level for 1955-1960, and they exceed the level in traditional Korea. Fertility began to decline, however, rapidly after 1965. Particularly, a marked decline occurred during 1960 and 1975. For instance, the total fertility rate is calculated at 6.0 in 1960, but went down to 4.2 in 1970 and 3.1 in 1975. The decline was slowed somewhat after 1975, but accelerated again in the early 1980s. According to a series of surveys by the Korea Institute for Population and Health, the total fertility rate is reported to have declined to not over 2.2 in 1985 (KIPH, 1985c).

The National Family Planning Programme initiated by the government in 1962 proved to be a major mechanism in the fertility transition. Various early surveys on fertility and family planning clearly indicate that low fertility pressure existed in the majority of families, particularly in urban areas, due to economic difficulties after the Korean War along with an increasing number of children surviving as a result of a rapid decline in infant and childhood mortality as will be discussed. In other words, the government programme to induce a fertility decline was timely as it paralleled a growing desire in a substantial portion of the population for a smaller family.

Table I-10. Per cent ratio of number of students enrolled in each school level to population at the equivalent school ages, 1966-1980

	Level:	Primary	Middle	High	College
	Age.	6-11	12-14	15-17	18-21
1966	Both sexes	96.6	42.3	27.5	9.7
	Male	98.1	50.9	35.0	14.0
	Female	95.1	33.0	19.6	5.1
1970	Both sexes	102.4	56.1	30.5	10.1
	Male	102.9	65.1	36.7	14.6
	Female	101.9	46.5	24.1	5.5
1975	Both sexes	103.2	75.2	43.6	12.2
	Male	103.0	80.8	51.5	17.5
	Female	103.4	67.0	35.8	6.7
1980	Both sexes	100.6	94.7	69.7	16.4
	Male	100.3	97.1	75.5	22.5
	Female	100.9	92.1	63.3	10.0

Source: EPB (B-1982).

Table I-11. Crude birth rates and total fertility rates, 1955-1980

	CBR (per 1000)		TFR	
	Cho	Kwon	Cho	Kwon
1955	39.5		5.5	
1955-1960		44.7		6.3
1960	42.1		6.0	
1960-1965		41.7		6.0
1965	32.2		4.6	
1965-1970		32.0		4.6
1970	29.8		4.2	
1970-1975		29.8		4.2
1975	22.8		3.1	
1980	22.4		2.7	

Sources: Cho L-J and others (1982: 35); Kwon T-H and others (1975: 12); Kwon T-H (1981: 25).

The tendency to want a smaller family in the early 1960s is confirmed by the prevalence in urban areas of induced abortions which were illegal until 1974. According to a survey in Seoul, 25 per cent of currently married women aged 20 to 44 had had at least one induced abortion by the time of the survey in 1965 (Hong S-B and Watson, 1976: 37). The practice of induced abortion was spread to other urban areas and later to rural villages. By 1975, the total induced abortion rate for the entire nation had reached 1.67 *(ibid:* 163). Although abortion was legalized in 1974, the proportion of women having abortions as a means of birth control has increased only slightly since then. In a word, the preference for abortion has waned with the growing provision of effective contraceptives through the National Family Planning Programme.

The postponement of marriage by women has also contributed considerably to the rapid decline of fertility since 1960. Based on census data, the singulate mean age at first marriage is calculated as 21.5 for 1960. This rose to 23.3 in 1970 and 24.1 in 1980, one of the highest in the world, as shown in table I-12. The increase has slowed down substantially since 1970 and any considerable change in age at marriage is no longer expected.

The above three elements are the major components of fertility change since 1960. Among them, the postponement of marriage for women and abortion explain most of the fertility change in the 1960s, while the influence of contraceptive use, promoted mostly by the National Family Planning Programme, was strengthened and surpassed the other two in the

Table I-12. Singulate mean age at first marriage and total induced abortion rate[a], 1955-1980

	Age at first marriage		Total induced abortion rate
	Male	Female	
1955	24.7	20.5	
1960	25.4	21.5	0.55
1966	26.7	22.9	1.35
1970	27.2	23.3	1.65
1975	27.4	23.7	2.31[b]
1980	27.5	24.1	

Sources: Kwon T-H and others (1975: 46); Lee H-T & Han D-W (1978); Han S-H (1973: 73); Park B-T and others (1979: 147).

[a] Total number of abortions expected to occur to each woman on average at the end of the reproductive ages.

[b] For 1976.

Table I-13. Decomposition of changes in total fertility rates, 1955-1975

(per cent change)

	1955-1960	1960-1965	1965-1970	1970-1975
Total change	5.6	−16.8	−17.6	−13.4
Change due to:				
contraceptive use	–	−1.7	−9.5	−5.9
abortion	−3.1	−5.1	−4.5	−4.0
age at marriage	−6.9	−7.6	−4.2	−3.7
widowhood & divorce	3.0	1.3	0.5	0.2
others[a]	11.0	−3.8	–	–

Source: Kwon T-H (1981: 30).

[a] Consists of the effects of the post Korean War boby boom.

1970s (Kwon T-H, 1981: 29-30). In short, the changes in fertility now dependent mostly upon the dissemination of contraceptive methods.

The overall societal change and growing population pressure are believed to be the major determinants of the fertility transition after 1960. It is usually thought, however, that the fertility decline on the societal level in the 1960s was largely a response to increasing population pressure due to the rapid growth of population between 1945 and 1965, as mentioned above. The influence of societal change has been apparent since 1970. Among the socio-economic factors in recent fertility transition, included economic development, urbanization, rural to urban migration and increasing education. It has also been found that individual fertility is related to the level of educational attainment, migration history, income, residential background, occupation, life style, and the employment status of the couple (Kwon T-H, 1982). Fertility differences in terms of the socio-economic background of individuals increased in the early transition period when the fertility decline was rapid, and has narrowed in more recent years with the dissemination of family planning to virtually every sector of the population. The detailed patterns of fertility differences have changed in accordance with the tempo of the fertility decline, the status of family planning and socio-economic development.

It is often pointed out that strong son preference constitutes the major barrier to fertility change in the Republic of Korea, but no convincing argument can be given for this proposition (Cho L-J and others, 1982: 93-96). Some studies reveal that son preference might have played a positive role in the rapid fertility decline in the 1960s and the early 1970s or that son preference and the level of fertility have hardly been related. Other studies show some positive relationships between the two. In any case, many surveys have confirmed that son preference has waned only somewhat in the Republic of Korea during the last two decades, in contrast to the trends of family size preference and the actual level of fertility. Fertility is believed already to have reached the level of bare replacement or below without and social resistance (KIPH, 1985c).

II. GENERAL TRENDS AND PATTERNS OF MORTALITY

1. DATA AND THE STATUS OF RESEARCH

Since the initiation of a national population control policy in 1962, research on population has flourished in the Republic of Korea, but the growth of knowledge on population change has been greatly biased; most demographic studies revolved around fertility related topics, and concern with mortality was grossly neglected. During the last two decades, there was rarely any serious effort given to assembling a comprehensive and detailed picture of mortality conditions in this country. Information on mortality was produced mostly in an attempt to discuss the general demographic situation or to estimate crude death rates through constructing life tables, and this lack of interest in mortality among population researchers may be accounted for primarily by the paucity of reliable data.

Vital registration data have existed in Korea since 1911. Despite their long history, however vital statistics are known to be deficient. According to an estimate, about 50 to 60 per cent of deaths were registered during the period 1911-1915 and 70 to 90 per cent during 1916-1945 (Kwon T-H, 1977:18). For the years 1942-1944, the coverage is believed to have been almost complete at all ages except 0-4 (Park J-B, 1961), but later the quality of vital registration date deteriorated again. From 1955 to 1965, the coverage of death registration rarely exceeded 60 per cent (Kwon, T-H, 1977: 18). For this reason, the government did not publish any comprehensive reports on vital statistics until the end of the 1970s except for 1966. Among the major reasons for poor registration in the post liberation period are included inefficiency and complicated registration administration, inadequate control of illegal burials and cremations, general lack of interest in vital statistics among politicians and high ranking government officials, and social barriers rooted in the traditional culture (NBOS and IPFP, 1981: 14-17).

The government developed an annual national registration survey called the Continuous Demographic Survey (CDS) in 1972 in its efforts to find the way to improve the quality of vital statistics and to obtain reliable vital rates. Since then, it has utilized the CDS data as the basic source of information for official calculations of mortality for the nation. Although gradually improving, however, the data were evaluated as somewhat deficient. By 1980, the overall coverage of death registration from the CDS reached almost 90 per cent *(ibid).*

Due to these problems with death registration statistics, census age distributions have been most frequently used in constructing life tables since these are believed to be of the best quality population statistics in the Republic of Korea. In addition, maternity history records available from various recent fertility surveys provide us with highly valuable and fairly reliable information on infant and childhood deaths.

One of the most serious problems in reviewing the levels of mortality in the Republic of Korea is wide disagreement among various estimates of mortality. Disagreement is most conspicuous among the estimates for the period from 1955 to 1970 when the second phase of mortality transition took place. For example, the crude death rate and life expectancy at birth for 1961-1965 are calculated as 10.5 per thousand and 62 years, respectively, according to official government estimates (Hong S-W, 1978: 136 and 140), while Kwon's figures for the corresponding period were estimated as 15 and 51 (Kwon T-H, 1977: Part I). Usually these two sets of estimates represent the two extremes at least for the years since 1960; other estimates are rather closer to the official figures. Anyway, such a wide discrepancy can be explained by the types of data used and the major assumptions involved.

The National Bureau of Statistics of Korea (NBOS) recently acknowledged, though unofficially, that the official levels of mortality were found to be unrealistically low and tried to develop new sets of assumptions and methods to ensure more realistic estimates. There was a similar concern in the late 1970s too, but all attempts to reconstruct the vital rates from scratch failed for fear that this might cause serious confusion in the government statistical system as a whole. Still government statisticians are very conservative in estimating the levels of mortality; they only allow minimum adjustment to the original CDS data. As an example, we may briefly examine how the underenumeration of infant deaths from the CDS was adjusted for.

The government adopted a dual reporting system for some selected years to check the re-

liability of the CDS. The level of underenumeration in the CDS was then determined for each item by comparing the results of the two independent surveys, and this figure was taken as the adjustment factor for the item if necessary. We may assume, however, that there were some systematic errors which were attendant in both surveys. It is generally believed that infant deaths occurring before the registration of birth are most likely not to be reported. A recent survey reveals that 83 per cent of the respondents indicated their intention to register neither the birth nor the death in such cases (NBOS and IPFP: 101). In view of the prevalence of the delayed registration of births, failure to consider this would result in a serious underestimate of infant mortality. We may also assume that the release of official estimates by the government would act as a normative or binding constraint in the study of mortality in most developing societies.

2. OVERALL TRENDS

Korea entered the first stage of demographic transition that is the initial decline in mortality, between 1910 and 1920. According to a series of census estimates as presented in table II-1, the crude death rate dropped from 34 in 1910 to 23 during the period 1940-1944. The primary factor responsible for this reduction of mortality was the adoption of modern public health measures and preventive medicine. Although the introduction of a modern system of medicine and public health measures commenced during the late Yi dynasty, there were few institutionally organized medical or public health activities in the Republic of Korea until the end of the 19th century. (For further information see chapter V), herb doctors and folk medicine contributed to some extent to the control of morbidity and mortality in traditional Korea, but traditional health care services were ineffective in controlling infectious and epidemic diseases, the most important causes of death at that time. It was not until the period of Japanese administration in 1910 that an active plan was formulated to improve and disseminate medical and hygiene services (Chang Y, 1966: 279-292). The marked reduction in the crude death rate, as indicated by table II-1, was obviously the effect of such attempts (Kim Y, 1966: 129-145). It should be noted, however, that industrialization and urbanization during that period had little impact on mortality. The reduction in mortality was much greater in the early part of the period when industrialization was insignificant than in the later part of the period when substantial industrialization took place. Also the benefits of industrialization were rarely shared by Koreans. The same observation can be made concerning the impact of urbanization on mortality.

Table II-1. Crude death rates, 1910-1980

(per thousand population)

	NBOS	Kwon	KIPH
1910-1915	33.7	34	–
1915-1920	31.6	33	–
1920-1925	29.5	30	–
1925-1930	26.4	26	24.6
1930-1935	23.3	24	24.2
1935-1940	21.4	23	20.2
1940-1945	19.5	23	19.2
1945-1950	15.8	23	25.6
1950-1955	14.3	33	30.3
1955-1960	12.8	16	14.4
1960-1965	10.5	15	10.0
1965-1970	9.5 (8.6)	13	10.4
1970-1975	8.0 (9.4)	11	8.9
1975-1980	6.7 (7.0)	–	6.6

Sources: Kong S-K and others (1983: 62); Kwon T-H (1980: 53).

Notes: Figures in parenthesis indicate the new official estimates.

NBOS stands for National Bureau of Statistics of Korea.

KIPH stands for Korean Institute for Population and Health.

At the end of the Second World War , Korea reobtained independence but was divided into South and North, which resulted in the Korean conflict from 1950-1953. The decade 1945-1955 was a period of disturbance in demographic development, as well as one of political, social and economic turmoil. There was a particularly high level of mortality during the war years (Kwon T-H, 1977: 58-60).

The Korean population entered into the second phase of its mortality transition after the Korean conflict. During the conflict years, various new medicines including antibiotics were introduced by the United Nations Forces. These were disseminated rapidly thereafter, and the result was a marked decline in mortality. During 1955-1960, the crude death rate was reduced by 4 to 6 points and the expectation of life at birth increased by 6 to 8 years , as shown in table II-2. This rapid reduction took place in the conditions within the country.

A continuous decline in mortality by any measure has been observed since 1960. As mentioned repeatedly, the 1960s witnessed the beginning of the overall transformation of Korean society characterized by modernization,

Table II-2. Expectation of life at birth, 1925-1980

Source:	NBOS		Kwon		Far-eastern model	
Sex:	Male	Female	Male	Female	Male	Female
1925-1930			37.9	37.2		
1930-1935			40.4	40.1		
1935-1940			40.4	41.7		
1940-1945			42.0	44.8		
1955-1960	51.4	53.7	46.9	52.5	52.7	59.9
1961[a]	54.5	60.6				
1960-1965	58.1	64.7	48.1	53.5	55.0	62.8
1966	59.7	64.1				
1965-1970			50.8	56.5	56.6	64.9
1971[a]	63.7	70.6				
1970-1975					59.0	66.2
1975	62.2	70.6				
1975-1980					60.9	72.2
1980[a b]	61.2	68.8				

Sources: KIFP (1978: 145-149); Kong S-K and others (1983: 122-123); Park J-B and Park B-T (1981); Kwon T-H (1975); ESCAP (1975).

Notes; [a] Estimates based on vital registration statistics.

Far-eastern model estimates are newly calculated by employing the Coale & Demeny method.

[b] Estimated by Kong S-K and others.

urbanization and economic development, but it is most probable that the impact of the societal change on mortality began to be felt strongly after 1970, as partially indicated by the changing causes of deaths to be discussed later. Equally or more important factors in the recent mortality decline may be a rapid expansion of health and medical services throughout the country and adoption of the National Family Planning Programme in 1962. Particularly, the latter is known to have contributed greatly to the improvement of maternal and children's health.

The degree of mortality decline since 1960 is hard to determine for different pictures emerge from different sets of estimates. The government or official estimates reveal rapid declines during the period 1955-1970 and a plateau after 1970 (see table II-2), but various census estimates, including the new sets of estimates obtained by applying the Coale and Demeny method to the UN Far-eastern Model Life Tables, show an entirely different picture. Steady reductions of mortality are discerned for both males and females during the period 1955-1975, while a significant drop is noticed for females between 1975 and 1980 as is shown in tables II-2 and II-6. It has been pointed in the above that the official estimates suffer because data and methods involved are not comparable. On the other hand, the marked reduction in women's mortality in the later half of the 1970s, which can be seen in the model life table estimation, should be accepted only on the basis of further evidence. Tentatively, the phenomenon could be related to such factors as the firm establishment of low fertility behaviour, a sudden reduction in the average household size, increasing prevalence of nuclear family living, and the general improvement of women's status in the Republic of Korea. It appears reasonable to assume that a mortality decline has persisted since 1955 and the rate of change was fairly steady during the twenty years from 1955 to 1975.

3. INFANT AND CHILDHOOD MORTALITY

The level of infant mortality is the most disputed research area in Korean mortality. The wide discrepancies among various estimates of crude death rate and life expectancy are explained for the most part by the methods and assumptions involved in the estimation of infant mortality.

Comparing with the levels in a series of life tables constructed by Kwon T-H (1975) based on census age data, most infant mortality rates for the period 1910-1945 estimated by others are very high, while those for recent years are substantially low. For example, Choi Hi-Young (1939) assumed an infant mortality rate of 252 in constructing the Korean life tables for the period 1926-1930, after examining various records

on burials and cremations in Seoul, while Kwon's estimate for 1925-1930 is in a range between 175 and 186. It is postulated that most burial and cremation records for children would have contained false information on age at death because of various circumstantial factors involved in both birth and death registration. For instance, delays in registering births for several years was very common during the colonial years and this is believed to have caused frequent false reports of the age at which children died after passing their first birthday to make it seem that death had occurred in infancy to avoid administrative nuisances, if the birth had not yet been registered. Also, delayed birth registration itself, which often resulted in large discrepancies between the actual age and the registered age of many Koreans in the past, would have been responsible for the frequent false reports of death having occurred after the first birthday as having taken place in infancy. (For other possible reasons, see Kwon T-H, 1977: 81.)

On the other hand, the official life tables of the Republic of Korea give an infant mortality rate of 52 for 1966, in contrast to our estimate of 88-95 for the same year. If calculated directly from the results of various surveys on fertility and mortality, the infant mortality rate for the second part of the 1960s would be about 50 (Kong S-K and others, 1983: 69). As discussed earlier, however, a significant degree of underenumeration is inevitable when information on infant death is collected through a survey, but researchers are reluctant to give any proper accounting for this when such information is used for the analysis of mortality. Other model life table estimates may risk causing an underestimate of infant and childhood mortality due mainly to a failure to take into account the different tempo of mortality transition between childhood and adulthood and to the unique age-sex patterns of Korean mortality. As discussed in chapter IV, the epidemiologic transition for childhood has lagged behind that for adulthood for the last twenty years in the Republic of Korea, judging from the most prevalent causes of death reported. The same observation was made by Lee E-S (1985) based on a comparison of the patterns of mortality and causes of death between the Republic of Korea and the United States.

All the life table measures of mortality manifest similar trends for infant and childhood

Table II-3. Infant and childhood mortality rates, 1925-1980

	NBOS		Kwon		Far-eastern model		Surveys 1971	Surveys 1974	Surveys 1976	Others
	$_1Q_0$	$_4Q_1$	$_1Q_0$	$_4Q_1$	$_1Q_0$	$_4Q_1$	$_1Q_0$	$_1Q_0$	$_1Q_0$	$_1Q_0$
1925-1930			186	130						241[a]
1930-1935			169	115						203[b]
1935-1940			164	111						
1938-1942										118[c]
1940-1945			149	99			150			
1955-1960	100	44	114	73	67	27	64	60	62	
1961*	69	24								
1960-1965			108	68	60	22	60	58	55	
1966	52	23								
1965-1970			88	54	54	19	50	50	46	
1971*	49	13								
1970-1975					48	15		44	36	
1975-1980					37	10				
1978-1979*	36	13								
1980*[d]	36	10								

Sources: Same as table II-2.

Notes: * Estimates based on vital registration statistics.

[a] Estimated by Mizushima from burial and cremation records in Seoul.

[b] Estimated by Choi H-Y from the same records as in (a).

[c] Estimated by Park J-B from vital statistics for Seoul.

[d] Estimated by Kong S-K and others.

All others are based on census survival ratios.

mortality since 1955, despite the wide discrepancies in the actual levels and the changing rate of mortality. The trends are almost identical with those of general mortality mentioned above. More detailed trends for infant and childhood mortality during the first two decades after the Korean conflict can be observed, however, in the 1974 KNFS data even though the reporting of child deaths is likely to be considerably underenumerated. One assumption is required in examining the trend based on the KNFS data. It is that the rate of completeness is the same throughout the entire period under consideration, that is 1954-1973. Although the validity is somewhat questionable, the assumption is still very useful in detecting the changing patterns of child mortality between 1955 and 1975.

According to Table II-4, infant mortality was reduced by almost half during the period from the mid-1950s through the early 1970s. The table also reveals that the changes in infant mortality had been gradual between 1955 and 1970 and became faster after entering the 1970s. This pattern of change is somewhat similar to that shown by indirect life table estimates based on two consecutive census age distributions as presented in table II-3, and differs greatly from that indicated by the government estimates.

Table II-4 also shows that the mortality decline at childhood ages 1-4 was much faster than that for infant mortality. For instance, the ratio of infant to childhood mortality is calculated as 143 for 1954 and 308 for 1968. This trend seems universal judging from various sets of model life tables, but the declining ratio of infant to childhood mortality is apparently much greater in the Republic of Korea. The ratios for the late 1960s, compared to the UN Far-eastern Model Life Tables, are fairly reasonable, but those for the earlier years are too low. This may be taken to indicate the lower reliability of the reports on child deaths for the earlier years, particularly those on infant deaths. If the mortality at ages 1-4 is accepted as correct and the changing ratios of infant to childhood mortality follow the UN Far-eastern Model Life Tables (UN, 1982), infant mortality is approximated 95 per 1,000 births for 1955, which means a reduction of infant mortality by about 50 per cent between 1955 and 1970. With various additional considerations concerning the quality of the 1974 KNFS data, it seems certain that a

Table II-4. Infant and childhood mortality and mortality change in four years for each reference year, 1954-1972, 1974 KNFS

Year of birth	Mortality (per 1000)			Ratio of Qx for year t to Qx for year t-4		
	$_5Q_0$	$_1Q_0$	$_4Q_1$	$_5Q_0$	$_1Q_0$	$_4Q_1$
1954	121.7	73.4	52.1			
1955	112.5	68.3	47.5			
1956	106.1	64.1	44.8			
1957	102.1	59.1	45.6			
1958	101.6	58.4	45.8	0.83	0.79	0.88
1959	101.6	58.3	45.9	0.90	0.85	0.97
1960	101.3	58.0	45.9	0.95	0.90	1.02
1961	94.6	54.4	42.5	0.93	0.92	0.93
1962	89.7	54.6	37.1	0.88	0.93	0.81
1963	81.4	53.4	29.5	0.80	0.92	0.64
1964	77.3	53.9	24.8	0.76	0.93	0.54
1965	70.1	50.7	20.5	0.74	0.93	0.48
1966	67.1	49.7	18.4	0.75	0.91	0.50
1967	64.8	48.8	16.9	0.79	0.91	0.57
1968	64.4	49.2	16.0	0.83	0.91	0.65
1969		47.9			0.94	
1970		44.5			0.90	
1971		38.4			0.79	
1972		33.2			0.67	

Source: Mortality rates are estimated by adopting the formula, nQx = 1/9 (nQ'x-2 + nQ'x +2) + 2/9 (nQ'x-1 + nQ'x+1) + 3/9 nQ'x, where Q is for the estimated mortality rate, Q' for the reported rate, x for age x, and n for n year of age interval.

rapidier decline in infant mortality has taken place since 1970, while the mortality decline at ages 1-4 began to accelerate in the mid-1960s.

With the improvement of mortality conditions, the proportion of deaths in early infancy to total infant deaths increases considerably. According to the 1974 KNFS as presented in table II-5, deaths occurring within the first month of birth account for one third of the total infant deaths for 1945-1949 birth cohort, whereas the equivalent proportion for the 1965-1969 birth cohort is 56 per cent. Even with the proportion of deaths during the first six months after birth to total infant deaths, the same pattern is observed: the proportion is 67 for the 1945-1959 cohort and 89 per cent for the 1965-1969 cohort. The pattern, confirming experience in the developed countries, extends to other childhood ages.

4. AGE AND SEX PATTERNS

It is very unlikely that any kind of real age sex patterns of mortality in the Republic of Korea can be deduced from most of the life tables constructed recently since they simply adopted a pattern generated by a family of model life tables selected to fit most closely the implicit Korean pattern, but examination of a series of survival ratios between two consecutive censuses clearly reveals the existence of somewhat distinctive mortality patterns in terms of age and sex compared with those found in other parts of the world (Kwon T-H, 1977: Ch. II). Similar observations can be made using data from the CDS and recent registration statistics (Goldman, 1980).

Both Kwon and Goldman noticed that Korean mortality is characterized by high death rates for the older relative to the death rates for the younger and very large sex differences at the older age levels. Particularly, mortality for males rises substantially after age 40 compared to the Western and model life table populations. It can also be observed that the level of male mortality at the pivotal working ages of 20 to 35 is very low relative to the younger age levels (Kwon T-H, *op. cit.*). Such patterns can be noticed even when the census survival ratios are compared with the equivalent life table values estimated from the UN Far-eastern Model (UN, 1982), which is known to have been newly developed allegedly to fit the mortality patterns in far-eastern countries including the Republic of Korea. In other words, the estimates of mortality, as presented in table II-6, are thought to be biased toward a much longer life expectancy and much lower levels of mortality at infant, childhood and late adult ages. Goldman, however, speculates that the pattern may be related to a high incidence of tuberculosis in the past. A more plausible reason may be found in the drinking and smoking behaviour of adult males in the Republic of Korea. In traditional Korea, they were considered an indispensable component of any social occasion or activity. Such drinking and smoking by young adults are a serious health hazard when they reach their mid-thirties or over.

It is generally observed in most populations that male mortality exceedes female mortality at all ages, but mortality in traditional Korea did not follow this pattern. According to a series of life table estimates of mortality for the years between 1925 and 1940, female mortality is apparently higher than male mortality at the crucial reproductive ages of 20 and 34 and at childhood ages 1 to 14 (Kwon T-H, 1977: 311-313). This pattern can be explained by the prevalence of a strong son preference and male dominance in Korean society. Such a sex difference is believed to have disappeared gradually with the continuous improvement of

Table II-5. Proportions of deaths within the first month and the first six months of birth among infant deaths, and proportions of infant deaths among deaths within the two years from birth, 1974 KNFS

Year of birth	(a) Infant deaths / Total births	(b) Deaths in 2 years / Total births	(c) Deaths in 1st month / Infant deaths	(d) Deaths in 6 months / Infant deaths	(e) a/b
1945-1949	.155	.230	33.3	66.7	67.4
1950-1954	.103	.141	28.4	75.9	73.2
1955-1959	.059	.076	38.3	71.9	77.7
1960-1964	.055	.072	48.9	79.2	76.3
1965-1969	.051	.061	55.8	87.6	83.4
1970 +	.044	.049	55.8	88.8	88.9

Table II-6. Age-sex specific death rates (Mx values), 1925-1980

(per thousand)

Year:	1925-1930	1930-1935	1955-1960		1961	1960-1965	1966
Source:	Kwon	Kwon	Kwon	F-E	NBOS	F-E	NBOS
A. Male							
0-4	73.00	64.18	45.25	23.34	21.43	19.81	15.76
5-9	12.09	10.58	7.40	2.43	3.78	2.00	3.82
10-14	5.78	5.24	4.03	2.06	1.35	1.72	1.55
15-19	8.51	7.71	5.93	3.12	2.81	2.69	2.15
20-24	8.74	7.92	6.10	4.63	4.09	3.92	2.67
25-29	7.71	6.98	5.36	5.31	4.47	4.51	2.96
30-34	7.89	7.14	5.47	6.41	5.68	5.45	3.27
35-39	10.75	9.73	7.46	8.47	7.17	7.29	4.01
40-44	15.31	13.91	10.81	11.94	9.75	10.48	5.10
45-49	20.14	18.45	14.73	16.68	14.38	14.83	5.81
50-54	26.03	24.13	19.93	24.80	21.46	22.47	15.94
55-59	35.48	33.19	28.17	33.92	28.22	31.26	31.73
60-64	50.37	47.38	40.84	51.44	46.64	48.05	35.25
65-69	73.11	69.03	60.19	73.92	60.93	69.62	50.43
70-74	106.22	100.43	87.99	103.01	101.46	97.76	67.35
B. Female							
0-4	78.86	64.97	37.73	17.76	18.12	14.62	15.41
5-9	15.77	12.71	7.27	1.43	3.79	1.09	3.81
10-14	6.73	5.60	3.47	1.12	1.63	0.86	1.41
15-19	8.11	6.79	4.15	2.25	2.85	1.71	2.14
20-24	9.41	7.91	4.75	3.17	4.48	2.40	2.61
25-29	9.57	8.07	4.92	4.04	4.53	3.09	2.86
30-34	9.86	8.33	5.13	4.75	4.59	3.71	3.16
35-39	10.99	9.35	5.89	5.94	5.30	4.77	3.80
40-44	12.46	10.70	7.03	7.55	6.34	6.25	4.15
45-49	14.17	12.31	8.43	10.34	8.19	8.78	4.50
50-54	17.20	15.10	10.57	14.68	10.87	12.70	5.01
55-59	24.60	21.23	15.32	21.20	13.13	18.63	14.74
60-64	39.02	33.83	24.50	30.60	20.87	27.27	17.15
65-69	60.63	53.68	39.30	44.45	28.02	40.27	30.62
70-74	92.92	82.57	61.96	64.63	53.89	59.23	63.36

Year:	1965-1970		1970	1970-1975	1975-1980	1978-1979	1980
Source:	Kwon	F-E	NBOS	F-E	F-E	NBOS	Kong
A. Male							
0-4	32.78	17.71	15.09	14.68	12.51	8.33	9.01
5-9	5.73	1.73	1.38	1.37	1.12	1.10	1.45
10-14	3.78	1.50	1.06	1.22	1.01	0.87	1.09
15-19	5.41	2.38	1.79	1.94	1.64	1.51	1.75
20-24	5.57	3.46	2.55	2.84	2.39	2.17	2.56
25-29	4.86	4.00	2.64	3.30	2.80	2.44	2.60
30-34	4.95	4.84	2.97	3.98	3.37	2.70	3.14
35-39	6.79	6.53	3.78	5.45	4.68	3.24	4.76
40-44	9.92	9.48	5.21	8.07	7.03	6.34	7.24
45-49	13.71	13.60	7.55	11.82	10.47	8.89	10.94

Table II-6 *(continued)*

Year:	1965-1970		1970	1970-1975	1975-1980	1978-1979	1980
Source:	Kwon	F-E	NBOS	F-E	F-E	NBOS	Kong
A. Male							
50-54	18.83	20.89	11.32	18.56	16.67	13.69	16.80
55-59	26.90	29.42	17.23	26.66	24.49	21.74	25.00
60-64	39.25	45.67	26.42	42.06	39.16	37.92	38.91
65-69	58.03	66.58	40.40	61.93	58.15	63.70	58.60
70-74	86.95	94.01	61.34	88.22	83.48	92.00	91.27
B. Female							
0-4	28.79	12.26	12.05	11.44	6.80	12.06	9.99
5-9	5.72	0.88	1.15	0.76	0.35	0.71	1.32
10-14	3.08	0.69	0.89	0.60	0.28	0.52	1.02
15-19	3.55	1.34	1.42	1.18	0.53	0.86	1.28
20-24	3.97	1.91	1.88	1.65	0.74	1.14	1.63
25-29	4.18	2.51	2.21	2.18	1.01	1.17	1.81
30-34	4.41	3.04	2.64	2.67	1.30	1.19	2.06
35-39	5.16	4.00	3.20	3.55	1.87	1.88	2.64
40-44	6.30	5.38	4.11	4.86	2.81	3.25	3.39
45-49	7.72	7.71	5.65	7.07	4.41	4.30	4.95
50-54	9.79	11.33	8.15	10.48	6.89	6.26	7.36
55-59	14.29	16.80	11.93	15.68	10.74	9.45	10.10
60-64	22.93	24.87	18.16	23.40	16.69	15.70	15.77
65-69	36.99	37.21	30.10	35.29	26.35	26.41	25.70
70-74	61.74	55.21	48.90	52.68	40.59	50.59	42.14

For notes and sources, see table II-2 and table II-3.

health conditions throughout the country. According to the 1974 KNFS, as discussed in the next chapter, mortality for infant boys is found to have been greater than for infant girls during the period 1955-1970. However, recent vital statistics still show a much higher infant mortality for female than for male births as indicated by table II-6 (for 1978-1979 and 1980), which may, in turn, be accounted for largely by the more usual delayed registration of female births. (The implications of this delay in registration of births for the reported infant death rate is discussed above).

The KNFS data disclose a reversed sex differential in mortality for the childhood ages 1-4. A risk of dying for boys compared to girls was consistently low at ages 1-4 during the 15 years between 1956 and 1970. Similar observations can be made in the census age-sex distributions. As shown in table II-7, the sex (or masculinity) ratios for single-year-of-birth cohorts whose ages were in the range of 0 to 4 in a given census are reported to have increased in the next census conducted 4 or 5 years later (when their ages became 4-8 or 5-9) between 1966 and 1975, and the reverse was true between 1975 and 1980. If we assume that there have been no significant sex differences in the census enumeration for those ages and between the two consecutive censuses, the observation should be regarded as indicating a

Table II-7. Sex ratios of census population at ages 0-9, 1966-1980

(Number of males per 100 females)

Age/year:	1966	1970	1975	1980
0	107.52	106.48	108.07	
1	106.87	106.91	108.22	
2	106.52	105.79	106.28	
3	107.95	106.66	107.48	
4	107.26	107.98	107.31	
5		106.88	107.32	106.27
6		107.57	107.25	107.16
7		108.20	106.57	106.35
8		107.93	106.76	106.90
9			108.37	107.09

Sources: NBOS (A-1966 to 1980).

persistently higher female mortality at ages from approximately 2 to 8 until about 1975 and the emergence of a reversed pattern thereafter. The gap in the risk of dying between males and females for ages 10 or more is found to have grown with declining mortality, as observed in other countries in the period of mortality transition. The same tendency can be clearly seen in the Republic of Korea if the sex differences in death rates for the post 1955 years are compared with those for all of Korea for the period 1925-1940.

III. DIFFERENTIAL MORTALITY

1. METHOD AND DATA USED FOR EXAMINING DIFFERENTIALS IN CHILD MORTALITY

There are very few studies available in the Republic of Korea examining the differential patterns of mortality. Among those available, two can be cited. Park Jae-Young analyzed the factors in mortality differences for infants and children and found that the risk of death for children under age 5 is associated with the type of current residence and the educational level of the mother (1980). The finding is confirmed by an analysis of the 1974 Korean National Fertility Survey data by Park Jae-Bin and Park Byung-Tae (1981). The latter added the educational level and occupation of the father to the major socio-economic determinants of infant mortality. As for the biological correlates, birth interval, the length of lactation and the experience of pregnancy wastage are found, by Park J-B and Park B-T (1981) and Chun T-Y (1980), to be most closely associated with infant and childhood mortality. However, there are many aspects of mortality differences for infants and children omitted in these studies and most of the results need clarification. Particularly, they all share the problem of not considering the interference of the rapid changes in mortality during the period 1955-1974 in examining the relationships between various factors and infant or childhood mortality. In this light, we have tried to analyze the differentials in mortality at infant and childhood levels in a more detailed and comprehensive manner.

The present analysis is based on maternity history data from the 1974 KNFS, because of its large sample size and the relatively high reliability of its data. Also, the survey collected very detailed and extensive information on each birth reported including the date of birth, the status of survival, the date of death when deceased, and the socio-economic as well as demographic background of the parents.

In examining mortality differentials, this research relies primarily on the unadjusted infant and childhood mortality rates calculated for selected variable groups, and secondly on the results of the multiple classification analysis (MCA) of those mortality rates. It should be noted, however, that the Republic of Korea has undergone an overall societal transformation since 1960 and this process has resulted in marked generational differences concommitantly in both the socio-economic status of individuals and their risk of dying. Failure to consider this fact would lead to a spurious observation on differential mortality. In the current analysis, this problem is dealt with by treating the variable, year of birth, as an explanator of mortality differences in all tabulations and MCA runs, but the impact of such societal changes over time can not be sufficiently taken into consideration, because the analysis had to adopt a rough categorization of the variable, year of birth, due to the number of child deaths reported in the survey. The variable is divided into three year-of-birth categories, 1956-1960, 1961-1965 and 1966-1970; so, it is often necessary to be reminded of this fact in interpreting the results of this analysis. Similar problems may be encountered, though much less serious ones, with other major explanatory variables. In other words, a convincing arguement is very difficult to make concerning the differential patterns of mortality based on the 1974 KNFS data due to an insufficient sample size for such a study.

In this research, the separation of infant and childhood mortality is attempted taking into consideration that factors involved in the risk of dying may differ between early and late childhood. In other words, all the analyses here are conducted for infant age and childhood ages 1-4 separately. Three other considerations were applied in preparing the data. First, births occurring to women whose first marriages had not been dissolved at the survey were selected for this analysis to avoid complications in treating cases of marriage dissolution. It can be argued that this would result in the elimination of marriage dissolution as a major factor in child mortality. Second, the analysis is confined to children born to women aged 20 to 44. Third, the data are composed of births which occurred between 1956 and 1970. Those occurred between 1971 and 1974 are excluded to avoid undue interruptions in the analysis resulting from the inclusion of births with too short a survival period in the case of childhood mortality.

For this analysis, an extensive list of factors was selected to explain the differences in the risk of dying in infancy and childhood, and

these factors are grouped into four categories according to their logical linkage to the mortality of young children, as presented below.

1. Demographic background of mother: age of mother at the time of survey, marriage duration at the time of survey, age of mother at the time of birth and marriage duration at the time of birth.

2. Bio-physiological factors: parity, sex, status of breast feeding, birth spacing, experience of child death before the birth in question and pregnancy interruptions in the given birth interval.

3. Socio-economic factors: educational level, occupation or employment status, and residential background of father and mother.

4. Strains in child rearing and cultural factors: preferential ordering of children by sex and parity, sex of the previous child, experience of child death before the birth in question, total number of surviving children before the given birth, child spacing.

More detailed descriptions on the status of those potential explanators are provided in the following discussions.

2. CHILD MORTALITY AND MOTHER'S DEMOGRAPHIC BACKGROUND

We have selected four variables as the demographic background of mothers as given above; that is, the age of mother at the time of survey, marriage duration at the time of survey, age of mother at the time of each birth and marriage duration at the time of each birth. As expected, both infant and childhood mortality were observed to be higher for a higher current age group or for a longer current duration group of mothers, with the exception of infant mortality by marriage duration at the time of the survey (see table III-1). The pattern does not, however, hold if the observation is further controlled for the year of birth, as shown in table III-2. No consistent pattern is found paralleling the differences in the mother's age at the survey among the three categories of variable, year of birth, and between infant and childhood mortality. In the case of differences by duration of marriage at the survey, the pattern differs between infant and childhood mortality. The lowest infant mortality is observed in the 15-19 year duration group, while the highest childhood mortality is seen in the duration group of 20 years or more.

The probability of infant death in terms of the mother's age at each birth was lowest among those births occurring at mothers' ages 25-29 and highest at ages 30-44. On the other hand, the level of childhood mortality declined with an increase in the mother's age. Similar patterns can be seen in the differences by duration of marriage at the time of the birth. In the case of infant mortality, the lowest level is reported for the 5-9 year duration group and the highest for the 10 or more year group, and the tendency is reversed for childhood mortality. The same pattern holds when the relationship between the age of the mother at birth and child mortality is further controlled for the year of birth. No consistent pattern is, however, found in the relationship between marriage duration and the level of infant or childhood mortality among different birth cohorts of children.

In a word, when children's deaths occurring only during the 15 year period from 1956 to 1970 are considered, no persistent patterns are detected, among the three five year cohorts, in the relationship between infant or childhood mortality and the demographic variables adopted for the current analysis except the mother's age at the birth. It can also be observed that the pattern of difference does not agree between

Table III-1. Child, infant and childhood mortality by selected demographic variables for 1956-1970 birth cohort

(per hundred)

	Child (0-4)	Infant (0)	Childhood (1-4)
Grand mean	7.85	5.27	2.73
Year of birth			
1956-1960	10.41	6.07	4.62
1961-1965	7.95	5.17	2.94
1966-1970	6.40	4.93	1.55
a. Mother's age at survey			
34 or less	7.04	5.09	2.06
35-39	7.90	5.13	2.92
40-44	8.82	5.69	3.32
b. Mother's age at birth			
24 or less	8.45	5.32	3.31
25-29	7.53	4.98	2.69
30 or more	7.37	5.78	1.69
c. Marriage duration at survey (in years)			
14 or less	6.77	5.02	1.84
15-19	7.37	4.65	2.86
20 or more	9.80	6.24	3.79
d. Marriage duration at birth			
0-4 years	7.88	5.26	2.76
5-9	7.41	4.72	2.83
10 or more	8.39	6.03	2.51

Table III.2. Child, infant and childhood mortality by selected demographic variables for birth cohorts 1956-1960, 1961-1965 and 1966-1970

(per hundred)

	Child (0-4)			Infant (0)			Childhood (1-4)		
	1956-1960	1961-1965	1966-1970	1956-1960	1961-1965	1966-1970	1955-1960	1961-1965	1966-1970
Grand mean	10.41	7.95	6.40	6.07	5.17	4.93	4.62	2.94	1.55
a. Mother's age at survey									
34 or less	9.78[a]	8.71	6.36	6.52[a]	5.44	4.91	3.49[a]	3.45	1.53
35-39	11.35	7.23	5.94	6.90	4.59	4.39	4.78	2.77	1.63
40-44	9.72	8.39	7.60	5.38	5.80	6.20	4.59	2.75	1.49[b]
b. Mother's age at birth									
24 or less	10.33	8.69	6.04	6.14	5.43	4.27	4.47	3.45	1.86
25-29	10.28	7.11	6.51	5.80	4.45	5.00	4.75	2.78	1.56
30 or more	17.24[a]	8.40	6.59	10.34[a]	6.22	5.44	7.69[a]	2.32	1.22
c. Marriage duration at survey (in years)									
14 or less	17.14[a]	8.22	6.06	14.29[a]	5.54	4.69	3.33[a]	2.83	1.43
15-19	9.72	6.51	6.00	5.70	4.02	4.38	4.27	2.59	1.70
20 or more	10.72	9.33	8.63	6.10	6.09	6.83	4.92	3.45	1.93
d. Marriage duration at birth									
0-4 years	10.39	8.04	6.13	6.27	5.24	4.63	4.40	2.96	1.58
5-9	9.19	7.24	6.41	5.33	4.05	4.94	4.08	3.33	1.55
10 or more	13.77[b]	8.73	6.82	7.25[b]	6.52	5.38	7.03[b]	2.37	1.52

[a] less than 500 births;

[b] less than 100 births.

infant and childhood mortality, though this observation may be thought spurious.

Further analyses of the association of demographic factors with infant and childhood mortality based on the MCA confirm the finding that the demographic factors for mothers, current or related to the timing of birth, do not explain mortality differences at child ages 0-4 to a significant degree (see table III-3).

3. BIO-PHYSIOLOGICAL CORRELATES OF CHILD MORTALITY

The parity of birth, sex, the status of breast feeding, birth spacing, the experience of child death before the birth in question and the experience of pregnancy interruptions before the birth are chosen to represent the bio-physiological factors in infant and childhood mortality for the current analysis. It is, however, doubtful that these can be correctly treated as bio-physiological factors in child mortality since cultural discrimination in child rearing practice is known to have been prevalent depending on the status of each child in such indicators. For example, son preference, or male supremacy in general, is one of the major cultural traits of traditional Korea, so in explaining the observed relationships between the bio-physiological factors adopted here and child mortality, consideration of the socio-cultural implications is often essential.

The marginal tabulations of the current data set, which are presented in table III-4, clearly show that both infant and childhood mortality rates are different according to the parity of each birth. Both rates are lowest among second births and highest among first births. There is a contrast in the pattern of difference by the sex of birth between infant mortality and childhood mortality: male births show a higher risk of infant death than female births, and vice versa in the case of the risk of death at childhood ages 1-4.

When controlled for the year of birth, the relationship between parity and mortality weakens greatly for both infancy and childhood (see table III-5). In the case of the sex of the child, males show a higher infant mortality rate than females for all three year-of-birth cohorts, but the reverse is true with childhood mortality. Although the degree of difference is found to be statistically not much significant, we can

Table III-3. MCA of child, infant and childhood mortality for combinations of selected demographic variables

(adjusted deviation from the mean)

	Child (0-4)	Infant (0)	Childhood (1-4)
(Grand mean	7.85	5.27	2.73)
a. For mother's age at survey and mother's age at birth			
Mother's age at survey			
34 or less	0.46	0.77	−0.30
35-39	−0.26	−0.31	0.05
40-44	−0.25	−0.58	0.32
(beta)	(0.01)	(0.03)	(0.02)
Mother's age at birth			
24 or less	−0.12	−0.52	0.41
25-29	−0.26	−0.24	−0.03
30 or more	0.76	1.48 *	−0.71
(beta)	(0.01)	(0.03)	(0.03)
Year of birth			
(beta)	(0.07) ***	(0.04) **	(0.06) ***
Multiple R	0.059	0.031	0.075
b. For duration at survey and duration at birth			
Marriage duration at survey (in years)			
14 or less	−0.36	0.24	−0.62
15-19	−0.80	−0.70	−0.12
20 or more	1.31 **	0.40	0.97
(beta)	(0.03)	(0.02)	(0.04)
Marriage duration at birth			
0-4 years	0.34	−0.03	0.38
5-9	−0.55	−0.54	−0.04
10 or more	0.11	0.78	−0.68
(beta)	(0.01)	(0.02)	(0.03)
Year of birth			
(beta)	(0.05) ***	(0.02)	(0.05) ***
Multiple R	0.066	0.038	0.076
c. For mother's age at survey and duration at survey			
Mother's age at survey			
34 or less	1.20	0.51	0.74
35-39	0.16	0.11	0.06
40-44	−1.73 **	−0.79	−1.03 *
(beta)	(0.04)	(0.02)	(0.04)
Marriage duration at survey (in years)			
14 or less	−1.13	−0.42	−0.75
15-19	−0.91	−0.72	−0.19
20 or more	2.44 ***	1.34 **	1.21 **
(beta)	(0.06)	(0.04)	(0.05)
Year of birth			
(beta)	(0.05) ***	(0.02)	(0.07) ***
Multiple R	0.069	0.035	0.079
d. For mother's age at birth and duration at birth			
Mother's age at birth			
24 or less	0.55	−0.04	0.62
25-29	−0.17	−0.12	0.06
30 or more	−0.70	0.33	−1.08 *
(beta)	(0.02)	(0.01)	(0.04)
Marriage duration at birth			
0-4 years	−0.42	0.01	−0.45
5-9	−0.47	−0.54	0.05
10 or more	1.44	0.71	0.79
(beta)	(0.03)	(0.02)	(0.03)
Year of birth			
(beta)	(0.06) ***	(0.02) *	(0.06) ***
Multiple R	0.062	0.032	0.077

* Significant at 0.1; ** at 0.05; *** at 0.01.

Table III-4. Child, infant and childhood mortality by selected bio-physiological variables for 1956-1970 birth cohort

(per hundred)

	Child (0-4)	Infant (0)	Childhood (1-4)
Grand mean: all	7.85	5.27	2.73
GM for 2+ births	7.67	5.17	2.64
e. Parity			
1st birth	8.35	5.53	2.99
2nd	7.14	4.95	2.30
3rd and higher	7.93	5.29	2.79
f. Sex			
male	7.79	5.47	2.45
female	7.91	5.06	3.01
g. Birth interval (for all births)			
0-17 months	10.03	6.87	3.40
18-29	7.95	5.28	2.82
30 or more	6.57	4.39	2.28
h. Birth interval (for 2nd or higher order births)			
0-17 months	16.10	11.63	5.06 *
18-29	7.88	5.23	2.79
30 or more	6.03	4.00	2.12
i. Pregnancy wastage in birth interval (for all births)			
not wasted	8.06	5.40	2.82
wasted	4.32	2.88	1.48
j. Pregnancy wastage (for 2nd or higher order births)			
not wasted	7.94 *	5.34 *	2.75 *
wasted	3.42	2.44	1.00
k. Status of breast feeding (for all births)			
not fed	46.52 *	43.78 *	4.87 *
0-11 months	31.24	28.06	4.42
12 or more	2.80	–	2.51
l. Status of breast feeding (for births survived 2 years +)			
(grand mean			1.56)
not fed			1.83 *
0-11 months			2.33
12 or more			1.48
m. Children's death before the birth (for all births)			
no death	7.08	4.66	2.53
1 or more	11.20	7.90	3.58
n. Children's death before the birth (for 2nd or higher)			
no death	6.48	4.25	2.32
1 or more	11.20	7.90	3.58

* less than 500 births.

still assign an important meaning to such observations.

It is generally accepted that male mortality is higher than female mortality at all ages and that this pattern is attributed mostly to bio-physiological factors. About 8 per cent higher infant mortality for male births after controlling for the year of birth (and parity) apparently confirms such an idea. The reversed sex differential at childhood ages 1-4 clearly indicates, however, that mortality is susceptible, after passing at least infant age, to the socio-cultural conditions of a given society. As discussed in more detail

in the following section, the higher female childhood mortality can readily be explained by the prevalence of a strong son preference in Korean society. In the light of current observations, we may tentatively hypothesize that bio-physiological factors in mortality are more properly pursued with infant deaths than childhood deaths.

Table III-5. Child, infant and childhood mortality by selected bio-physiological variables for birth cohorts 1956-1960, 1961-1965 and 1966-1970

(per hundred)

	Child (0-4)			Infant (0)			Childhood (1-4)		
	1956-1960	1961-1965	1966-1970	1956-1960	1961-1965	1966-1970	1955-1960	1961-1965	1966-1970
Grand mean: all	10.41	7.95	6.40	6.07	5.17	4.93	4.62	2.94	1.55
GM for 2+	10.40	7.87	6.27	5.81	5.26	4.80	4.87	2.76	1.54
e. Parity									
1st birth	10.43	8.27	6.73	6.55	4.91	5.21	4.15	3.53	1.60
2nd	9.39	7.58	5.21	5.77	5.45	3.96	3.85	2.25	1.30
3rd and higher	11.15	7.95	6.75	5.83	5.16	5.20	5.65	2.96	1.63
f. Sex									
Male	9.89	8.37	6.18	6.08	5.66	4.99	4.06	2.87	1.25
Female	10.94	7.50	6.64	6.05	4.64	4.86	5.21	3.00	1.86
g. Birth interval (for all births)									
0-17 months	12.48	9.97	8.67	7.33	6.54	6.84	5.56[a]	3.67	1.96
18-29	9.92	8.92	6.06	5.73	6.34	4.15	4.46	2.76	1.99
30 or more	9.61	6.02	5.49	5.62	3.35	4.62	4.23	2.76	0.92
h. Birth interval (for 2nd or higher order births)									
0-17 months	22.14	13.11	15.10	12.98	9.84	12.24	10.53	3.64	3.26
18-29	9.58	9.00	6.12	5.26	6.48	4.18	4.57	2.69	2.02
30 or more	8.77	5.96	4.95	4.87	3.37	4.14	4.10	2.68	0.85
i. Pregnancy wastage in birth interval (for all births)									
Not wasted	10.59	8.14	6.59	6.16	5.29	5.05	4.72	3.01	1.57
Wasted	4.76[b]	4.23[a]	4.29[a]	3.17[b]	2.82[a]	2.86[a]	1.64[b]	1.45[a]	1.47[a]
j. Pregnancy wastage (for 2nd or higher order births)									
Not wasted	10.63	8.05	6.55	5.90	5.37	5.05	5.02	2.84	1.58
Wasted	2.56[b]	3.85[a]	3.38[a]	2.56[b]	2.88[a]	2.26[a]	0.00[b]	0.99[a]	1.55[a]
k. Status of breast feeding (for all births)									
Not fed	52.70	52.73	41.28	50.00	48.18	39.45	5.41	8.77	3.03
0-11 months	43.58	34.77	23.48	38.99	30.15	21.86	7.52	6.61	2.07
12 or more	4.76	3.01	1.52				4.40	2.52	1.43
l. Status of breast feeding (for births survived 2 years or more)									
(grand mean							2.74	1.72	0.82)
Not fed							0.00[b]	3.70[b]	1.54[a]
0-11 months							3.15[a]	2.64[a]	1.31[a]
12 or more							2.76	1.53	0.74
m. Children's death before the birth (for all births)									
No death	9.56	7.40	5.43	5.56	4.78	4.07	4.24	2.75	1.42
1 or more	14.78	10.20	10.42	8.70[a]	6.75	8.49	6.67[a]	3.70	2.11
n. Children's death before the birth (for 2nd or higher)									
No death	8.94	7.03	4.91	4.85	4.72	3.61	4.30	2.42	1.35
1 or more	14.78	10.20	10.42	8.70[a]	6.75	8.49	6.67[a]	3.70	2.11

[a] less than 500 births;

[b] less than 100 births.

Table III-6. MCA of child, infant and childhood mortality for combinations of selected bio-physiological variables[a]

(adjusted deviation from the mean)

	Child (0-4)	Infant (0)	Childhood (1-4)
e. For parity, sex and mother's age at birth			
(Grand mean	7.85	5.27	2.73)
Parity			
1st birth	0.01	0.41	−0.42
2nd	−0.92	−0.16	−0.80
3rd & higher	0.44	−0.14	0.60
(beta)	(0.02)	(0.01)	(0.04)**
Sex			
Male	−0.07	0.20	−0.29
Female	0.07	−0.21	0.30
(beta)	(0.00)	(0.01)	(0.02)*
Mother's age at birth			
24 or less	0.36	−0.29	0.68
25-29	−0.33	0.20	−0.15
30 or more	0.00	0.95	−0.99
(beta)	(0.01)	(0.02)	(0.04)**
Year of birth			
(beta)	(0.06)***	(0.02)*	(0.07)***
Multiple R	0.061	0.030	0.082
f. For status of breast feeding (and year of birth)			
(Grand mean			1.56)
Status of breast feeding (2nd or higher order births)			
Not fed			0.48
0-11 months			0.91
12 or more			−0.10
(beta)			(0.02)*
Year of birth			
(beta)			(0.06)***
Multiple R			0.064

[a] MCA runs for variable groups which include birth interval, pregnancy wastage and children's death are presented in table III-12.

* Significant at 0.1; ** at 0.05; *** at 0.01.

The level of mortality during either infancy or childhood is clearly associated with the status (or number of months) of the breast feeding of the child. The shorter the lactation period, the higher the risk of the child's death is, but it is doubted in the Republic of Korea whether the observed relationship can be accepted to indicate that the lack of breast feeding is a crucial determinant of child mortality. Much of the relationship is ascribed to the simple fact that the early death of children brings about no or short lactation. By 1970, lactation often continued for more than two years after birth, if not disturbed by nature, and sometimes extended to or after the birth of the next child (see section VI-4). To eliminate such interference in the relationship between breast feeding and child mortality, we have examined the children who survived at least two years or more separately, assuming that the effects of breast feeding upon children's deaths do not last more than two years. In reality, we have examined to what extent the lactation status in the first two years affects, or is related to, the level of mortality after age 2. Unlike the former, this analysis would be biased to suppress the actual association between the two, by eliminating from the analysis the effect during the first two crucial years. The result shows only minor differences in mortality at ages 2-4 in terms of the status of breast feeding. Although, the number of observations are small, the period of lactation seems to be positively associated with the survival of children between ages 2 and 4, when considered for each five year birth cohort. Extending this observation to the earlier ages and considering the problems related to the assumptions made for this analysis, we may reasonably conclude that breast feeding has been an important determinant of infant and childhood mortality in the Republic of Korea.

The risk of dying during infancy and childhood has a negative relationship with child spacing (or birth interval). The pattern persists in all three birth cohorts of children. It is, however, to be noted that the first birth interval is not the interval between two consecutive births. Considering this as an interfering factor, we have examined additionally the implications of child spacing for infant and childhood mortality only for the second or higher order of births, and found the relationship greatly strengthened. When the pregnancy interval is used instead of the birth interval, similar tendencies are observed. It may be argued that child spacing can be more properly classified as a conditional factor surrounding the rearing of a child, than as a bio-physiological factor. It has been mentioned earlier, however, that infant mortality appears to be largely determined by bio-physiological factors in view of the observation that the pattern of infant mortality differs from that of childhood mortality for such biological factors as the sex of the child which also has a cultural significance. Extending the logic to the observed relationship between child spacing and infant mortality, we may rightly treat child spacing as a partially bio-physiological factor.

In the case of the second or higher order of births, it is noticed that births followed by pregnancy wastages (still birth and abortion), though the number is very small, have much less probability of dying in infancy compared to the births without any such interruptions in the birth interval. A similar tendency, but to a lesser degree, is seen at childhood ages 1-4. Taking these facts into account, (1) that induced abortions consisted of the mojority of pregnancy wastages and (2) that induced abortions between

births were performed mostly to control child spacing, the findings can be easily understood: pregnancy wastages would have functioned to ease the burden of raising the children who followed. This can also be thought to confirm indirectly that the birth interval is a crucial factor in mortality differences in infancy and early childhood.

We have also tried in this analysis to look at the mortality differences among children according to the deaths of previous children before a given child was delivered, partly to learn whether children born to certain mothers or families have a lesser or greater probability of dying at infancy of childhood than other children. The results clearly show that a child with a sibling who died before its birth has a higher risk of dying than other children both in infancy and in childhood, indicating the reasonableness of the hypothesis. Other explanations of the relationship are presented in section III-5.

We can reach several tentative conclusions concerning the relationship between bio-physiological factors and mortality in infancy and childhood based on these discussions. Among them, the status of breast feeding and child spacing together with the status of pregnancy wastage in each spacing appear to be important determinants of infant and childhood mortality. Also, we can assume that children born to a particular mother or family may have either a higher or lower risk of dying compared to other children. In the case of parity and the sex of a child, no consistent pattern was observed between infant and childhood deaths. Particularly, the sex difference clearly suggests that infant mortality is well explained by bio-physiological factors, while childhood mortality is largely subject to cultural and circumstantial influences. This observation is very meaningful because of the dual natures of most variables selected here to represent the bio-physiological aspects; in some respects, socio-cultural meanings can be assigned to these variables, but the effect of a variable upon mortality at ages 0-4 is not always unidirectional regardless of whether it is defined as a bio-physiological variable or a socio-cultural variable. For instance, masculinity is assumed to have a high mortality propensity if sex is defined as a bio-physiological factor, whereas the contrary is assumed in Korea if the cultural meanings of sex are in question. For the variables whose mortality effects are assumed to be in the same direction regardless of the categorical definition of a variable, such as child spacing, it would be hard to determine which category meanings are more important in explaining the observed pattern.

4. SOCIO-ECONOMIC DIFFERENCES

We have selected the level of educational attainment, the occupation or employment status, and the residential background of the father and mother separately as indicators of the socio-economic background of the children. On top of the usual examination of the relationship between each variable and the level of mortality, two additional analyses were brought in here to determine the relative importance of the three types of variable groupings (education, occupation/employment and residence) and to evaluate the relative significance of the father's background and the mother's status in explaining the mortality differences of children at ages 0-4. The three types of variables have been chosen as representing socio-economic indicators in view of the results of various previous studies on the demographic behaviours of Koreans.

The level of educational attainment is usually regarded as having been the most important explanator for the socially meaningful behaviour of individuals in the Republic of Korea. This general observation is confirmed too in the current analysis of differences in infant and childhood mortality. Children born to parents with a higher level of education are exposed to much less risk of dying than those with a lower level of education for both infants and children aged 1-4, although the range of difference for childhood mortality is much greater than for infant mortality. The same pattern can be observed in all year of birth groups. The reason for this marked difference is simple and obvious: the more educated parents provide their children with better care, health and nutrition. In addition, more educated Korean parents have fewer children on the average, which means in turn a wider average interval between births (Kwon T-H, 1982). As discussed above, a longer birth interval is a decisive factor in lower infant and childhood mortality. Particularly, the relationship between the educational level of parents and infant mortality is thought to be strongly influenced by this fertility factor.

When the effect of the father's educational level is compared with that of the mother's by controlling for the possible interference of other socio-economic variables (Table III-9), it became clear that the mother's educational level explains more differences in infant mortality, while the father's educational level is a more decisive explanator of childhood mortality differences. The pattern for infant mortality coincides with that of fertility differences as seen in the same data source (Kwon T-H, 1982), sug-

Table III-7. Child, infant and childhood mortality by selected socio-economic variables for 1956-1970 birth cohort

(per hundred)

	Child (0-4)	Infant (0)	Childhood (1-4)
Grand mean	7.85	5.27	2.73
o. Mother's level of education			
Primary –	8.54	5.61	3.10
Secondary +	4.95	3.83	1.17
p. Father's level of education			
Primary –	9.24	5.81	3.64
Secondary +	6.43	4.71	1.80
q. Mother's employment/occupation status before marriage			
Not worked	7.76	5.26	2.64
Non-manual	6.47	5.20	1.34
Farmer	8.38	5.33	3.22
Labourer	7.86	5.20	2.81
r. Father's current occupation			
White collar	6.01	4.57	1.51
Service/sales	6.76	5.02	1.83
Farmer	9.44	6.09	3.57
Labourer	6.93	4.52	2.52
s. Mother's grown-up place			
Rural	8.07	5.33	2.90
Urban	6.71	4.95	1.85
t. Father's grown-up place			
Rural	8.20	5.45	2.91
Urban	6.11	4.41	1.78
u. Current residence			
Rural	8.86	5.89	3.16
Urban	6.81	4.66	2.26

gesting that fertility is an important intermediate variable in differentiating infant mortality. On the other hand, the contrasting pattern for childhood mortality is accounted for by the fact that the standard of living and the life style of a family are determined primarily by the socio-economic status of the father. The same assumption can have an extended application to mortality differences in infancy and childhood by other socio-economic variables, discussed below.

Little difference was observed in the level of infant mortality in terms of the mother's occupation/employment status. When the relationship is controlled for the year of birth, no consistent patterns can be detected. In the case of childhood mortality, however, a marked difference can be seen between births occurring to mothers employed as non-manual workers before marriage and births to mothers who had manual jobs or did not work. When only the mother's employment status is considered, the lowest childhood mortality is observed among non-manual workers, and the next among non-working mothers. Similar tendencies appear for differences in child mortality depending on the father's occupation. Although there are some differences in infant mortality in terms of the father's occupation, the pattern is not consistent at all among the three year-of-birth groups. In the case of childhood mortality, children with parents in professional or managerial positions are in the least risk of dying group, which is followed by children with fathers in clerical jobs. The highest risk is found among children whose fathers are farmers. When observed separately for each year of birth group, minor variations from this pattern can be noted due most probably to their small sample sizes.

Between the occupation/employment statuses of the father and the mother, the father's appears to be relatively more important in explaining the differences in both infant and childhood mortality. After controlling for each together with the year of birth, no significant variations in either infant of childhood mortality can be observed in terms of the mother's occupation/employment status, whereas differences relative to the father's occupation are outstanding. It is well established, however, that a man's occupation is closely related to his educational level. When controlled for the level of education in this light, differences by the father's occupation mostly vanish (see table III-9).

The residential background of the parents consists of three variables; the place the father grew up, the place the mother grew up and the current residence. Each residential type is separated into either urban or rural areas. In all three indicators of residential background, an urban background is found to be associated with lower mortality in both infants and children aged 1-4. Here too, there are much larger gaps in childhood mortality. If the difference according to the place where the father grew up is compared with the mother's, the former is slightly greater than the latter. It was also found that infant and childhood mortality for both urban and rural areas defined by the type of current residence are higher than those for the equivalent areas defined by the type of place either the father or the mother grew up. This observation clearly indicates that the mortality of children born to parents who have migrated from rural to urban areas is placed in between that of children born to rural non-migrants and that of children born to urban non-migrants. In other words, the migration status of residents may be thought to be associated with the mortality of their children at ages 0-4, but none of these patterns are well confirmed if the differences are examined for the three birth cohorts of children, separately.

Among the three types of socio-economic variables (education, occupation/employment and residence), the level of the parents' education turns out to provide the most important explanation of mortality differences for children 0-4 years old. There is little relationship between residential background and mortality at ages 0-4 when controlling for other socio-economic variables and the year of birth, and a slightly significant relationship between the occupational status of the father and childhood mortality. It can also be observed that the socio-economic background of the father is as important, or more important than, the status of the mother in explaining the differences in infant and childhood mortality. The current analysis of the differences in child mortality at ages 0-4 confirms the assumption, made in accordance with the earlier discussion on the relationship between bio-physiological factors and child mortality, that socio-economic or cultural factors are the major determinant of mortality for children aged 1-4, while infant mortality is largely controlled by bio-physiological factors.

5. CHILD REARING CONDITIONS AND CULTURAL FACTORS

In the mind of most Koreans, there has been a clear preferential ordering of children in terms of sex and parity. The traditional family system is said to have developed a strong son preferences as well as placing great value of the first or at least one son. Consequently, a first

Table III-8. Child, infant and childhood mortality by selected socio-economic variables for birth cohorts 1956-1960, 1961-1965 and 1966-1970

(per hundred)

	Child (0-4)			Infant (0)			Childhood (1-4)		
	1956-1960	1961-1965	1966-1970	1956-1960	1961-1965	1966-1970	1955-1960	1961-1965	1966-1970
Grand mean	10.41	7.95	6.40	6.07	5.17	4.93	4.62	2.94	1.55
o. Mother's level of education									
Primary –	11.31	8.48	6.92	6.61	5.42	5.17	5.03	3.23	1.84
Secondary +	4.93	5.24	4.80	2.63	3.88	4.18	2.36	1.41	0.65
p. Father's level of education									
Primary –	11.67	9.43	7.45	6.57	5.98	5.15	5.45	3.68	2.43
Secondary +	8.72	6.31	5.54	5.34	4.27	4.75	3.57	2.13	0.82
q. Mother's employment/occupation status before marriage									
Not worked	9.05	7.92	6.78	5.35	5.28	5.18	3.91	2.79	1.70
Non-manual	5.04[a]	6.95[a]	6.67[a]	3.36[a]	4.81[a]	5.93[a]	1.74[a]	2.25[a]	0.79[a]
Farmer	14.09	7.25	6.07	8.42	4.56	4.38	6.85	2.82	1.76
Labourer	8.78[a]	11.45[a]	5.28[a]	4.73[a]	6.87[a]	4.32[a]	4.26[a]	4.92[a]	1.00[a]
r. Father's current occupation									
White collar	7.19[a]	4.90[a]	5.16	5.14[a]	2.58[a]	5.63	2.17[a]	2.38[a]	0.56
Service/sales	9.55[a]	7.11[a]	5.09	6.05[a]	5.08[a]	4.45	3.73[a]	2.14[a]	0.67
Farmer	12.68	9.75	7.11	6.85	6.48	5.23	6.26	3.50	1.98
Labourer	8.57	6.76	6.30	5.18	4.17	4.47	3.58	2.71	1.92
s. Mother's grown-up place									
Rural	10.91	7.98	6.57	6.17	5.17	4.99	5.04	2.96	1.66
Urban	8.08[a]	7.64	5.44	5.56[a]	5.21	4.49	2.64[a]	2.56	0.99
t. Father's grown-up place									
Rural	11.25	8.37	6.32	6.58	5.64	4.64	5.00	2.89	1.76
Urban	5.98[a]	5.81	6.36	3.42[a]	2.99	5.77	2.65[a]	2.90	0.63
u. Current residence									
Rural	11.88	9.50	6.43	6.72	6.46	4.85	5.53	3.26	1.66
Urban	8.82	6.25	6.25	5.37	3.83	4.92	3.65	2.52	1.40

[a] less than 500 births;

[b] less than 100 births.

Table III-9. MCA of child, infant and childhood mortality for combinations of selected socio-economic variables

(adjusted deviation from the mean)

	Child (0-4)	Infant (0)	Childhood (1-4)
(Grand mean	7.85	5.27	2.73)
g. For mother's education and father's education			
Mother's level of education			
primary –	0.43	0.27	0.18
secondary +	−1.81 ***	−1.13 **	−0.74 *
(beta)	(0.03)	(0.02)	(0.02)
Father's level of education			
primary –	0.89	0.28	0.66
secondary +	−0.91 ***	−0.29	−0.67 ***
(beta)	(0.03)	(0.01)	(0.04)
Year of birth			
(beta)	(0.05) ***	(0.02)	(0.07) ***
Multiple R	0.080	0.037	0.091
h. For mother's employment/occupation and father's occupation			
Mother's employment/occupation status before marriage			
not worked	−0.14	−0.01	−0.14
non-manual	−0.11	0.46	−0.60
farmer	0.12	−0.15	0.30
labourer	0.56	0.20	0.40
(beta)	(0.01)	(0.01)	(0.02)
Father's current occupation			
white collar	−1.76	−0.78	−1.06
service/sales	−1.05	−0.28	−0.81
farmer	1.49	0.84	0.72
labourer	−0.84 ***	−0.74 **	−0.12 ***
(beta)	(0.05)	(0.03)	(0.04)
Year of birth			
(beta)	(0.06) ***	(0.02)	(0.07) ***
Multiple R	0.076	0.038	0.088
i. For residential background of parents			
Mother's grown-up place			
rural	0.05	−0.06	0.11
urban	−0.21	0.23	−0.44
(beta)	(0.00)	(0.01)	(0.01)
Father's grown-up place			
rural	0.22	0.12	0.11
urban	−0.95	−0.52	−0.47
(beta)	(0.02)	(0.01)	(0.01)
Current residence			
rural	0.80	0.57	0.27
urban	−0.75 **	−0.53 **	−0.25
(beta)	(0.03)	(0.02)	(0.02)
Year of birth			
(beta)	(0.06) ***	(0.02)	(0.07) ***
Multiple R	0.070	0.035	0.081
j. For mother's socio-economic background			
Mother's level of education			
primary –	0.66	0.40	0.28
secondary +	−2.78 ***	−1.71 ***	−1.16 ***
(beta)	(0.05)	(0.04)	(0.03)
Mother's employment/occupation status before marriage			
not worked	−0.20	−0.04	−0.17
non-manual	0.92	1.15	−0.23
farmer	0.04	−0.22	0.29
labourer	0.29	−0.01	0.31
(beta)	(0.01)	(0.02)	(0.01)
Mother's grown-up place			
rural	0.04	−0.01	0.05
urban	−0.17	0.02	−0.19
(beta)	(0.00)	(0.00)	(0.01)
Year of birth			
(beta)	(0.05) ***	(0.02)	(0.07) ***
Multiple R	0.075	0.039	0.085
k. For father's socio-economic background			
Father's level of education			
primary –	0.80	0.28	0.56
secondary +	−0.83 **	−0.29	−0.57 ***
(beta)	(0.03)	(0.01)	(0.03)
Father's current occupation			
white collar	−1.02	−0.47	−0.59
service/sales	−0.59	−0.09	−0.53
farmer	0.96	0.58	0.43
labourer	−0.63 *	−0.59	−0.07
(beta)	(0.03)	(0.02)	(0.03)
Father's grown-up place			
rural	0.15	0.08	0.07
urban	−0.62	−0.35	−0.30
(beta)	(0.01)	(0.01)	(0.01)
Year of birth			
(beta)	(0.05) ***	(0.02)	(0.07) ***
Multiple R	0.081	0.039	0.092
l. For major socio-economic variables			
Mother's level of education			
Primary –	0.46	0.27	0.23
secondary +	−1.94 ***	−1.13 **	−0.88 **
(beta)	(0.04)	(0.02)	(0.03)
Father's current occupation			
white collar	−0.86	−0.08	−0.83
service/sales	−0.71	0.05	0.79
farmer	1.08	0.45	0.68
labourer	−0.83 *	−0.66	−0.19 *
(beta)	(0.03)	(0.02)	(0.04)
Current residence			
rural	0.06	0.18	−0.11
urban	−0.06	−0.17	0.10
(beta)	(0.00)	(0.01)	(0.01)
Year of birth			
(beta)	(0.05) ***	(0.02)	(0.07) ***
Multiple R	0.082	0.044	0.089

* Significant at 0.1; ** at 0.05; *** at 0.01.

son is most preferred by parents and the next preference goes to other sons. Such a distinctive preference in the ordering of the children can be expected to have had great implications for the children's mortality differences in accordance with their position among their siblings in high mortality conditions. If the basic resources for child rearing are in short supply, the priorities for resource allocation among the children will be determined by the preferred ordering of the children. In other words, each child in a family is subject to different child

rearing conditions in line with its position on the scale of preference. It is also presumed in the same context that if the previous child is a son, the next child will receive relatively poor care from the family or parents due to their inferior position vis a vis the previous child. Whether or not the family or the couple had experienced the death of a previous child may consititute another factor which would condition a psychological state in the parents in connection with the child rearing of later children. It can be hypothesized that the experience of the death of a child will give rise to more care for the children who follow. Besides, the child rearing situation is likely to be directly affected by the number of children in a given period and the child spacing of a particular birth if other conditions are equal.

It has been mentioned that childhood mortality is lower for males than for females due most probably to the prevalence of a strong son preference. With a more sophisticated preference ordering of children which accounts for the preference of sons by parity, a further difference can be observed. Disregarding the timing (year) of the births of children, the lowest mortality for the ages 1-4 if for first sons among the children surviving at the time of a particular birth, while the highest level is reported for daughters (see table III-10). This pattern of childhood mortality coincides exactly with the preferential ordering of children, but in the case of infant mortality, the preferential ordering explains the differences only partially. Unlike in the case of childhood mortality, daughters show less risk of dying in infancy than sons regardless of their position among brothers, but when only sons are considered, first sons display a lower infant mortality rate than other sons on the average, suggesting again that psychological factors intervene, though only partially, the patterns of infant mortality, while they dominate the patterns of childhood mortality. When the relationship is examined for the three five year birth cohorts separately, little deviation appears in the patterns of differences in childhood mortality, while some irregularities are found in infant mortality (see table III-11).

Table III-10. Child, infant and childhood mortality by selected child rearing constraints and cultural variables for 1956-1970 birth cohort[a]

(per hundred)

	Child (0-4)	Infant (0)	Childhood (1-4)
Grand mean	7.85	5.27	2.73
v. Preferential order of children			
1st son surviving	7.46	5.33	2.25
other sons	8.11	5.61	2.65
daughters	7.91	5.06	3.01
w. Sex of the previous birth			
no birth	8.36	5.53	2.99
male	8.15	5.44	2.86
female	7.18	4.90	2.39
x. Number of surviving children before the birth			
0-1	7.88	5.57	2.64
2	7.41	4.53	3.04
3 or more	8.39	5.24	2.65

[a] For the variables, birth interval, pregnancy wastage in the birth interval, children's death before a particular birth, see table III-4.

As discussed above, the preferential ordering of children seems to affect the level of mortality during childhood in still another way. The birth following a male birth shows more risk of dying than the birth after a female birth. If controlled for year of birth, however, this pattern is not apparent for either infants or children aged 1-4. On the other hand, the results of the current analysis are a sound basis for rejecting the idea that a child's death before the birth of a particular child would lead the family to give better care to that particular child, thus resulting in a lower infant or childhood death rate for such children. As examined earlier, there is a reverse tendency between the previous experience of a child's death and the risk of dying of a child born after such an experience. Rather, this finding suggests that the previous experience of a child's death is an indication of the prevalence of relatively poor child rearing conditions in the family, which is in turn believed to be closely associated with socio-economic status. In the case of birth interval, as a constraint in child rearing conditions, no further discussion is required here since its impact on infant and childhood mortality has been examined earlier in detail. Based on those observations, it can be concluded here that the birth interval, or child spacing, has constituted one of the most important determinants of child rearing conditions during both infancy and childhood in Korean society.

6. SUMMARY OF THE FINDINGS ON DIFFERENTIAL MORTALITY DURING INFANCY AND CHILDHOOD

From the analysis of differential infant and childhood mortality in the Republic of Korea based on the 1974 KNFS data, several interesting observations can be made, although the analysis itself was subject to various types of problems related to the quality of data, relatively small sample size for the analysis of differential mortality, data arrangement and so forth. Also, interpretations of the findings appear to be problematic in many cases. It is

frequently observed that logical or theoretical hypotheses are supported by the results of crude analyses but are rejected as invalid when checked by those based on refined techniques. The results obtained by the use of refined techniques such as MCA may be viewed as more reasonable, but it seems to the author that such techniques are likely to introduce unexpected biases or distortions since the current data and analytical framework are not sufficiently adequate for their use. Keeping these limitations in mind, let us now summarize the tentative findings of differential mortality at ages 0-4.

First, the major factors associated with mortality differences in infancy differ for the most part from those affecting mortality differences for children aged 1-4. Bio-physiological factors appear to influence mortality during infancy most, while social, economic and cultural factors are found to be major determinants of child rearing conditions which affect the level of mortality of a child greatly after infancy. This observation can be extended to conclude that the survival of a child is governed mostly by bio-physiological conditions immediately after birth, but the effect of these conditions vanishes rapidly, while soocio-economic and cultural situations again importance in regulating survival as the child grows older.

Among the variables included in the current analysis, child spacing is apparently the most crucial determinant of infant mortality in the Republic of Korea. This suggests that the fertility behaviour of individual couples is very closely associated with infant and childhood mortality, and thus that the fertility transition in the Republic of Korea since the early 1960s is a major force in reducing child mortality. In addition, the status of breast feeding, a child's sex, the status of pregnancy wastage within a given birth interval and the survival of previous children before a particular birth are listed as important bio-physiological factors influencing the survival of an infant. These factors, except the child's sex, also reveal significant associations with childhood mortality, though the degree of association is greatly reduced. Unlike bio-physiological variables, the demographic background of the mother both at the time of the survey and at the time of the birth of each child, such as age and marriage duration, seems hardly to be related to the survival of children.

A child's risk of dying, particularly at ages 1-4, is closely associated with parents' educational level. Although child mortality differs according to other socio-economic variables such as residential background and the parents' occupation/employment status, most of the differences are found to be spurious when controlled for other socio-economic variables and a child's year of birth. Only a minor relation-

Table III-11. Child, infant and childhood mortality by selected child rearing constraints and cultural variables for birth cohorts 1956-1960, 1961-1965 and 1966-1970[a]

(per hundred)

	Child (0-4)			Infant (0)			Childhood (1-4)		
	1956-1960	1961-1965	1966-1970	1956-1960	1961-1965	1966-1970	1956-1960	1961-1965	1966-1970
Grand mean	10.41	7.95	6.40	6.07	5.17	4.93	4.62	2.94	1.55
v. Preferential order of children									
1st son surv.	8.42	8.33	6.06	5.30	5.77	4.98	3.29	2.72	1.14
other sons	11.96[b]	8.41	6.27	7.17[b]	5.57	5.00	5.15[b]	3.01	1.34
daughters	10.94	7.50	6.64	6.05	4.64	4.86	5.21	3.00	1.86
w. Sex of the previous birth									
no birth	10.43	8.30	6.73	6.55	4.93	5.21	4.15	3.55	1.60
male	11.00	7.81	6.96	6.52	5.23	5.06	4.79	2.72	2.01
female	9.61	7.87	5.66	4.89	5.25	4.63	4.97	2.77	1.08
x. Number of surviving children before the birth									
0-1	10.22	8.19	6.30	6.52	5.36	5.02	3.95	2.99	1.35
2	10.12[b]	6.59	6.78	4.71[b]	3.71	5.18	5.68[b]	3.00	1.69
3 or more	12.17[b]	8.65	6.31	5.65[b]	6.04	4.61	6.91[b]	2.77	1.78

[a] For the variables, birth interval, pregnancy wastage in the birth interval and children's death before a particular birth, see table III-8.

[b] Less than 500 births.

Table III-12. MCA of child, infant and childhood mortality for combinations of selected child rearing constraints and cultural variables, for all births and the second or higher order births

(adjusted deviation from the mean)

Mortality:	Child (0-4)		Infant (0)		Childhood (1-4)	
Births:	All	2nd+	All	2nd+	All	2nd+
(Grand mean	7.85	7.67	5.27	5.17	2.73	2.64)
m. For preferential order of children, sex of the previous birth and children's death before the birth						
Preferential order of children						
1st son surv.	−0.72	−1.28	−0.07	−0.25	−0.69	−1.09
Other sons	0.56	0.46	0.47	0.42	0.12	0.06
Daughters	0.07	−0.07	−0.21	−0.22	0.29	0.29
(beta)	(0.02)	(0.02)	(0.01)	(0.01)	(0.02)*	(0.03)*
Sex of the previous birth						
No birth	1.48		1.01		0.53	
Male	−0.29	0.17	−0.19	0.15	−0.11	0.02
Female	−0.76	−0.17	−0.52	−0.16	−0.26	−0.02
(beta)	(0.03)**	(0.01)	(0.03)*	(0.01)	(0.02)	(0.00)
Children's death before the birth (for all births)						
No deaths	−0.89	−1.21	−0.69	−0.93	−0.23	−0.31
1 or more	3.86	3.55	2.97	2.73	1.03	0.96
(beta)	(0.07)***	(0.08)***	(0.06)***	(0.07)***	(0.03)***	(0.03)***
Year of birth	(0.06)***	(0.06)***	(0.02)	(0.02)	(0.07)***	(0.08)***
Multiple R	0.090	0.100	0.066	0.091	0.082	0.090
n. For birth interval, duration at birth and number of surviving children						
Birth interval						
0-17 months	2.92	8.88	2.12	6.82	0.92	2.54
18-29	0.20	0.47	0.21	0.35	0.01	0.14
30 or more	−1.79	−1.96	−1.35	−1.49	−0.49	−0.53
(beta)	(0.07)***	(0.11)***	(0.06)***	(0.10)***	(0.03)**	(0.05)***
Marriage duration at birth						
0-4 years	−1.50	−2.13	−1.71	−2.23	0.18	0.05
5-9	0.30	−0.18	0.34	−0.25	0.04	0.07
10 or more	2.45	2.06	2.79	2.23	−0.29	−0.13
(beta)	(0.06)***	(0.06)***	(0.08)***	(0.08)***	(0.01)	(0.01)
Number of surviving children before the birth						
0-1	0.49	0.72	1.04	1.44	−0.56	−0.73
2	−0.35	−0.20	−0.91	−0.56	0.56	0.36
3 or more	−0.79	−0.66	−1.53	−1.18	0.75	0.53
(beta)	(0.02)	(0.02)	(0.06)**	(0.05)**	(0.04)	(0.04)
Year of birth	(0.06)***	(0.06)***	(0.02)	(0.01)	(0.08)***	(0.08)***
Multiple R	0.084	0.122	0.064	0.105	0.082	0.096
o. For birth interval, sex of the previous birth and pregnancy wastage in the birth interval						
Birth interval						
0-17 months	2.88	8.21	2.15	6.35	0.85	2.30
18-29	−0.13	0.11	−0.14	0.01	0.01	0.10
30 or more	−1.45	−1.51	−1.04	−1.10	−0.47	−0.46
(beta)	(0.06)***	(0.10)***	(0.05)***	(0.09)***	(0.03)*	(0.04)***
Sex of the previous birth						
No birth	−1.23		−0.93		−0.36	
Male	0.87	0.45	0.59	0.28	0.32	0.19

Table III-12 *(continued)*

(adjusted deviation from the mean)

Mortality.	Child (0-4)		Infant (0)		Childhood (1-4)	
Births:	All	2nd+	All	2nd+	All	2nd+
Female	–0.01	–0.46	0.06	–0.29	–0.07	–0.20
(beta)	(0.03)**	(0.02)	(0.03)*	(0.01)	(0.02)	(0.01)
Pregnancy wastage in birth interval						
Not wasted	0.15	0.17	0.11	0.12	0.04	0.06
Wasted	–2.37	–2.71	–1.81	–1.87	–0.62	–0.90
(beta)	(0.02)**	(0.03)**	(0.02)*	(0.02)*	(0.01)	(0.01)
Year of birth	(0.06)***	(0.05)***	(0.02)	(0.01)	(0.07)***	(0.07)***
Multiple R	0.084	0.118	0.057	0.095	0.079	0.092

* Significant at 0.1; ** at 0.05; *** at 0.01.

ship can be seen between the father's occupation and childhood mortality. When a comparison is made of the socio-economic background of the father and that of the mother, the former appears better to explain the mortality differences of children, although the gap is slight. The culture bound preferential ordering of children based on sex and parity is found to be a factor producing significant differences in childhood mortality.

In addition to various problems involved in the current analysis mentioned earlier, it should also be remembered that the data used here consisted of births which occurred between 1956 and 1970. Considering that the mortality transition started in the Republic of Korea as early as the 1910s or the 1920s and is still in progress, the current findings should be viewed as representing neither the earlier nor more recent mortality phenomena. It is very likely that rapid declines in the level of mortality in the Republic of Korea since 1970 would have produced considerable changes in the pattern of mortality differences between the ages 0 and 4, too. Probably, the direction of change can be anticipated; that is, the increasing importance of bio-physiological factors, relative to socio-economic and cultural factors, in explaining the difference in child mortality, since mortality declines usually mean the lessening interference of socio-economic or cultural factors in mortality regulating conditions, but the assumption may also be contested in the context of recent Korean development. As is discussed in chapters V and VI, the discrepancies in health related conditions, such as the accessibility to or availability of good medical service and nutritional status, have widened among various socio-economic groups due to the uneven distribution of benefits from national development.

7. DIFFERENTIALS IN ADULT MORTALITY

Information on the socio-economic background of adults who have died is rare in the Republic of Korea. The 1980 vital statistics report contains data on registered deaths cross tabulated by age, sex and occupation. In addition, the 1974 KNFS provides partial indirect information on differentials in the adult mortality of men who were married at least once and whose latest wife still survived at the time of the survey. Of the two available pieces of datum, the former is found to be higher deficient; particularly, the reporting of occupation is too unreliable to be used for any practical purposes of mortality study. For example, the death rate for farmers is reported to have been more than double that for non-farmers, and professional workers showed the highest death rate for all age groups among the non-farming population during 1975-79. Such a pattern can never be understood as reasonable, and therefore points only to the extremely poor quality of death registration in the Republic of Korea.

On the contrary, even though the information is limited to male deaths which are identified from the marital records of ever married women aged 15-49, the data from the 1974 KNFS offers some important clues to the patterns of adult mortality since it also contains information on socio-economic background of the late as well as the current husbands. The present discussion on differentials in adult mortality is based on this data.

According to table III-13, the educational level shows a very close association with the risk of dying for adult men born in both the periods 1935-1944 and 1945-1954. The educational level is inversely related to the probability of dying, but

no such relationship is found for the earlier birth cohort of 1925-1934.

Whether a man lived mostly in rural or urban areas before marriage does not appear to be a factor in differentiating the level of their mortality. Unlike what might be expected, men with rural backgrounds show a lower death rate than those with urban backgrounds in the birth cohorts of 1925-1934 and 1935-1944. The reverse is the case, though the gap in the proportion of the deceased is small, in the more recent 1945-1954 cohort. Similar unlikely tendencies can be observed in the occupational differences in adult male mortality. The highest probability of dying occurs among white collar workers in the 1925-1934 cohort and among sales/service workers in the 1935-1944 and 1945-1954 cohorts, while the lowest risk is found among labourers in the 1925-1934 and 1935-1944 cohorts and among white collar workers in the 1945-1954 cohort. The comparability of the occupational status of those surviving currently and those who died long ago may well questioned. For example, a much greater proportion of low status clerical workers can be expected to be included in the white collar workers who died than among those still surviving if the birth cohort is controlled. Also, labourers can be expected to have a relatively high concentration in the young adult age group, while sales workers would in the late adult group. In other words, occupational mobility from labourer to sales worker takes place frequently with the aging of the workers, and this would partly explain the relatively low mortality for labourers and high mortality for sales and service workers which appears in table III-13.

Table III-13. Per cent proportions dying of the first husbands of ever-married women currently surviving: the 1974 KNFS

Year of birth	1925-1954	1925-1934	1935-1944	1945-1954
Grand mean	5.49	13.46	6.94	1.43
a. Type of grown-up place				
Rural	5.57	13.39	6.71	1.46
Urban	5.01	14.08[b]	8.61[a]	1.32[a]
b. Level of educational attainment				
Primary or less	7.59	13.23[a]	9.02	2.54
Secondary or more	3.86	13.76[a]	4.89	0.85
c. Latest occupation				
White collar	4.82	14.29[a]	6.34[a]	0.79[a]
Service/sales	5.72	13.13[b]	8.40[a]	2.05[a]
Farmer	6.94	13.52[a]	7.34	2.05[a]
Labourer	4.10	12.86[a]	5.93	1.01

[a] less than 500 persons;

[b] less than 100 persons.

Table III-14 presents the MCA result of the survivorship of the first husbands of the women respondents in terms of the level of educational attainment, the grown-up place, the occupation and year of birth of the husbands. The result confirms the above observation that adult male mortality is significantly different by educational level and the year of birth. From the above, it may be plausible also, the assume that socio-economic differences in adult male mortality in the Republic of Korea have become distinctive in recent years and in the process of urbanization, educational expansion and industrialization. Such a changing pattern may well be explained by the growing disparities in health and nutritional conditions among various socio-economic groups since the late 1970s, as discussed in chapters V and VI. Also, it is believed that these findings on male mortality can be applied to women with little change.

Table III-14. MCA of proportions dying of the first husbands of ever-married women currently surviving for socio-economic variables of husband: The 1974 KNFS

	No.	Adjusted deviation from the mean
(Grand mean		5.49)
Type of grown-up place		
rural	3 716	–0.20
urban	659	1.11
(beta)		(0.02)
Level of educational attainment		
primary or less	1 911	1.68
secondary or more	2 464	–1.30
(beta)		(0.06)***
Latest occupation		
white collar	767	0.60
service/sales	752	1.19
farmer	1 514	–0.29
labourer	1 342	–0.68
(beta)		(0.03)
Year of birth		
1925-1934	676	7.67
1935-1944	1 744	1.36
1945-1954	1 955	–3.87
(beta)		(0.18)***
Multiple R		0.196

*** Significant at 0.01.

IV. MAJOR HEALTH PROBLEMS AND CAUSES OF DEATH

1. PREVALENCE OF DISEASES

Infant mortality is usually thought of as the most general indicator of health conditions of a society. It has been mentioned earlier (section II-3) that Korean society has witnessed an incessant decline in infant mortality since the 1920s with the exception of the Korean conflict years 1950-1953, indicating a continuous improvement in health conditions throughout the country. All other mortality indicators lead us to the same conclusion. Apart from overall health conditions, specific health problems which Korean society has faced can be properly understood only through the examination of morbidity patterns, changing causes of death, development of health policies and systems, and other factors such as nutrition. We will review the status and problems related to morbidity and causes of deaths in this chapter, and other topics will be dealt with in the following chapters.

Concerning the prevalence of diseases, information is very limited. For the nation as a whole, the government has collected information on morbidity at three year intervals since 1977 through the Social Statistical Survey, from which table IV-1 originated. Also, national surveys on health were conducted in the early 1980s by the Korean Institute for Population and Health (Moon and others, 1982; KIPH, 1984b), and scattered pieces of materials are available for selected areas. Among them, a set of information from an anthropological type survey conducted in five ecologically distinctive communities throughout the country apparently renders a rough picture of the relationship between community related factors and patterns of morbidity. It should be noted, however, that the survey data on sickness and disease are basically subjective in nature, and thus lack any rigorous measurement criteria from the medical point of view. The comparability of these surveys is highly questionable in view of the concepts, methods, reference period and timing adopted in each. For example, a 1976 rural survey reveals that the subjective reporting on ill health conditions were only 50 accurate and accounted for about 35 per cent of the ill health cases determined by medical examination (Kim J-S and others, 1977: 24-25).

According to the 1977 Social Statistical Survey, 7 per cent of the population were sick during the one month reference period prior to the survey. The rate for the reduced two week period rose to 9.2 in 1980 and dropped again to 7.6 per cent in 1983. The changes in the morbidity rate may be attributed partly to various types of survey biases, and thus can not be fully accepted as an indication of the real morbidity trend during the period 1977-1983. Nevertheless, table IV-1 shows persistent differences in morbidity in terms of sex and residential area. Morbidity is higher for urban areas and for females. This pattern is also confirmed by other surveys between 1971 and 1983 (Kim J-S and others, 1977:31-32; Moon H-S and others, 1982:94). The difference by sex may be alluded largely to higher proportions of female population in old ages, whereas the regional difference is thought to be accounted for by the regional difference in the perception of sickness. As suggested by the anthropological survey mentioned above, the perception of disease may develop in relation to the availability of health and medical services, the major types of work in earning a livelihood and the population composition of the community. For example, in areas where most occupational activities do not require particularly good physical conditions throughout the year and can be performed easily by a replacement or postponed with little disadvantage to the workers, concern with sickness is relatively minor. In such areas, the prevalence of disease is reported to be less than in other types of areas regardless of the socio-economic status of the community (PDSC, 1985). From two KIPH surveys on health conducted in 1982 and 1983, a consistent pattern can be seen in the reported rate of morbidity between the low income class and other population sectors in urban areas; that is, the rate is significantly higher in the lower class. Excluding the lower class, no consistent difference is seen in terms of household income (Pyun J-W, 1982: 95-97). Considering the extremely unsanitary living environment of the urban low income residential areas and the prevalence of malnutrition among the poor, as discussed in section VI-4, such a differential can be easily understood. Various surveys on health also disclose a distinctive pattern of disease prevalence in terms of age. The

age specific prevalence rates show a "U" shaped curve with very low levels of morbidity at ages 10-29 (Moon O-R and Hong J-W, 1976; Pyun J-W, 1982: 95). Table IV-1 additionally presents the number of days of sick leave and the number of days confined in bed on the average. The number of days of sick leave is found to have gone down between 1977 and 1983, while the time for being confined to bed increased substantially between 1977 and 1980. It is, however, too early to determine whether these represent reality, and thus to find probable explanations.

From table IV-2, it is possible to come to some crude conclusions on the general patterns

Table IV-1. Morbidity rate, days of disability and days confined in bed for a specified reference period before survey by sex and area, 1971-1983

A. Morbidity rate (per cent)

	Sources				
	Social Statistical Survey[a]			Kim	KIPH[b]
During	1977 1 month	1980 2 weeks	1983	1971-1973 1 month	1982 15 days
Whole country					
Both sexes	7.0	9.2	7.6	19.6	13.6
Male	6.5	8.3	7.1	17.0	12.2
Female	7.4	10.0	8.1	22.7	15.0
Urban area					
Both sexes	8.0	10.7	9.3	22.8	13.9
Male	7.5	9.8	8.5	19.8	12.2
Female	8.4	11.7	10.0	25.7	15.6
Rural area					
Both sexes	6.1	7.4	4.9	16.0	13.2
Male	5.6	6.7	4.8	13.5	12.1
Female	6.5	8.1	5.0	18.6	14.3

B. Days in sick leave and confined in bed (Social statistical survey[a])

	Days of sick leave			Days in bed		
During	1977 1 month	1980 2 weeks	1983	1977 1 month	1980 2 weeks	1983
Whole country						
Both sexes	6.4	6.1	6.0	3.2	4.4	4.3
Male	6.3	6.2	6.0	3.1	4.6	4.6
Female	6.6	5.9	5.9	3.3	4.2	4.0
Urban area						
Both sexes	6.4	6.2	6.1	2.9	4.3	4.3
Male	6.3	6.3	6.1	2.9	4.5	4.6
Female	6.5	6.1	6.1	3.0	4.2	4.2
Rural area						
Both sexes	6.5	5.9	5.6	3.6	4.5	4.2
Male	6.3	6.1	5.7	3.3	4.8	4.6
Female	6.6	5.6	5.5	3.8	4.2	3.7

Sources: [a] EPB (B-1984: 183);
[b] Moon H-S and others (1982: 94);
Kim J-S (1977: 31-32).

Note: Morbidity rate = Number of people in illness/total population surveyed in each category.

of morbidity and disease treatment behaviour in the Republic of Korea. First of all, unlike the patterns of prevalent causes of death to be discussed presently, which reveal diseases of the circulatory system as the most important cause of death in the Republic of Korea recently, the most prevalent diseases in everyday living are those related to the digestive system, which is followed by diseases of the respiratory system and of the metabolic system. It can also be seen that the morbidity pattern of a community is closely associated with its environmental and demographic conditions. For instance, the quality of air is seemingly related to the incidence of respiratory diseases: the carbon monoxide diffused into the air may explain the dominance of diseases of the respiratory system in the metropolitan squatter area and the green-house farming community in table IV-2. On the other hand, sea diving to gather shell fish and humid air may be linked to the prevalence of respiratory diseases in the island fishing village. Diseases of the digestive organs such as stomachaches and diarrhoea are most commonly found among agricultural populations, which, in turn, can be related to the common dietary habit of eating heavy 'bab' (mostly cooked rice or barley) and 'kimchi' (hot and spicy pickled cabbage). It is generally believed that such a dietary habit is also prevalent in other parts of the country and health problems related to digestive organs due to it are ubiquitous, though the degree differs in terms of the socio-economic background of individuals. The relatively frequent incidence of metabolic diseases in the rice farming village may be explained by the higher proportion of aged population compared to other areas. Also, circulatory diseases are most frequently found in mining workers (PDSC, 1985).

2. TRENDS OF COMMUNICABLE AND OTHER TRADITIONALLY PREVALENT DISEASES

Although the coverage is grossly suspect, a long series of government statistics are available concerning the incidence of communicable diseases. The government has also published statistics on tuberculosis and leprosy patients

Table IV-2. Selected indicators of health status in five Korean communities, 1984

	Metro-politan squatter	Mining and agricultural	Green house farming	Rice farming	Island fishing	Total
A. Percentage of sick persons during last one year	23.3	19.4	23.2	14.2	18.8	19.7
B. Percentage of sick persons by duration of illness						
Less than 1 month	53.2	49.0	71.3	63.6	68.2	59.8
1-12 months	19.2	18.6	8.2	20.8	29.5	19.9
More than a year	27.7	32.4	20.5	15.6	2.3	20.4
C. Percentage of sick persons by symptoms						
Digestive	20.6	45.5	22.8	39.2	13.3	28.8
Respiratory	25.7	9.5	30.1	6.2	29.1	20.1
Circulatory	9.7	24.1	4.1	6.2	1.9	10.9
Metabolic	12.0	13.6	19.5	28.9	10.1	15.4
Others	32.0	7.3	23.6	19.6	45.5	24.8
D. Percentage of sick persons by method of treatment						
Visited clinic	54.8	52.9	60.0	31.7	59.9	54.9
Visited pharmacy	34.8	27.4	23.8	30.5	31.0	29.8
Took herb medicine	3.9	4.5	10.5	15.9	5.6	7.0
Others	1.3	–	1.9	7.3	2.1	2.0
None	5.2	8.9	3.8	14.6	1.4	6.2
E. Percentage of persons with listed symptoms recently						
Fever	13.6	30.2	14.1	1.4	31.0	18.2
Stomach ache	11.7	42.9	25.3	7.2	24.5	21.5
Headache	13.0	36.5	25.3	25.4	34.0	26.5
Queasiness	6.8	35.7	13.1	11.6	8.4	14.4
Diarrhoea	16.0	32.8	22.8	27.5	20.6	23.5

Source: PDSC (1985).

and the results of the parasitic infection test annually. Except data on parasitic infection, all these statistics have been compiled through administrative channels, and accordingly their coverage and the comparability of figures for different years are highly questionable. Nevertheless, they enable us to assemble a basic picture, though very rough, of the changing patterns of morbidity in the Republic of Korea in line with the process of epidemiologic transition.

It is well documented that the incidence rate of all communicable and infectious diseases, which were the major causes of death up to the 1950s, have gone down steadly since the 1920s when a modern health system and various modern health measures were introduced. Exceptions to this downward trend can be seen for the period 1945-1950 and for the Korean conflict years, 1950-1953. A particularly significant change is believed to have taken place after 1960 with the increasing availability of anti-biotics and the activation of local health centres to promote the national family planning programme.

According to government statistics, part of which are presented in table IV-3, communicable diseases in Class 1, such as cholera, dysentery, typhoid fever, diphtheria and malaria have become almost negligible in recent years. There was some cholera until 1970. For example 83 out of 100,000 persons were reported to be sick with chorela in 1946 and 5.3 persons in 1969. After 1970, the outbreak of cholera was reported only in 1980, but the rate of incidence was meager 0.4. In the case of dysentery, the rate of incidence ranged between 12 and 31 per 100,000 population during 1935-1945, but dropped to less than 2 since 1960. Malaria has been rare since 1960 without any active eradication programme, except in the year 1970, when its incidence rate was reported as 49.4. Smallpox, too, has been rare since 1960. The total rate of Class 1 communicable diseases ranged mostly between 60 and 100 during the colonial period 1925-1945, and was reduced to 20 and 30 during 1960-1965 and further to around one in recent years. A very similar pattern can be observed with Class 2 communicable diseases like whooping cough, measles and mumps. Currently, the total rate for these Class 2 communicable diseases is expected to be around 20. Furthermore, there have been marked drops in the fatality rate accompanying the changes in the incidence rate. Recently, few deaths are reported to have caused by any kind of communicable disease.

As becomes evident from the major causes of death to be discussed presently, tuberculosis and parasitic diseases were widely prevalent until the mid-1960s in the Republic of Korea, but the incidence of tuberculosis has greatly been reduced since then. As shown in tables IV-4 and IV-5, both the total number of tuberculosis patients registered and the tuberculosis prevalence rates for quinquennial age groups have decreased even further between 1970 and 1980. The same tendency can be seen for leprosy patients registered. Profound changes have taken place in the parasitic infection rate since 1970, too. According to the stool test results of school children, 63.5 were found infected in 1970, but the rate went down to 19.2 per cent in 1980 and to 8.6 per cent in 1983. These observations on communicable and other selected diseases clearly indicate that Korean society has entered the later stage of epidemiologic transition parallel with demographic transition.

Table IV-3. Registered morbidity rates of selected communicable diseases, 1940-1980

(per 100,000 population)

	1940	1955	1960	1965	1970	1975	1980
A. Class 1 communicable diseases							
Typhoid fever	42.4	2.0	13.2	13.5	13.2	1.8	0.5
Diphtheria	11.5	2.2	3.8	3.7	1.2	1.0	0.2
Bacterial dysentery	19.5	1.3	0.4	1.1	1.4	–	0.2
B. Class 2 major communicable diseases							
Whooping cough				17.5	10.4	5.1	3.5
Measles				36.4	13.7	16.2	8.9
Mumps				8.9	4.4	5.2	3.5

Sources: MHSA (A).

Note: The rates are three year moving averages.

Table IV-4. Prevalence of tuberculosis, leprosy and parasite infection, 1970-1983

	1970	1975	1980	1983
Registered number of T.B. patients	171 465	170 344[a]	153 942	
Registered number of leprosy patients	37 876	32 152	27 964	26 470
Rate of parasite infection (per cent)	63.5	48.2	19.2	8.6

Sources. MHSA (A).

[a] For 1976.

Table IV-5. Prevalence rates of tuberculin reactors, radiologically significant pulmonary tuberculosis and bacteriologically confirmed pulmonary tuberculosis by age group, 1965-1980

(in percentage)

	Radiologically sig. pul. tb.				Bacteriologically conf. tb.			
	1965	1970	1975	1980	1965	1970	1975	1980
5-9	3.0	2.8	2.1	0.7	0.12	0.06	0.16	0.03
10-14	1.7	1.9	1.4	0.5	0.13	0.04	0.07	0.03
15-19	2.1	2.5	1.8	1.5	0.80	0.39	0.47	0.19
20-24	3.8	3.8	2.7	2.1	0.97	0.69	0.60	0.53
25-29	4.4	2.5	2.9	2.2	1.45	0.39	0.83	0.20
30-34	5.7	4.2	3.0	2.2	1.28	1.07	0.73	0.45
35-39	6.6	5.4	3.0	2.8	0.62	1.40	0.68	0.72
40-44	8.8	6.8	4.3	3.1	2.68	1.11	1.39	1.17
45-49	8.0	6.3	5.7	4.7	2.64	1.35	1.69	0.85
50-54	8.8	5.8	6.0	4.3	1.15	1.34	1.95	0.84
55-59	10.4	8.8	7.0	5.8	1.66	2.59	2.29	1.28
60-64	12.7	8.3	7.8	7.7	2.54	2.56	1.56	1.94
65+	13.7	14.1	9.8	8.3	0.91	2.23	2.03	2.44
Total	5.1	4.2	3.3	2.5	0.94	0.74	0.76	0.54
(N =	13 438	18 264	27 090	23 319	13 438	18 264	27 090	23 319)

	Tuberculin reactors (10mm +)			
	1965	1970	1975	1980
0-4	10.2	8.5	4.8	4.9
5-9	33.7	26.1	15.9	12.6
10-14	69.5	54.1	49.6	32.1
15-19	69.4	72.0	69.6	71.1
20-24	77.3	73.4	78.8	73.2
25-29	80.0	81.8	81.3	79.7
30-34	84.6	85.0	87.1	85.6
35-39	84.5	85.3	87.1	85.6
40-44	87.2	89.6	86.9	87.9
45-49	86.6	87.9	86.8	87.1
50-54	85.4	87.2	86.0	86.2
55-59	85.2	84.9	85.5	85.2
60-64	83.8	80.7	82.6	72.4
65-69	82.6	80.7	81.8	78.4
70-74	73.9	74.6	77.7	75.4
75+	61.5	71.4	76.3	72.6
Total	59.7	59.0	58.5	57.6
(N =	12 944	14 417	17 950	13 604)

Source: MHSA (A-1985: 38-39).

3. CAUSES OF DEATH: GENERAL TRENDS

The information on causes of death, though available from as early as 1911, is of very poor quality. In the entire period 1910-1945, death certificates, usually provided by police and village leaders, did not provide any reliable clue to the real cause of death. Even today, the quality of reporting on causes of death remains unsatisfactory. Even in 1980, the certificates from physicians totalled less than 35 per cent (Kong S-K and others, 1983:20) and a significant portion of doctor's certificates is believed to have been issued without examining the patient or the body of the deceased. Moreover, the classificatory definitions and causes of death have often changed. The information has, however, some value, though rough, in helping us to understand the changing patterns of mortality conditions in the Republic of Korea over the last 70 years.

As shown in table IV-6, the leading causes

of death in 1920 were reported to be communicable/infectious and parasitic diseases, diseases of the respiratory organs, diseases of the nervous and sense system, and diseases of the digestive system. The infectious diseases alone, excluding influenza and some other diseases such as diarrhoea which were then classified as non-infectious, accounted for 30 per cent of all deaths for which the causes were reported. Owing to efforts by the colonial government to control infectious and epidemic diseases in the 1910s and 1920s, the proportion of deaths caused by them dropped significantly after 1921, while the other major causes of death remained unchanged to the end of the colonial period. More specifically, the main hazards of life during the colonial years were measles, influenza, tuberculosis, meningitis, bronchitis, pneumonia, diarrhoea, and nephritis. Among them, measles, meningitis, pneumonia, and diarrhoea were concentrated in the early childhood period.

Until the late 1960s, the major causes of death changed little. The only significant change in the 1960s was a substantial reduction of deaths caused by viruses such as influenza and diarrhoea, and this is known to have been related to the import and greater availability of new medicines including antibiotics since the Korean conflict. Entering the 1970s, however, the patterns of mortality by cause of death changed suddenly; diseases of the circulatory system, injury/poisoning and neoplasms became the major causes of death, whereas the proportion of deaths caused by diseases of the nervous and sense organs, diseases of the respiratory system, and diseases of the digestive organs was reported as less than 10 per cent each. More recently, between 1980 and 1983, there was a steady increase in the proportion of deaths caused by injuries, poisoning and neoplasms, whereas the proportion of deaths due to diseases of the circulatory system showed a marked decline, as is clear in table IV-7. No proper reason can be given for this phenomena, but the decreasing incidences of circulatory diseases (mostly hypertensive diseases) would have resulted from the government's efforts to improve the reliability of the reporting by doctors of the causes of death. More specifically, the major causes of death in 1980-1983 include cerebrovascular diseases, hypertension, poisoning and toxic effects, malignant neoplasm of the stomach, chronic liver disease and cirrhosis, cardiac arrest, tuberculosis, suicide, motor vehicle and traffic accidents, and intracranial and internal injuries (see table IV-7).

Such recent changes in the major causes of death are thought partly to reflect the modernization of mortality patterns in response to a rising standard of living resulting from rapid economic development since the late 1960s. These can also be explained partly by changes in the level of mortality. Comparing the recent distribution pattern of causes of death in the Republic of Korea with that in the United States and Japan, there is still a considerable gap,

Table IV-6. Trend of major causes of death from all cause classifiable registration reports, 1930-1983

(in percentage)

	1930	1939	1961	1966	1974[a]	1980	1983
Infectious and parasitic	8.6	12.3	12.8	11.4	5.9	4.0	4.5
Neoplasms	0.2	0.7	3.7	4.6	6.6	11.0	12.5
Blood, allergic, metabolic, and nutritional	2.9	0.7	3.8	2.7	0.9	1.2	1.1
Mental, nervous and sense organs	23.7	16.7	12.4	12.6	0.5	2.0	1.9
Circulatory system	4.8	0.9	3.0	3.9	14.8	26.6	27.9
Respiratory system	23.5	17.9	20.4	15.1	5.6	4.9	4.7
Digestive system	18.4	19.6	17.3	15.1	3.0	7.8	8.5
Genito-urinary system	2.7	3.3	1.6	1.2	0.8	0.9	0.9
Pregnancy, childbirth and puerperium	0.9	0.8	0.4	0.4	0.2	0.1	0.1
Skin and cellular tissue	1.8	0.2	0.0	0.0	0.0	0.0	0.0
Bones and organs of movement	1.2	0.2	0.4	0.4	0.3	0.4	0.4
Congenital malformations and certain diseases of early infancy	0.8	0.6	0.1	0.0	0.0	0.2	0.3
Symptoms senility and ill-defined	7.6	23.8	22.4	29.2	54.7	32.1	27.8
Accidents, poisoning and violence	2.9	2.2	1.7	3.5	6.7	8.8	9.5

Sources: GGK (B; 1939); NBOS (1965; 1966; C-1981; C-1983); Kong S-K and others (1983); Lee D-W and Kim I-S (1977).

[a] Based on registration data sampled by Lee D-W and Kim I-S.

Table IV-7. Percentages of causes of death diagnosed by doctors (Special list of 55 causes), Republic of Korea, 1980, 1981 and 1983

I.C. D. Number	Causes of death	1980	1981	1983
(Number of cases)		(58 187)	(64 404)	(68 467)
001-999	All causes of death	100.00	100.00	100.00
001-139	Infectious and parasitic diseases	5.02	4.97	4.87
001-009	Intestinal infectious diseases	0.39	0.49	0.53
010-018	Tuberculosis	3.90	3.82	3.76
033	Whooping cough	0.01	0.01	0.00
036	Meningococcal infection	–	0.00	0.02
037	Tetanus	0.03	0.03	0.03
038	Septicaemia	0.42	0.40	0.33
050	Smallpox	–	–	–
055	Measles	0.13	0.07	0.03
084	Malaria	0.01	0.00	0.00
140-208	Malignant neoplasms	13.98	14.31	15.47
151	M.N. of stomach	4.39	4.53	4.89
153	M.N. of colon	0.03	0.16	0.30
154	M.N. of rectum, rectosig -moid junction and anus	0.61	0.51	0.29
162	M.N. of trachea, bronchus and lung	1.16	1.34	1.62
174	M.N. of female breast	0.22	0.25	0.28
180	M.N. of cervix uteri	0.10	0.08	0.15
204-208	Leukaemia	0.55	0.64	0.70
250	Diabetes mellitus	0.97	1.01	1.03
261	Nutritional marasmus	–	–	0.09
262, 263	Other protein-calorie, malnutrition	0.07	–	0.00
280-285	Anaemias	0.19	0.19	0.17
320-322	Meningitis	0.52	0.47	0.47
390-459	Diseases of the circulatory system	32.27	29.51	27.72
390-392	Acute rheumatic fever	0.01	0.01	0.01
393-398	Chronic rheumatic heart disease	0.09	0.16	0.19
401-405	Hypertensive disease	10.08	10.52	4.22
410-414	Ischaemic heart disease	0.78	0.78	1.04
410	Acute myocardial infarction	0.64	0.60	0.75
*427.5	Cardiac arrest	5.07	4.22	
430-438	Cerebrovascular disease	11.53	9.65	15.65
*436	Acute ill-defined cerebrovascular disease	4.80	3.53	8.75
*437.8	Apoplexy	1.07	0.89	
440	Atherosclerosis	0.29	0.40	1.62
480-486	Pneumonia	1.76	1.44	1.42
487	Influenza	0.01	0.05	0.06
490-493	Bronchitis, emphysema and asthma	1.99	1.83	1.65
531-533	Gastric and duodenal ulser	0.65	0.63	0.48
540-543	Appendictis	0.04	0.02	0.03
571	Chronic liver disease and cirrhosis	4.16	4.36	5.04
580-589	Nephritis, nephrotic syndrome and nephrosis	0.80	1.13	0.97
600	Hyperplasia of prostate	0.01	0.02	0.02
630-639	Abortion	0.02	0.01	0.01
640-646 and 651-676	Directly obstetrical reasons	0.12	0.20	0.10
740-759	Congenital anomalies	0.48	0.54	0.67
760-779	Certain conditions originating in the perinatal period	0.08	0.10	0.09
767	Birth trauma	–	0.00	0.00
780-799	Symtoms, signs and ill-defined conditions	10.87	12.47	8.81
*797	Senility without mention of psychosis		5.43	5.05

Table IV-7 *(continued)*

I.C.D. Number	Causes of death	1980	1981	1983
*799	Other ill-defined and unknown cause of morbidity and mortality		6.63	
800-999	Injury and poisoning	18.03	20.13	22.24
800-829	Fracture of bones	2.26	2.65	4.82
850-869 and 950-957	Intracranial and internal injury	2.97	3.56	4.55
940-949	Burns	0.54	0.68	0.59
960-989	Poisoning and toxic effect	5.89	6.04	5.82
E800-E949	Accidents and adverse accidents	11.02	14.61	18.22
E810-E819	Motor vehicle traffic accidents	3.22	3.66	3.99
E880-E888	Accidental falls	0.33	0.35	3.24
E950-E959	Suicide	3.15	3.71	3.48
E960-E969	Homicide	0.35	0.33	0.34

Sources: Kong S-K and others (1983); NBOS (C-1981; C-1983).

* Causes added by the Korean government.

though it has narrowed significantly since 1960. When calculated based on the proportional distribution of causes of death in accordance with the 17 major classification categories, the index of dissimilarity (Keyfitz, 1968: 47) shows a slightly greater difference between the Republic of Korea and the States (28.9 between the Republic of Korea 1980 and the US 1977) than between the Republic of Korea and Japan (23.9 between the Republic of Korea 1980 and Japan 1978), while the difference between the States and Japan is much less apparent (16.9).

4. AGE-SEX PATTERNS OF CAUSES OF DEATH

Very distinctive differences in the composition of causes of death can be seen in terms of broad age groups as they were reported by doctors in 1980 and 1981. As is shown in table IV-8, injury and poisoning constitute the most important causes of death for people under age 45, whereas diseases of the circulatory system account for about 40% of deaths at ages 45 and over. Diseases of the circulatory system are listed as the second most important cause of death at ages 30-44, neoplasms at ages 45 and over. Diseases of the digestive organs are included among the five major causes for the population aged 15 or over. The proportional distribution of causes of death differs more widely between populations with wider age gap, though the difference is significant between any two age groups examined above.

When examined more closely, a distinctive pattern can be seen in the childhood age group 0-4. In contrast to the general pattern discussed above, the traditionally dominant causes of death are still found to play a major role in determining the risk of dying in childhood in the Republic of Korea. The 1981 registration data show that the most important causes of death in childhood are injury and poisoning (21.1 per cent). In addition, diseases of the respiratory system (11.2 per cent) and infectious and parasitic diseases (10.6 per cent), congenital anomalies (9.2 per cent) and diseases of the nervous and sense organs (9.0 per cent) account for the majority of deaths occurring in childhood. More specifically, pneumonia, meningitis, intestinal infectious diseases and tuberculosis are included in the list of prevalent diseases causing childhood deaths. This observation indicates that the recent epidemiologic transition in the Republic of Korea has not progressed equally for all ages. Lee Eun-Sul (1985) also observed that the composition of causes of death for childhood shows a much greater dissimilarity than that for adults, compared to the patterns for the equivalent age groups in the United States, suggesting a different pace or pattern of epidemiologic transition in terms of age between the Republic of Korea and developed societies. This would partly explain why mortality levels for children as gleaned from the census point to a much lower life expectancy compared to those indicated for adults reference to various kinds of model life tables including the UN Far-Eastern model (UN, 1982), as mentioned earlier.

We can also examine the age pattern of deaths by major causes in the same data. According to the 1980 registration statistics on deaths certified by doctors, the share of deaths caused by diseases of the circulatory system rises with the increase of age. Neoplasms, too, appear

Table IV-8. Percentages of causes of death diagnosed by doctors (17 major classification) by age group, 1980

I.C.D. Number	Cause of death	0-4	5-14	15-44	45-64	65+
Number of cases		2 750	1 855	14 912	19 639	19 031
001-999	All causes	100.00	100.00	100.00	100.00	100.00
001-139	Infectious and parasitic diseases	9.89	4.96	6.18	5.32	3.09
140-239	Neoplasms	3.53	8.52	10.76	20.65	11.86
240-279	Endocrine, nutritional metabolic diseases and immunity disorder	2.00	0.81	0.95	1.84	2.02
280-289	Diseases of blood and blood-forming organs	0.44	0.92	0.38	0.18	0.13
290-319	Mental disorders	0.55	0.59	1.42	0.56	0.51
320-389	Diseases of the nervous system and sense organs	7.45	9.33	2.15	0.69	0.55
390-459	Diseases of the circulatory system	13.67	11.86	19.18	36.63	42.70
460-519	Diseases of the respiratory system	14.80	4.53	2.09	2.91	7.07
520-579	Diseases of the digestive system	4.22	2.80	7.53	11.36	6.88
580-629	Diseases of the genitourinary system	0.62	1.67	2.12	1.27	1.09
630-676	Complications of pregnancy, childbirth and the puerperium	–	–	0.52	0.02	0.01
680-709	Diseases of the skin and subcutaneous tissue	0.15	0.05	0.11	0.09	0.11
710-739	Diseases of the musculoskeletal and connective tissue	0.40	0.27	0.31	0.39	0.25
740-759	Congenital anomalies	7.67	1.67	0.14	0.04	0.06
760-779	Certain conditions originating in the perinatal period	1.75	–	–	–	–
780-799	Symptoms, signs and ill-defined conditions	10.40	7.28	5.76	6.99	19.28
800-999	Injury and poisoning	22.69	45.61	40.36	11.04	4.37

Source: Kong S-K and others (1983).

to be a more important cause of the death as age increases, although the highest proportion of deaths caused by neoplasms is seen at ages 45 to 64. On the other hand, deaths resulting from injury and poisoning are most frequently found proportionally during the crucial working ages of 15 to 44. Particularly, these account for more than 50 per cent of deaths occuring at the earlier working ages 15-24. Diseases of the digestive system constitute a more important cause of death at ages 45-64 than in other age groups. The share of deaths caused by diseases of the respiratory system is relatively greater in childhood and old age, whereas the proportion of communicable and parasitic diseases decreases as age increases.

Among the major causes of death, injury and poisoning, diseases of digestive organs and diseases of the circulatory system pose as treats of life to a considerably different degree between the male and female populations. The proportion of deaths due to injury, poisoning and diseases of the digestive organs is reported to be about 50-70 per cent higher for males than for females according to the 1980 data. On the contrary, the share of deaths caused by diseases of the circulatory system is higher for the female population by about 20 per cent (see table IV-9). There are either few or no consistent differences by sex among different age groups.

5. SOCIO-ECONOMIC DIFFERENCES IN CAUSES OF DEATH

The information on the socio-economic background of the deceased lacks reliability as mentioned earlier. Reporting of the occupation of the deceased appears to be biased toward white collar and farming jobs, and a significant proportion of the deaths which occurred in urban areas is believed to have been registered in rural areas since the registration should be done where the civil records are kept regardless of the place of actual residence. Another problem in examining the socio-economic differences in causes of death lies in the fact that the government statistical publications provide the information on socio-economic differentials in the form of simple cross-tabulation only. In other words, the effect of the different age structure among various

Table IV-9. Percentages of causes of death diagnosed by doctors (17 major classification) by sex, 1980

I.C.D. Number	Cause of death	Both sexes	male	female
Number of cases		58 187	35 593	22 594
001-999	All causes	100.00	100.00	100.00
001-139	Infectious and parasitic diseases	5.02	5.38	4.45
140-239	Neoplasms	14.02	13.98	14.07
240-279	Endocrine, nutritional metabolic diseases and immunity disorder	1.65	1.49	1.90
280-289	Diseases of blood and blood-forming organs	0.25	0.22	0.30
290-319	Mental disorders	0.76	0.82	0.68
320-389	Diseases of the nervous system and sense organs	1.61	1.60	1.63
390-459	Diseases of the circulatory system	32.27	29.98	35.89
460-519	Diseases of the respiratory system	4.67	4.33	5.22
520-579	Diseases of the digestive system	8.30	9.50	6.42
580-629	Diseases of the genitourinary system	1.41	1.30	1.59
630-676	Complications of pregnancy, childbirth and the puerperium	0.14	–	0.37
680-709	Diseases of the skin & subcutaneous tissue	0.10	0.08	0.14
710-739	Diseases of the musculoskeletal & connective tissue	0.32	0.28	0.39
740-759	Congenital anomalies	0.48	0.44	0.56
760-779	Certain conditions originating in the perinatal period	0.08	0.07	0.11
780-799	Symptoms, signs and ill-defined conditions	10.87	9.07	13.69
800-999	Injury and poisoning	18.03	21.48	12.60

Source: Kong S-K and others (1983).

socio-economic strata can not be properly considered in examining socio-economic differences in causes of death.

Nevertheless, recent registration statistics clearly reveal significant regional differences in the leading causes of death. According to the 1981 data, deaths caused by diseases of the circulatory system and malignant neoplasms are positively associated with the degree of urbanization of an area (see table IV-10). On the contrary, injury and poisoning are reported to be the most important causes of deaths in rural areas and the importance of these causes decreases with the rising level of urbanization. No significant regional differences can be seen for other major causes like diseases of the digestive system and infectious and parasitic diseases. This pattern of regional differences may well be explained by the environmental as well as social conditions of each regional type. For instance, it is well documented that people in metropolitan cities suffer severely from various kinds of pollution and strains resulting from high population density, crowding, acute impersonal competition, lack of neighbourhood relationships, various types of social disorganization, growing conflict among various social sectors, improperly controlled industrialization and so forth. Such a living environment may be partially linked to the more frequent deaths from diseases of the circulatory system and neoplasms in these areas. On the other hand, the heavy use of chemical fertilizers and pasticides in farming and bad road conditions coupled with the operation of over-crowded buses on periodic market days, improper use of tracters are assumed to raise the risk of dying from poisoning and accidents in rural area.

Though not distinctive, the 1980 death registration data show differences in the major causes of death in terms of occupational status of the deceased. As is clear from table IV-11, the five most prevalent causes of death are the same in all occupational categories. The major variation between occupational groups can be observed in the order of the first two important causes of death. Diseases of the circulatory system are the most important causes of death in sales and service occupations, the non-economically active population and the unemployed or occupation unidentified cases, while injury and poisoning are listed as the major causes of death among white collar workers, farmers and production line workers including labourers. From this pattern we may

Table IV-10. Percentages of causes of death diagnosed by doctors (Special list of 55 causes) by types of area, 1981

I.C.D. Number	Causes of death	Metropolitan cities	Other cities	Rural area
No. of cases		33 507	11 807	18 731
001-999	All causes of death	100.00	100.00	100.00
001-139	Infectious and parasitic diseases	4.91	4.85	5.15
001-009	Intestinal infectious diseases	0.40	0.48	0.64
010-018	Tuberculosis	3.89	3.79	3.73
033	Whooping cough	0.01	–	0.02
036	Meningococcal infection	–	–	0.01
037	Tetanus	0.01	0.03	0.07
038	Septicaemia	0.44	0.37	0.37
050	Smallpox	–	–	–
055	Measles	0.07	0.04	0.07
084	Malaria	0.00	–	–
140-208	Malignant neoplasms	16.41	12.84	11.46
151	M.N. of stomach	4.81	4.05	4.32
153	M.N. of colon	0.18	0.20	0.10
154	M.N. of rectum, rectosig -moid junction and anus	0.63	0.44	0.34
162	M.N. of trachea, bronchus and lung	1.61	1.03	1.04
174	M.N. of female breast	0.33	0.15	0.15
180	M.N. of cervix uteri	0.12	0.03	0.02
204-208	Leukaemia	0.76	0.72	0.38
250	Diabetes mellitus	1.27	0.94	0.60
261	Nutritional marasmus	–	–	–
262, 263	Other protein-calorie, malnutrition	–	–	–
280-285	Anaemias	0.21	0.16	0.15
320-322	Meningistis	0.33	0.58	0.65
390-459	Diseases of the circulatory system	33.06	27.53	24.40
390-392	Acute rheumatic fever	0.01	–	0.01
393-398	Chronic rheumatic heart disease	0.21	0.15	0.10
401-405	Hypertesive disease	12.09	9.97	8.06
410-414	Ischaemic heart disease	0.90	0.67	0.62
410	Acute myocardial infarction	0.69	0.57	0.46
*427.5	Cardiac arrest	4.26	4.30	4.08
430-438	Cerebrovascular disease	10.99	8.48	8.01
*436	Acute ill-defined cerebrovascular disease	4.28	3.17	2.41
*437.8	Apoplexy	0.88	0.81	0.95
440	Atherosclerosis	0.54	0.25	0.25
480-486	Pneumonia	1.33	1.59	1.54
487	Influenza	0.03	0.04	0.08
490-493	Bronchitis, emphysema and asthma	1.89	1.58	1.88
531-533	Gastric and duodenal ulser	0.62	0.56	0.70
540-543	Appendictis	0.02	0.03	0.02
571	Chronic liver disease and cirrhosis	4.29	4.59	4.34
580-589	Nephritis, nephrotic syndrome and nephrosis	1.31	1.17	0.77
600	Hyperplasia of prostate	0.02	0.03	0.01
630-639	Abortion	0.01	0.01	0.01
640-646 and 651-676	Directly obstetrical reasons	0.18	0.22	0.22
740-759	Congenital anomalies	0.66	0.72	0.22
760-779	Certain conditions originating in the perinatal period	0.09	0.19	0.07
767	Birth trauma	–	–	0.01
780-799	Symptoms, signs and ill-defined conditions	10.87	13.25	14.86
*797	Senility without mention of psychosis	5.22	5.89	5.53

Table IV-10 *(continued)*

I.C.D. Number	Causes of death	Metropolitan cities	Other cities	Rural area
*799	Other ill-defined and unknown cause of morbidity and mortality	5.22	6.95	8.93
800-999	Injury and poisoning	16.22	22.25	25.77
800-829	Fracture of bones	2.51	2.95	2.71
850-869 and 950-957	Intracranial and internal injury	3.14	4.20	3.89
940-949	Burns	0.70	0.80	0.56
960-989	Poisoning and toxic effect	4.18	6.17	9.28
E800-E949	Accidents and adverse accidents	12.14	16.62	17.75
E810-E819	Motor vehicle traffic accidents	2.87	4.43	4.60
E880-E888	Accidental falls	0.30	0.40	0.42
E950-E959	Suicide	2.63	3.70	5.66
E960-E969	Homicide	0.21	0.38	0.51

Source: NBOS (C-1981).

* Causes added by the Korean government.

Table IV-11. Percentages of causes of death diagnosed by doctors by occupation (17 major classification), for ages 15-64, 1980

I.C.D. Number	Cause of death	White collar	Sales/ service	Farmer	Blue collar	Unemp./ unknown
Number of cases		3 131	3 498	4 722	4 218	18 982
001-999		100.00	100.00	100.00	100.00	100.00
001-139	Infectious and parasitic diseases	2.87	4.32	5.61	4.13	6.78
140-239	Neoplasms	17.98	18.15	16.09	10.41	17.21
240-279	Endocrine, nutritional metabolic diseases and immunity disorder	0.86	1.11	0.59	0.73	1.99
280-289	Diseases of blood and blood-forming organs	0.29	0.11	0.21	0.17	0.33
290-319	Mental disorders	0.57	0.51	1.00	0.90	1.05
320-389	Diseases of the nervous system and sense organs	1.09	0.97	0.74	1.26	1.59
390-459	Diseases of the circulatory system	27.08	31.70	23.27	23.49	31.66
460-519	Diseases of the respiratory system	1.44	1.97	2.94	1.85	2.90
520-579	Diseases of the digestive system	8.11	12.58	12.58	9.39	8.80
580-629	Diseases of the genitourinary system	1.69	1.43	1.21	1.33	1.89
630-676	Complications of pregnancy, childbirth and the puerperium	0.06	0.03	0.08	0.07	0.37
680-709	Diseases of the skin and subcutaneous tissue	0.10	0.06	0.15	0.05	0.11
710-739	Diseases of the musculoskeletal and connective tissue	0.19	0.11	0.32	0.28	0.45
740-759	Congenital anomalies	0.13	0.06	0.04	0.05	0.10
760-779	Certain conditions originating in the perinatal period	–	–	–	–	0.01
780-799	Symptoms, signs and illdefined conditions	4.89	4.80	8.64	5.22	6.76
800-999	Injury and poisoning	32.64	22.07	26.51	40.68	18.05

Source: Kong S-K and others (1983).

again assume roughly the relationship between the type of living environment and causes of death. It is apparent that people in occupational activities or status which are thought to develop anxiety or to be subject to severe pressure die more frequently of diseases of the circulatory system. Probably, the importance of injury and poisoning as the major causes of death in manufacturing workers and labourers indicates the relatively great hazard of life involved in manufacturing and other blue collar works. The risk of dying or of disaster for manufacturing workers and labourers is reported very high in the Republic of Korea compared to other developing or developed countries due mainly to bad working conditions, lack of safety investment and long working hours (Kim J-S, 1985: 41-53). The pattern can be understood by additional considerations such as demographic composition and place of residence for the remaining occupations.

The causes of deaths in the 1980 registration show a noticeable dissimilarity between the population with no schooling and the population with some kind of formal schooling. The difference is minor, however, among people with varying educational levels excluding those with no education at all. This pattern is largely explained by differences in age composition in terms of the level of educational attainment (see table IV-12). It is certain that the population with no schooling is mostly composed of pre-school children and the elderly. Also, variations in cause of death, though minor, between other groups with different levels of formal education are seemingly accounted for by the differences in age distribution. In a word, no significant differences by educational level in the causes of death are expected to emerge when age distributions are standardized.

The impact of age distribution on the cause of death pattern is more marked in the differences by marital status, which presented in table IV-13. The table reveals a marked difference in the cause of death between single and ever-married persons and a moderate difference between currently married and widowed persons. The causes of death for single persons are almost identical with those for the population aged 0-24, whereas the causes of death for widowed persons are very similar to those for the population aged 65 and upward. Proper consideration of the effects of marriage or marital status upon causes of death is not likely to be given with the current data available.

Table IV-12. Percentages of causes of death diagnosed by doctors (17 major classification) by the level of educational attainment, for all ages, 1980

I.C.D. Number	Cause of death	None	Primary	High	College
Number of cases		18 674	23 274	13 590	2 649
001-999	All causes	100.00	100.00	100.00	100.00
001-139	Infectious and parasitic diseases	4.79	5.58	4.69	3.36
140-239	Neoplasms	10.12	15.50	15.47	21.03
240-279	Endocrine, nutritional metabolic diseases and immunity disorder	1.59	1.65	1.58	2.38
280-289	Diseases of blood and blood-forming organs	0.21	0.24	0.34	0.15
290-319	Mental disorders	0.62	0.81	0.88	0.83
320-389	Diseases of the nervous system and sense organs	2.31	1.32	1.32	0.79
390-459	Diseases of the circulatory system	34.59	32.26	29.18	31.90
460-519	Diseases of the respiratory system	7.66	3.82	2.58	1.85
520-579	Diseases of the digestive system	7.06	9.37	8.01	9.14
580-629	Diseases of the genitourinary system	1.16	1.31	1.80	2.08
630-676	Complications of pregnancy, childbirth and the puerperium	0.03	0.21	0.20	0.08
680-709	Diseases of the skin and subcutaneous tissue	0.13	0.08	0.11	0.04
710-739	Diseases of the musculoskeletal and connective tissue	0.40	0.34	0.24	0.08
740-759	Congenital anomalies	1.29	0.10	0.13	0.04
760-779	Certain conditions originating in the perinatal period	0.25	0.01	0.01	–
780-799	Symptoms, signs and illdefined conditions	17.21	9.13	6.14	5.66
800-999	Injury and poisoning	10.60	18.28	27.31	20.61

Source: Kong S-K and others (1983).

Table IV-13. Percentages of causes of death diagnosed by doctors (17 major classification) by marital status, for all ages, 1980

I.C.D. Number	Cause of death	Single	Married	Divorced	Widowed
Number of cases		11 220	30 867	796	15 304
001-999	All causes	100.00	100.00	100.00	100.00
001-139	Infectious and parasitic diseases	6.99	5.04	7.92	3.38
140-239	Neoplasms	5.58	17.79	15.20	12.53
240-279	Endocrine, nutritional metabolic diseases and immunity disorder	1.35	1.64	1.51	1.89
280-289	Diseases of blood and blood-forming organs	0.48	0.21	–	0.18
290-319	Mental disorders	1.28	0.62	1.51	0.64
320-389	Diseases of the nervous system and sense organs	5.43	0.77	1.01	0.55
390-459	Diseases of the circulatory system	13.84	34.31	30.28	41.79
460-519	Diseases of the respiratory system	5.67	3.82	3.64	5.72
520-579	Diseases of the digestive system	4.20	10.26	8.42	7.35
580-629	Diseases of the genitourinary system	1.66	1.44	1.76	1.16
630-676	Complications of pregnancy, childbirth and the puerperium	0.13	0.19	0.13	0.05
680-709	Diseases of the skin and subcutaneous tissue	0.11	0.09	0.13	0.11
710-739	Diseases of the musculoskeletal and connective tissue	0.36	0.31	0.38	0.31
740-759	Congenital anomalies	2.30	0.06	–	0.04
760-779	Certain conditions originating in the perinatal period	0.41	0.01	–	–
780-799	Symptoms, signs and illdefined conditions	7.16	8.69	9.67	18.04
800-999	Injury and poisoning	43.08	14.75	18.47	6.25

Source: Kong S-K and others (1983).

V. HEALTH SERVICES AND THEIR DEVELOPMENT

1. DEVELOPMENT OF MODERN HEALTH SYSTEM

The modern health care system developed in the West was introduced to the Republic of Korea in the late 19th century. Historical documents disclose that the western type of medical care was initiated in the late 19th century by western missionaries and Japanese doctors attached to their military forces stationed in the Republic of Korea. Among them, the most important was the opening of a royal clinic, called 'Kwang-hye-won' in 1885, by Dr. H.N. Allen, an American missionary. The name was changed to 'Je-jung-won' later. After western type of medical care was introduced to various sectors of the population by western Christian missionaries and gained popularity over the traditional herb treatment based on Chinese medicine. The royal clinic established the first medical school in 1899 and produced its first seven graduates in 1908. Modern medical services were expanded through the establishment of Severance Hospital by a Canadian mission group in 1904. In 1909, the hospital started a medical school, which played a decisive role in training Korean doctors during the colonial period. The traditional medical system rapidly declined with this gradual introduction of western medicine (Kim D-J, 1966. 470-494).

Along with the introduction of new medical facilities, there were various efforts to control contageous diseases based on newly available medical knowledge. Ji Suk-Young privately initiated smallpox vaccination in some small local areas in 1883 and devoted himself to its dissemination throughout the country until the work was taken over by the government. The government staged a Western type cholera prevention activities, with newly adopted legal provisions, for the first time in the country's history in 1895, and enacted regulations on preventing various contageous diseases in 1899. Missionaries opened leprosia institutions in several cities such as Kwang-ju, Busan and Taegu to care for the lepers between 1904 and 1909 (*Ibid:* 493-4).

After the annexation of Korea to Japan in 1910, more systematic development of health and medical system took place, although it was only possible by repressive measures. The colonial government elaborated regulations on health administration immediately after the annexation. They drew distinctions between medical personnel in terms of their qualifications and types of work, and introduced a licensing system for medical and paramedical practitioners. The government issued a detailed decree on preventing contageous diseases in 1915 to handle the following nine diseases: cholera, dysentery, typhoid fever, paratyphoid fever, smallpox, epidemic typhus, scarlet fever, diphtheria and pestilence. In addition, regulations on the prevention of such chronic contageous diseases as liver distoma, leprosy, measles and tuberculosis were issued and various administrative measures were used to control them, and quarantines were strict. The 1910-1945 period also witnessed a surge of medical education. Between 1916 and 1944, six new medical schools and one dental school were established in major cities.

New developments in the health and medical system began after 1945. Immediately after the Second World War, new knowledge on western medicine was introduced through the US military. Especially, the introduction of sulfa drugs and D.D.T. is known to have contributed greatly to controlling micrococcus pneumonia and the spread of epidemic typhus, and thus lowering mortality in those years of extreme turmoil and adversity (Kim D-H, 1966: 547). Political instability during 1945-1950 and the Korean conflict between 1950-1953, however, deterred the effective reorganization of health administration. Only in the late 1950s did the Korean government set up a policy to expand the health and medical network to the grass-roots level, by reducing the number of 'myuns' (sub-counties) without physicians (*Ibid:* 549). As shown in table V-1, 777 of 1,495 'myuns' were reported to have no western type physician in 1955. Public service doctors were recruited through a provision which imposed six months of compulsory service in a doctorless area as a precondition for a specialists license to eliminate this problem. Consequently, the number of 'myuns' with no western type physician dwindled to 413 out of the 1,487 'myuns' in 1962. The number increased again in the next few years and did not change much during the decade 1965-1974.

Table V-1. Number of doctorless eups and myuns and percentage of population in those areas to total population of the country, 1952-1970

	All Eups and Myuns	Without physician	Without dentist	No herb doctor	None of the three
1952					
Number	1 471	1 024	1 365	1 025	761
Per cent		48.3	70.1	53.6	35,3
1955					
Number	1 495	777	1 386	950	551
Per cent		30.8	61.7	41.5	21.5
1960					
Number	1 484	722	1 376	976	470
Per cent		29.5	61.8	43.1	18.5
1962					
Number	1 487	413	1 326	939	271
Per cent		15.3	55.5	39.4	10.5
1965					
Number	1 466	649	1 343	887	504
Per cent		26.2	56.0	36.0	20.7
1970					
Number	1 473	673	1 343	1 000	557
Per cent		20.2	48.4	33.9	16.7
1974					
Number	1 459	602	1 321	1 115	536
Per cent		17.0	44.0	36.1	14.9

Sources: MHSA (A-1952 to 1974).

2. POLICY AND ADMINISTRATION

Since 1960, the Republic of Korea has witnessed profound changes in every aspect of life, and the health and medical system is no exception. An extensive network of health administration was set up with the establishment of health centres in all 'guns', county level administrative units, in 1962 and health subcentres, branch offices of health centres, in all 'myuns' (sub-counties) in 1964. These constituted the almost exclusive network of the government health care service until the late 1970s. The major activities of health centres in their early stages consisted of the prevention of infectious diseases through immunization and the implementation of the family planning programme. In addition, health centres engaged in various other activities such as tuberculosis control, sanitary administration and the provision of basic medical services to the poor. The growth of the health centre network coincided with the development of the national family planning programme, indicating the crucial contribution of the latter to the former. Partly to implement the family planning programme, 102 health centres were established in 1962 and 1,473 subcentres were set up in all 'myuns', rural areas with populations of less than 20,000, with a family planning field worker in each subcentre. In 1967, a mother and child health care programme was initiated in connection with the family planning programme and MCH workers were assigned to the subcentres. The role of the subcentres was expanded once again in 1977 by adding tuberculosis control workers (Yang J-M, 1983: 452-3). The majority of health subcentres are now staffed with two or three field workers and one public health physician who is recruited from among medical school graduates to serve three years in doctorless areas as an alternative to military service. The curative function of the government health service was strengthened in the early 1980s with the introduction of primary health posts in more than 1,200 remote doctorless areas.

During the period 1962-1977, the government health care service was medical assistance oriented. In other words, it aimed to provide medical care to low income families and rural people. Although the health network grew rapidly, no vigorous, congruent health policy evolved. Even for grass-roots health centre activities, the family planning programme was treated most favourably by the central government in its budget allocation and staffing (Yang J-M, 1983: 452). The criticism was often made

Table V-2. Manpower employed in health centres, health subcentres and primary health fosts, 1961-1984

Number of	1961	1962	1965	1967	1970	1975	1979	1984
A. Health Centres								
Health Centres	87	189	189	189	192	198	204	224
Physicians	103	205	311	312	311	325	511	273
Dentists	2	21	27	27	29	25		322
Pharmacists	5	8	17	67	53	62	128	120
Midwives	91	115	18	24	93	184		
Nurses	2	479	469	422	339	422	1 060	836
X-ray technicians	47	53	115	161	153	164	198	243
Laboratory technicians	29	35	125	142	92		261	342
Other technicians	16	82	133	156	117	27		
C.D. workers	21	67	49	54	71	246*		
Sanitary inspectors	7	125	324	330	261	261*		
F.P. workers	41	–	872	901	899	832	1 617	672
T.B. workers				279	282	288	1 110	452
M.C.H. workers							109	402
Leprosy workers							77	89
B. Health Subcentres and Primary Health Posts								
Health Subcentres				1 347	1 354	1 338	1 336	1 303
Primary Health Posts								1 310
Physicians				796	797	761	935	972
Dentists								77
F.P. workers							1 615	1 319
T.B. workers							1 672	1 271
M.C.H. workers							870	480
P.H. workers								1 093
Nursing aides								57
Health practitioners								1 167
Village health workers								4 599

Sources: MHSA (A-1965 to 1985).

* Transfered to Shi, Gu or Gun Administration Offices.

that the government health programmes had only administrative significance. Nevertheless, this expansion of the health network to cover the whole country should have contributed greatly to enhancing the awareness of health problems, particularly in rural areas. Consi-dering the facts that all field workers are women and that strong sex segregation prevails in every-day living, women are expected to gain greater benefits as a result of this development. The government health programmes have only li-mited significane in urban areas where good private medical facilities are concentrated. Also, the general urban environment such as popula-tion concentration, anonymity even among neighbours and frequent residential moves are often cited as crucial factors in the very limited role of urban health centres.

In 1977, the government adopted com-pulsory medical insurance for the employees of private firms with more than 500 employees. The policy was expanded to apply to firms with more than 300 workers and employees in government organizations and private teaching institutions in 1979 with half of the contribut-ing fund being paid by the employer or jointly by the employer and the government in the case of educational institutions. The programme was further expanded to cover employees in firms with more than 100 workers in 1981 and to those with more than 16 workers in 1983. Medical insurance became optional for firms with more than 5 employees in 1982, and residential communities and occupational groups were given a right to join the insurance as a unit in 1981. As a result, the proportion of medically insured workers has grown rapidly as shown in table V-3. It was 22.4 in 1977, and increased to 45.7 in 1979, 60.5 in 1981 and 77.6 per cent in

1983. The proportion of the population benefited by medical insurance rose from 9 in 1977 to 24 in 1980 and 42 per cent in 1984.

This policy was implemented as a component of the social welfare policies of the Fourth National Plan for Economic and Social (preveiously Economic) Development which was a departure from the total growth orientation of the former development plans. Medical insurance has emerged as the most important component of the government's health policy since 1977. In other words, the government's health policy since 1977 has been characterized as medical insurance oriented (Park C-M, 1985). With the initiation of the new policy, the national expenditure on health increased gradually. The share of health in total government expenditures was 0.75 in 1975, but rose to 1.26 in 1977 and 1.62 per cent in 1983 (Moon O-R, 1985). Average household expenditures on health care are shown in table V-4, and indicate growing medical needs and demand in Korean society. At the same time, medical care costs rose due mostly to the increasing use of sophisticated and expensive medical treatment, which was, in turn, prompted partly by the higher standard of living and partly by the growth of big medical enterprises. The proportion of gross domestic products on health was estimated to reach 4.6 per cent in 1980 and was expected to increase rapidly after that (Park J-K, 1982: 18-22), but the government's share of total national health costs is still very limited, although it has increased gradually since 1975. According to a series of estimates by Park J-K (1979: 71; 1982: 21), the proportion borne by the private sector was 85.1 in 1970, 89.3 in 1974 and 81.8 per cent in 1980. It is also believed that the rapid expansion of medical insurance since 1977 has changed the nature of the health environment, behaviour and problems. An increasingly larger portion of the population has had better medical care, but excessive or relatively luxurious medical care and a widening gap between socio-economic groups in their access to adequate medical facilities have emerged as critical problems in the health system (e.g., KIPH, 1985a: 148-157).

Another important advancement in the recent government health policy is an attempt to develop community health programmes and concomitantly to introduce primary medical

Table V-3. Number of persons covered by medical insurance, number of persons received treatment on medical insurance, and income and expenditure of medical insurance, 1977-1984

	1977	1978	1979	1980	1981	1982	1983	1984
A. Population covered by medical insurance (M.I.) (in 1000 persons)								
Insured persons	1 199	1 662	2 576	2 813	3 572	4 380	5 077	5 471
Dependents	2 004	2 221	5 215	6 300	7 834	9 133	10 500	11 580
Total	3 203	3 883	7 791	9 115	11 406	13 513	15 577	17 050
Per cent of beneficiaries to total population	8.8	10.5	20.7	24.0	29.5	34.4	39.0	42.0
Per cent of insured workers	22.4		45.7		60.5		77.6	
B. Persons received treatment on M.I. (in 1000 persons)[a]								
In-patient	47	137	353	312	475	583	666	853
Out-patient	802	2 611	7 348	10 448	17 551	26 089	31 336	42 818
Total	849	2 747	7 701	10 760	18 026	26 672	32 002	43 671
C. Income & expenditure (in 10 million Won; in 1000 cases)								
In come								
Insurance	1 435	3 736	10 338	16 009	24 786	37 248	40 918	
Government	31	70	175	210	178	186	102	
Others	27	106	856	1 727	2 464	3 124	3 214	
Total	1 493	4 869	11 349	17 947	27 427	36 058	44 234	
Expenditure								
No. of treated cases	962	2 956	10 371	16 528	22 337	28 792	37 675	45 864
Borne by insurance	469	1 537	7 185	13 279	18 409	28 015	39 479	50 228
Total[b]	764	2 490	10 257	18 441	26 416	40 312	57 159	72 777

Sources: MHSA (A-1980 to 1985; B-1984: 106).

[a] For 1977: from 1 July to 31 December only;
For 1977 and 1978: Class 1 M.I. associations are only included;
For 1979 and 1980: Class 1 M.I. associations and M. I. for civil servants and private school workers are included;
For 1981 Pensioners and dependents of medically insured military personnel are added to.

[b] Expenditures borne by insurance plus those by individuals.

Table V-4. Annual health expenditure per household, 1966-1980

	Urban household		Farm household		
	in Won (A)	Per cent ratio to total expenditure	in Won (B)	Per cent ratio to total expenditure	B/A (per cent)
1966	3 900	2.4	3 666	3.3	94.0
1970	11 136	3.1	6 966	3.4	62.6
1975	31 572	4.0	23 101	3.7	73.2
1980	137 016	5.3	95 895	4.5	70.0
1983	235 296	5.9	213 027	5.3	90.5

Sources: EPB, The Family Income and Expenditure Survey; MOAF, The Farm Household Economy Survey. Requoted from EPB (B-1984: 201).

care to people living in remote areas. The government enacted a special law on health care for agricultural and fishing villages in 1980 and had set up about 1,310 primary health care posts in remote rural areas by 1984. The programme was developed after five years of experimentation by the Korean Health Development Institute. Also there have been several research projects on community health in various medical or public health schools since the mid-1970s (e.g. Kim I-S and others, 1977). To staff these posts, health practitioners are recruited from among qualified nurses, and after six months of special training are authorized to conduct simple medical treatment. This new development signifies the beginning of a change in the concept of health care from "patient oriented" to "community oriented" among health policy makers.

The mother and child health (MCH) programmes of health centres and subcentres were evaluated and judged to be totally unsuccessful, due mainly to difficulty in recruiting MCH workers from licensed nurses which differs from what is required for family planning and tuberculosis control workers. The government has since 1980 established about 90 MCH centres staffed with doctors and nurses in rural areas to solve the problem. The centre provides not only medical care but also does deliveries service. To sum up, the health policies of Korea since the late 1970s can be characterized as medical insurance oriented on the one hand and on the other by the development of primary health care and MCH services based on the concept of community centred health care.

3. MANPOWER AND FACILITIES

It was reported that there were fewer than 3,000 medical doctors in the Republic of Korea in 1945 (Park C-M, 1984: 15). The number of doctors has increased steadily since then, as shown in table V-5. During the forty years since 1945, the number of licensed doctors (including limited area doctors who are allowed to practice only in certain geographical, mostly remote rural areas) increased about ten times. As a result, the doctor to population ratio rose substantially. A similar trend can be observed with dentists though the size of the dental community is about one sixth that of medical doctors. The number of herb (or oriental) medical practitioners increased rapidly between 1951 and 1960 and fluctuated during the period 1960-75. It should be noted that the share of specialists has continuously increased since the adoption of the specialist system in the early 1950s. There were only 10 licensed specialists all over the country in 1952, but the number increased to 1,629 in 1970 and 13,723 in 1984. Also, the proportion of specialists rose from 21 in 1960 to 28.2 in 1970 and 50 per cent in 1984. The proportion is still on the rise. This indicates among other things that the expansion of medical manpower, particularly that of doctors, has accompanied the upgrading of their quality.

The most drastic increase in medical personnel can be seen in the case of nurses whose ratio to western type doctors was only 0.34 in 1951; that is one licensed nurse to every three licensed doctors. Until 1970, doctors outnumbered nurses, but to solve this problem nursing education facilities were greatly expanded in the 1970s, and the number of qualified nurses almost quadrupled between 1970 and 1984. However, the nurse-doctor ratio is still less than 2 to 1. If only those currently employed are counted, the ratio is believed to be around unity, indicating a severe shortage of qualified nurses even nowadays. A scheme was, however, developed to issue nursing aide licenses to those who have completed nine months of special training. The number of nursing aides has risen sharply since 1970, and surpassed the

number of licensed nurses by 71 per cent in 1984. Unlike nurses, the number of licensed midwives has increased rather slowly, showing a 24 per cent rise between 1975 and 1984. The trend for pharmacists since the mid-1960s is almost identical with that of western medical doctors, so is the size of the pharmaceutical community.

Table V-6 shows that only 73.5 per cent of the licensed doctors in western medicine reported their employment status in 1980. Among them 96.5 per cent were currently employed. The discrepancy between the number of doctors licensed and the ones who reported their employment status may be accounted for by such factors as failure to report, overseas employment or emigration, death of the licensed person or retirement. Among them, the most important factor may be the mere failure to report. The gap is most noticeable among midwives and nurses. Early retirement, frequently upon marriage, is undoubtedly a major reason for this, which is, in turn related to the strong social bias against working mothers in the Republic of Korea. Even after allowing for a large proportion of omissions in the annual

Table V-5. Number of medical personnel, 1951-1984

	1951	1955	1960	1965	1970	1975[a]	1980	1984
A. Total numbers								
Western doctor[b]	5 082	6 141	7 765	10 854	14 932	19 588	22 564	27 567
(specialist)	10[c]	223	1 629	2 825	4 206	5 854	8 415	13 723
Dentist	796	967	1 369	1 762	2 122	2 595	3 620	4 972
Oriental doctor[b]	1 566	2 078	2 922	2 849	3 252	2 551	3 015	3 591
Pharmacist				10 028	14 648	19 750	24 366	28 531
Midwife	1 700	2 369	4 134	5 714	6 182	3 773	4 833	5 991
Nurse	1 723	2 487	4 836	8 898	14 506	23 632	40 373	54 081
Nursing aide					3 452	33 433	68 577	92 264
B. Number per 100,000 persons								
Western doctor[b]	25	29	31	38	46	56	59	68
(specialist)	–	1	7	10	13	17	22	34
Dentist	4	5	5	6	7	7	9	12
Oriental doctor[b]	8	10	12	10	10	7	8	9
Pharmacist				35	45	56	64	70
Midwife	8	11	17	20	19	11	13	15
Nurse	8	12	19	31	45	67	105	133
Nursing aide					11	95	179	227

Sources: MHSA (A-1955 to 1985).

[a] License renewed as of 31 December 1974;

[b] Limited area doctors included;

[c] For 1952.

Table V-6. Employment status of medical personnel, 1980

	Western doctor	Oriental doctor	Dentist	Midwife	Nurse	Technician
(A) License registered	22 564	3 015	3 620	4 833	40 373	10 447
(B) Employment status reported	16 588	2 661	3 058	1 543	15 132	4 649
(C) Employed	16 003	2 472	2 968	1 328	14 129	4 412
(D) Unemployed	585	189	90	215	1 003	237
(E) C/A (per cent)	70.9	82.0	82.0	27.5	35.0	42.2

Source: MHSA (A-1985: 84-99).

employment status reporting, it is believed that only 50 per cent of the license registered nurses and midwives are currently employed in their respective professions. In other words, the ratio of active doctors to active nurses is still around unity.

Sex segregation is highly distinctive in medical occupations. Oriental doctors consist almost exclusively of males while the proportion of female doctors in western medicine is 14 per cent according to the 1981 statistics. Among technicians, men slightly outnumber women, and vice versa with pharmacists. On the other hand, nursing and midwifely are thought to be exclusively women's occupations.

Disparities in medical personnel are considerable between regions. Compared to the proportion of population, medical personnel are most concentrated in Seoul. As demonstrated by table V-8, the degree of concentration of doctors is positively associated with the level of urbanization of an area. Dentists and nurses, however, show a relatively large concentration in non-metropolitan cities. The population per medical practitioner serving in rural areas is four to ten times greater than in Seoul depending upon the kind of medical profession: the most marked discrepancy can be observed for doctors in western medicine, and the least for dentists.

Medical facilities have increased steadily, too. Among them, the most noticeable increase is in the opening of general hospitals. There were only twelve general hospitals in 1970, but the number has more than doubled every five years since 1970. Compared to general hospitals, the number of either western type or oriental hospitals and clinics has increased only marginally, whereas the number of midwifery clinics decreased substantially between 1970 and 1984. The number of hospital beds has increased markedly since 1970, showing a rise of 417 per cent during 1970-1984 due mostly to the rapid increase in general hospitals. In a word, emphasis on big facilities has developed with the popular notion that big institutions equipped with complicated modern facilities can provide better, more reliable care. This demand for high quality medical care has grown rapidly since the adoption of a medical insurance policy in 1977 (KIPH, 1985a: 142-143).

Disparities in medical facilities between urban and rural areas are also considerable. Table V-10 shows that about 85 per cent of both western type and oriental clinics and hospitals were located in urban areas in 1984. The metropolitan cities apparently have a smaller share of medical facilities than the smaller cities, but this does not necessarily mean that the

Table V-7. Sex composition of medical personnel, 1984

	Western doctor	Dentist	Oriental doctor	Pharmacist	Technician
Total	28 015	4 972	3 426	28 531	17 501
Male	24 159	4 456	3 314	13 616	9 601
Female	3 856	516	112	14 915	7 891
Per cent males	86.2	89.6	96.7	47.7	54.9

Source: MHSA (A-1985: 79-82).

Table V-8. Regional distribution of medical personnel reported as currently employed, 1981

	Per cent of population (1980)	Western doctor		Oriental doctor		Dentist		Nurse	
		Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Seoul	22.3	7 791	44.2	1 284	46.4	537	29.7	6 713	42.0
Busan	8.4	1 810	10.3	293	10.6	256	14.1	1 665	10.4
Daegu	4.3	916	5.2	119	4.3	62	3.4	361	2.3
Inchon	2.9	346	2.0	66	2.4	50	2.8	448	2.8
Other Shis	19.3	3 086	17.5	503	18.2	619	34.2	4 162	26.0
Rural area	42.8	1 574	8.9	396	14.3	259	14.3	1 490	9.3
Others[a]	–	2 096	11.9	109	3.9	29	1.6	1 160	7.3
Total	100.0	17 619	100.0	2 770	100.1	1 810	100.1	16 000	100.1

Source. MHSA (A-1983: 86-87).

[a] Consisted of those employed overseas and in military service.

residents of the smaller cities have better medical care. Considering the average size of medical institutions, which is partly indicated by the average number of doctors in an institution, and the quality of service being offered, it appears that there is an extreme concentration of good facilities in metropolitan cities, particularly in Seoul.

4. USE OF MEDICAL SERVICES

Koreans usually visit pharmacies with minor health problems and diseases and buy all kinds of drugs without a doctor's prescription, so pharmacies act somewhat as a medical care institution. In addition, herb drug stores and clinics are popular, too, among a significant portion of the population. It is widely held that herb medicine or treatment is particularly effective in the case of some serious diseases like hypertension, neuralgia and arthropathies. As such, diverse systems including western type hospitals/clinics and health centres are in operation to take care of diseases and health problems, and people themselves usually decide what kind of treatment they should receive and where to go based on common sense. Furthermore, there is no clear-cut distinction between general practitioners and specialists to the mind of ordinary people. Rarely is a recommendation from a general practitioner required to visit a specialist, and accordingly these two types of practitioners are more frequently competative with than complementary to each other.

Various surveys confirm that pharmacies act as the most important primary health care institutions in the Republic of Korea. According to the Social Statistical Survey in 1982, 72 per cent of sick persons during the two week reference period before the survey had visited a pharmacy for their first medical treatment. Those visiting

Table V-9. Number of medical facilities, 1965-1984

	1965	1970	1975	1980	1984
General hospital	24	12	37	82	170
Western hospital	182	228	133	240	310
Western clinic	5 002	5 402	6 087	6 344	7 584
Sanitarium[a]	–	5	5	5	13
Dental H and C	1 079	1 344	1 614	2 158	2 752
Oriental H and C	2 247	2 443	2 382	2 356	2 628
Dispensary[b]		111	203	266	256
Midwifery clinic		756	727	488	503
Hospital beds[c]					
Number		16 538	21 242	38 096	68 983
Per cent utilization		56.7	64.5	60.7	61.6

Sources: MHSA (A-1966 to 1985).

[a] Consists of T.B., leprosy and mental hospitals.

[b] Clinics attached to industrial and business establishments.

[c] Beds in clinics are excluded.

Table V-10. Regional distribution of medical facilities, 1984

	Seoul	Busan	Daegu	Incheon	Other Shis	Rural area	Total
General hospital	51	18	6	8	66	21	170
Western hospital	88	39	9	10	107	57	310
Oreintal hospital	5	1	5	1	3	1	16
Dental hospital	2				2		4
Mental hospital	3	1			1	3	8
T.B. hospital	1				2	1	4
Leprosy hospital						1	1
Western clinic	2 687	913	504	260	1 989	1 231	7 584
Oriental clinic	1 176	288	134	73	546	395	2 612
Dispensary	66	44	18	7	72	49	256
Midwifery	130	100		22	153	98	503

Source: MHSA (A-1985: 106-7).

Table V-11. Percentage of first place to visit for medical treatment by urban-rural areas, 1982

	Total	Pharmacy	Hospital/ clinic	Oriental doctor	Health centre	Others
Total	100.0	72.2	23.9	1.7	1.7	0.5
Urban	100.0	72.9	25.4	1.0	0.4	0.3
Rural	99.9	71.1	21.4	2.7	3.8	0.9

Source: EPB (B-1984: 204).

hospitals and clinics for primary care totalled only 24 per cent and the role of health centres in primary health care was found to have been very minor (see table V-11). The pattern differs little between urban and rural areas.

Beyond primary care, western type medical doctors have played an increasingly decisive role. According to the Social Statistical Survey, the number of patients who visited medical doctors in any treatment stage represented 28.2 per 1,000 population in 1977, but increased to 31.4 in 1980 and to 75.8 per cent in 1983. The initiation and expansion of a medical insurance system is apparently the major factor in this increasing reliance on doctors. The same data disclosed a wide urban-rural gap in dependency on qualified doctors in illness treatment, contrary to the case of primary care. The number of patients who visited medical doctors in urban areas was 35.6 per 1,000 population in 1977 and 92.5 in 1983, while in rural areas it was 21.3 and 49.0 respectively (see table V-12). The pattern is confirmed by table V-13 which presents the regional difference in the yearly access to various medical facilities per person in 1982. This difference in access to western medicine is also noted in terms of the educational level (EPB, B-1984: 191) and the standard of living (Song K-Y and others, 1983: 91). The most marked difference is seen between medical insurance beneficiaries and non-beneficiaries (*Ibid.* table V-13).

The rapid expansion of medical facilities throughout the country should have resulted in easier access to, and a wider choice of, medical care for the general population. When the distribution of time-distance from the nearest medical facilities, including pharmacies, is used as an indicator of accessibility to medical facilities, accessibility is found to have increased greatly between 1977 and 1982 both in urban and rural areas though the regional difference persisted (see table V-14). Accessibility is also proven to be related significantly to the proportion of sick people who received any kind of medical treatment. A survey in remote rural

Table V-12. Ratio of patients visited medical doctors to total population and number of visits per patient during two weeks of illness by area and sex, 1977, 1980 and 1983

	Per 1000 persons			No. of visits		
	1977[a]	1980	1983	1977[a]	1980	1983
Whole country						
Total	28.2	31.4	75.8	3.1	2.6	3.6
Male	26.9	30.2	70.4	3.1	2.8	4.2
Female	29.5	32.6	80.8	3.2	2.5	3.4
Urban area						
Total	35.6	42.5	92.5	3.2	2.9	3.7
Male	34.4	41.1	84.8	3.1	3.2	3.9
Female	37.0	43.9	99.7	3.2	2.7	3.5
Rural area						
Total	21.3	19.1	49.0	3.1	1.9	3.2
Male	20.2	18.2	47.5	3.1	2.0	3.4
Female	22.3	19.9	50.4	3.1	1.9	3.1

Source: EPB (B-1984: 200).

[a] Average during one month.

Table V-13. Number of annual visits to medical facilities per person by type of facilities and number of annual visits to hospitals or clinics by status of medical insurance or aid coverage, 1981

	Shi area	Eup area	Myun area	Remote area
A. No. of annual visits to medical facilities				
Hospital/clinic	5.28	3.94	1.95	0.73
Herb doctor	1.09	0.62	0.60	0.30
Pharmacy	10.35	9.64	6.50	3.18
Others	0.31	0.41	0.53	0.20
Total	17.03	14.61	9.58	4.41
B. No. of annual visits to hospitals/clinics				
Beneficiaries	7.16	5.99	2.60	1.50
Non-beneficiaries	3.89	3.18	1.81	0.59

Source: Song K-Y and Kin H-S (1982).

areas reveals a marked difference in the proportion between the areas with accessibility of less than 30 minutes and those of more than 30 minutes (Song K-Y and others, 1983: 80). In the same context, the availability of medical service in an area is closely related to the proportion of the people who received medical care. For instance, a national survey of the health care network in 1981 discloses the proportion of medical care recipients for urban areas as 77.8 and that for rural areas as 59.2 per cent as shown in table V-15. The table also reveals socio-economic differences in the proportion of medical care recipients. A distinctive difference is observed in terms of the standard of living and the educational level of the household head, though the range of difference is much narrower in urban areas. The sex pattern of differences in the proportion of medical care recipients is not consistent between different types of areas. Regional inconsistency is also found with the age difference except for the highest proportion of medical care recipients for ages 0-9 in all types of communities. This observation clearly suggests the importance of the socio-economic status of individual households, such as the type of residential area, standard of living and educational level, to the access to medical facilities. The relationship had already been confirmed for an earlier year 1973 (Ro K-K and

Table V-14. Percentage of households by time-distance to health facilities (on foot) by urban-rural areas, 1977 and 1982

(in minutes)

	Total	0-14	15-29	30-44	45-59	60+
1977						
Total	100.0	29.9	20.0	17.9	6.2	26.0
Urban	100.0	39.9	25.1	20.6	6.2	8.2
Rural	100.0	19.4	14.6	15.0	6.4	44.6
1982						
Total	100.0	69.4	25.3	4.3	0.7	0.3
Urban	100.0	76.9	20.2	2.9	–	–
Rural	100.0	41.5	44.2	9.5	3.4	1.4

Source: EPB (B-1984: 200).

Table V-15. Percentages of persons who visited medical facilities among those sick during the 14 days prior to survey, for type of regions and socio-economic background, 1981-1983

	Shi area (1981)	Eup area (1981)	Myun area (1981)	Remote area (1883)
Number	11 441	5 958	21 263	18 825
Total	77.8	73.1	59.2	58.7
Sex				
Male	77.4	71.9	60.4	63.1
Female	78.1	74.0	57.9	55.2
Age				
0-9	89.5	86.6	81.4	76.3
10-19	77.9	72.4	57.5	58.6
20-29	75.2	72.9	63.6	67.1
30-39	73.1	66.7	55.3	60.6
40-49	70.6	68.8	55.5	54.9
50-59	72.2	70.1	51.9	53.7
60 or more	71.8	73.1	44.2	51.6
Education				
(excluding students and children before school age)				
None	60.7	61.0	46.8	49.7
Primary	73.1	66.4	56.5	58.1
Middle	73.5	71.3	61.4	66.2
High	74.6	75.8	65.6	72.4
College	77.7	_[a]	_[a]	_[a]
Standard of living				
Lower	71.7	67.7	58.7	51.2
Middle	81.8	81.7	60.4	59.2
Upper	83.8	89.2	_[a]	76.7

Source: Song K-Y and others (1983: 76-79).

[a] Not calculated due to a small number of sick persons.

Kim M-I, 1975). The same survey shows the economic burden or medical costs as the most frequently cited reason for not receiving any medical treatment and the self diagnosis of the seriousness of the symptoms as the second important reason, suggesting problem areas in the Korean health system (Song K-Y and others, 1983: 82-86).

If the qualitative aspect of medical care is added the socio-economic differences in accessibility to medical facilities should be much more profound. Most good facilities are available only in big cities, so people in rural areas and small cities prefer to use facilities in big cities rather than those available nearby if they are affordable. For example, the above mentioned survey in remote areas reveals that 57 and 39 per cent of hospital/clinic visitors as in-patients and out-patients respectively during the two week period before the survey went to cities, while 93 per cent of the health centre visitors and 86 per cent of the pharmacy users had treatment in rural areas or in the family (Song K-Y and others, 1983: 112).

5. PREVENTIVE AND FAMILY HEALTH

Until the early 1960s, the government's immunization service for various communicable diseases was very limited. The full coverage throughout the country was achieved by the establishment of a national health centre network in 1962. Also, the subjects for vaccination have changed in accordance with the changing patterns of prevalent communicable diseases. Smallpox immunization was introduced in 1954, triple vaccine in 1956, polio vaccination in 1965, vaccination against Japanese encephalitis in 1971, and immunization against measles in 1980. On the other hand, the government terminated immunization against epidemic typhus in 1975 and smallpox in 1979. The annual amount of vaccination services which provided through health centres is presented in table V-16. Although the quality of such administrative statistics is grossly suspect, the table confirms that the immunization programme has played an increasingly decisive role in preventing important communicable diseases since the early 1960s. Recently, the role of private medical institutions in immunization has increased greatly, particularly for children, with a growing reliance for diseases treatment and child delivery on hospitals and clinics.

Only one set of data is available on the population coverage of vaccination service; that is, the proportion of children under age 2 vaccinated against tuberculosis, DPT, polio and measles which was obtained from a national family health status survey in 1982 (Moon H-S and others, 1982). The data, which are presented in table V-17, demonstrate that 80.2 and 80.6 per cent of children aged under 2 were immunized in the case of DPT and polio, while the rate of BCG vaccination was 69.4 and that for measles was 55.4 per cent. The rate differs in terms of the socio-economic background of the children's parents. It can observed that the rate of vaccination is positively associated with the socio-economic status of parents; most marked differences are based on household income. It is also apparent that mothers aged 25-29 are more careful about immunization than those at other ages.

Even though the coverage of immunization is believed to have increased substantially since

Table V-16. Number of vaccination services provided through health centres for selected years, 1955-1984

(in thousand persons)

	1955	1960	1965	1970	1975	1980	1984
Smallpox	22	492	2 034	5 930	2 532		
Typhoid fever	37	438	6 230	13 410	10 946	9 160	3 343
Chorela		3	1 740	42 589	14 319	15 697	1 944
Diphtheria	13	5	55	38	1 690*		
D.T.						831	743
D.P.T.		379	699	1 500	1 715	1 466	2 099
Polio			1 164	414	861	1 685	2 485
Japanese encephalities					152	517	2 296
Epidemic typhus	39	91	482	424			
Measles						32	83

Sources: MHSA (A-1955 to 1985).

* D.T. included.

Table V-17. Percentages of vaccinated children aged under 24 months by selected socio-economic background, 1982

	BCG	DPT	Polio	Measles
Number	1 261	1 183	1 190	766
Total	69.4	80.2	80.6	55.4
Current residence				
Urban	71.8	82.7	81.9	58.3
Rural	65.1	75.9	78.3	50.4
Age of mother				
24 or less	68.3	79.8	76.4	47.6
25-29	72.2	81.8	82.3	58.4
30 or more	64.5	77.3	81.7	55.8
Education of mother				
Primary or less	60.5	72.1	74.9	41.1
Middle	74.3	80.1	79.0	54.7
High or more	73.3	88.5	88.0	71.2
Income				
Upper	67.8	91.4	90.1	75.8
Middle	72.2	80.9	81.7	56.3
Lower	64.7	74.5	74.9	45.4

Source: Moon H-S and others (1982: 89).

the early 1960s, no data are available on the changing trends except for BCG vaccinations. According to table V-18, 16.4 per cent of the total population was reported to have had BCG inoculations in 1965, and the proportion reached 47.8 per cent in 1980. In all ages, the coverage of BCG inoculation increased markedly during the period 1965-1980. The highest proportion persisted for ages 10-14. On the other hand, the most marked change in coverage was seen for children aged 0-9, indicating the tendency toward increasingly earlier vaccination. This trend of BCG inoculation is presumed to apply similarly to vaccinations against such important communicable diseases as diphtheria, polio, whooping cough, tetanus and measles.

The status of prenatal care, the situation surrounding child delivery and the prevalence of family planning practice can be used as partial indicators of mother and child health care. Various surveys on family planning reveal that the rate of family planning practice among currently married women aged 15-44 has risen steadily since the early 1960s. For example, the rate was 20 in 1960, and increased to 40 in 1970 and 60 per cent in 1983 (KIFP, 1978: 313;EPB, B-1984: 245). According to a series of Social Statistical Surveys, the proportion of pregnant mothers who visited medical or health institutions before delivery was 57 in 1977, and this rose to 76 in 1980 and 88 per cent in 1983 countrywide. Similar trends are observed in the proportion of babies born in hospitals and clinics and the proportion of deliveries attended by qualified medical or para-medical practitioners. In 1974, most deliveries took place at home (91.5 per cent) and without assistance from either doctors, midwives or MCH workers (79.2 per cent) (MHSA, 1982: 66-67). The tendency had completely reversed by 1983, showing that 69 per cent of all deliveries occurred in hospitals or clinics and 74 per cent were attended by qualified personnel. These observations indicate that the behaviour related to mother and child health has chaged completely during the last single decade.

Table V-18. Per cent coverage of B.C.G. vaccination by age group, 1965-1980

	1965	1970	1975	1980[a]
Total number tested	15 736	20 836	30 585	25 682
Total	16.4	30.3	41.3	47.8
0-4	6.1	38.3	48.2	49.8
5-9	28.1	54.3	72.8	74.2
10-14	49.3	52.6	77.1	88.8
15-19	32.6	47.4	62.9	83.1
20-24	22.0	28.3	49.2	60.0
25-29	5.5	20.5	29.5	49.9
30-34	0.8	7.6	22.5	30.1
35 or more	0.1	0.4	2.2	5.9

Source: MHSA (A-1985: 37).

[a] Figures for age groups 30-34 and 35 or more are estimated from the 1965 and 1975 survey data.

The behaviour also differs according to the socio-economic status of the family. As shown in tables V-19 and 20, there are profound differences in both the status of prenatal care and child delivery circumstances in terms of urban-rural residence and the educational level of mothers regardless of the survey year: there is much better mother and child care from qualified practitioners for families in urban areas and with better educations. It should be noted here that the government MCH programme appears not to have contributed greatly to such overall improvements in mother and child health. For instance, the rate of MCH registration of mothers was only 9.7% for the whole country in 1982, and the rate is higher for rural areas (17.4) than in urban areas (5.4 per cent) in contrast to the above observations (Moon H-S and others, 1982: 90-91).

6. PROBLEMS IN HEALTH SERVICE

Most problems in the Korean health delivery system have been suggested in the course of examining the status and development of the national health care system. Now, in concluding this chapter, it appears necessary to discuss the nature and sources of those problems briefly.

The general perception of health may constitute one of the major sources of health related problems in the Republic of Korea. As Yang J-M (1983: 451) observed, an idea prevails among policy makers as well as the general public that "only highly trained manpower can provide good health care, and good medical facilities guarantee the high standard of national health." This observation suggests that Koreans view health as the concern of individuals and in the context of patient-doctor relationships. Although the concept of family and community health was introduced recently, little progress has been achieved in this area. Rather the individual patient orientation in health care has seemingly grown in connection with the introduction of compulsory medical insurance for a large segment of the population since 1977. The policy together with an improved standard of living is often said to have resulted in excessive and luxurious medical care, the rising of profit oriented hospital management, and sharp increases in medical costs (KIPH, 1985a: 142-143). In this connection, a notion developed that only money can buy good medical care and good service from doctors and nurses, so it became customary to pay a special tribute to the attendant medical personnel for better or extra care on top of regular fees in hospitals, particularly in the case of in-patients, which means discriminatory care in terms of the socio-economic status of patients even in the same institution.

Although an attempt has been made to introduce community-centred health service in the 1980s, the government has rarely expressed any serious concern over the worsening environment in many communities. The control of infectious diseases has improved greatly since the early 1970s with the start of the 'Saemaul-undong' (New Village Movement), as a result of the improvement of sewage disposal and drinage systems, the installation of piped water systems and the replacement of old ditch type toilets to newly introduced sanitary toilets, but various

Table V-19. Per cent rate of prenatal care and average number of visits for prenatal care by residential area and level of educational attainment of mother, 1977, 1980 and 1983

	Per cent rate			Average number of visits		
	1977	1980	1983	1977	1980	1983
Total	57.2	75.9	87.9	4.2	3.9	4.1
Current residence						
Urban	–	86.2	92.9	5.1	4.4	5.0
Rural	–	61.6	80.0	2.6	3.0	2.5
Education of mother						
None	26.5	43.1	54.5	3.5	2.3	2.1
Primary	43.0	62.7	76.3	3.0	3.1	2.4
Middle	68.1	82.6	89.7	3.6	3.6	3.4
High	87.9	91.1	95.4	5.7	4.7	5.6
College	94.9	98.9	97.8	6.9	7.2	6.6

Source: EPB (B-1984: 191).

types of water and air pollution due to industrialization and urbanization have been posed as a serious threat to the resident population in many parts of the country, both urban and rural, as was partially discussed earlier (see, Section IV.1). In short, government health policy is characterized by a total lack of consideration of social values, community norms, people's perceptions and changing environmental factors concerning health.

It has already been mentioned that medical treatment has dominated national health care since 1977. Despite this increasing importance of the medical system in national health, little effort has been made to search for a viable medical care system. The system has always been totally patient oriented and based on the fee-for-service principle, though there has been scattered criticism (e.g., Yang J-M, 1983: 465; KIPH, 1985a: 142). Despite the introduction of primary health posts in remote areas and an ever increasing proportion of specialists, no workable system has evolved to draw vertical role distinctions among various types of medical institutions and between general practitioners and specialists. Also, functional distinctions between clinics and pharmaceutical stores are ambiguous in many fields (Park C-M, 1984: 9-10; KIPH, 1985a: 151-157). The major, though unauthorized, function of a pharmacist is to offer medical consultations and prescribe

Table V-20. Place of child delivery and type of delivery assistance by residential area and level of educational attainment of mother, 1977, 1980 and 1983

	Per cent by place of delivery			Per cent by delivery assistance			
	Hospital/ clinic	Home	Others	Medical doctor	Family member	Midwife/health worker	Others
1977							
Total	32.0	64.2	3.7	28.5	55.7	11.7	4.1
Residence							
Urban	53.2	42.3	4.6	46.5	34.3	16.0	3.3
Rural	11.7	85.3	3.0	11.2	76.3	7.7	4.8
Education of mother							
None	6.3	93.7	–	5.3	82.1	3.2	9.5
Primary	15.0	82.0	3.0	13.7	72.7	8.3	5.2
Middle	37.4	55.7	5.6	31.5	45.1	20.2	3.3
High	74.1	21.8	4.1	65.9	18.8	15.3	–
College	95.6	4.4	–	91.3	2.2	6.5	–
1980							
Total	53.7	43.1	3.2	51.7	39.2	7.8	1.3
Residence							
Urban	74.9	21.2	3.9	71.2	19.7	8.1	1.0
Rural	24.4	73.5	2.3	24.6	66.2	7.3	1.9
Education of mother							
None	15.5	84.5	–	15.5	77.6	–	6.9
Primary	31.3	64.7	3.0	30.5	60.5	6.4	2.6
Middle	61.7	34.5	3.8	58.7	31.1	9.9	0.3
High	81.3	15.0	3.7	78.0	12.6	9.4	–
College	96.7	3.3	–	94.5	2.2	3.3	–
1983							
Total	68.8	29.1	2.1	68.1	25.4	6.3	0.2
Residence							
Urban	82.6	14.5	2.9	81.7	11.4	6.9	–
Rural	46.3	52.7	1.0	46.1	48.5	5.2	0.2
Education of mother							
None	36.4	63.6	–	33.3	60.5	6.3	–
Primary	41.5	54.9	3.6	39.7	50.3	9.4	0.6
Middle	65.6	32.3	2.1	65.4	26.7	7.7	0.2
High	89.8	8.6	1.6	89.3	7.4	3.3	–
College	97.8	2.2	–	97.8	1.1	1.1	–

Source: EPB (B-1984: 202-3).

medicine to customers. In turn, clinics and hospitals sell drugs to patients at unrealistically high prices and give them no option. Such a lack of coordination is known to have been one of the most crucial hazard in Korean health system, but no effective measure to deal with the problem has yet evolved. This competitive situation in the medical world appears to have contributed to bringing about undesirable perceptions of health and medical practitioners among the general public. For most people, a visit to a clinic or a hospital is though to be a necessity only in the case of an acute ailment or prolonged suffering. People are used to diagnosing their symptoms and getting drugs at pharmacies, so wrong and excessive use of drugs prevails widely throughout the country. There is also no doubt that virtually uncontrolled drug advertisements through the mass media for most items plays a decisive role in the misuse of and excessive reliance on drugs.

During the last two decades, the number of medical practitioners increased substantially, and accordingly, the doctor-population ratio improved greatly although this is not yet satisfactory compared to the ratios in the developed countries (KIPH, 1985a: 146-147). The overall shortage of doctors is not, however, considered an important problem since twenty medical colleges currently produce a total of more than 3,000 graduates each year. Rather the shortage of employed nurses compared to employed doctors could have grave implications for national health. As stated earlier, it is hard to recruit qualified nurses who are thought to be most instrumental for health care in doctorless rural and remote areas. Many factors are associated with such a severe shortage of qualified nurses. Of those, voluntary early retirement may be the most important one, but underlying reasons are more complicated. Their social status is relatively low compared to girls with the same educational qualifications, college or three year junior college graduates, and they are hardly recognized as professionals in medical institutions. Furthermore, they are usually underpaid and avoided in most clinics because of their much higher salary base compared to nursing aides.

Despite the overall improvement, the very uneven distribution of medical manpower and facilities persists among regions. Although the government health service programme is concentrated in rural areas, its contribution to alleviating the adversary medical conditions of rural areas is only marginal, since it satisfies only a fraction of the health needs even in rural areas (Kim J-S, 1985: 111–116. Furthermore, the quality of medical/health service differs greatly by the type of region: good medical facilities and manpower are concentrated in metropolitan cities. There is a marked difference in accessibility to medical facilities in terms of the socio-economic background of the family such as household income and the couple's level of education. Together with the wide discrepancy in the accessibility between medical insurance beneficiaries and non-beneficiaries, these differing patterns should have a crucial implication for the national health policy. Unlike what has been attempted by the government, the recent development of the health system appears to have contributed to widening the gap in accessibility to medical care between the rich and the poor and between urban and rural residents.

VI. NUTRITIONAL SITUATION

1. PRODUCTION OF FOOD

Until the early 1960s, the Republic of Korea suffered severely from a chronic food shortage. According to historical documents, starvation had prevailed widely during the late Chosun dynasty, and traditionally spring was termed 'bori-koke' (barley hill) since this was the most difficult time for the nation to feed its population because rice harvested in autumn ran out of supply and there was yet to be harvest of barley, the alternate staple food. The severity of the food situation is well reflected in many folk stories describing the barley hill as the steepest hill in the whole world to climb. This chronic food shortage began to ease in the mid-1960s with the introduction of new high yield types of rice and the development of agricultural technology. Particularly, the initiation of the New Village Movement, called 'Saemaul Undong', in the early 1970s in rural area is credited with having prompted the adoption of agricultural innovations and the resultant increase in agricultural productivity. In addition, the overall changes in the socio-economic structure of rural area in the wake of the industrialization, urbanization and economic development of the country have totally altered the characteristics of the agricultural economy. Inspired by commercialism and entreprenuership, traditional farming which was focused almost exclusively on rice and barley cultivation gave way to emphasis on various kinds of cash crops, multiple cropping and vinyl house farming during the winter wherever possible (e.g., Chang Y,. 1985).

The resultant changes in food production are illustrated in table VI-1. Although the quality of the data is highly suspect, especially for the earlier years, the table nevertheless shows a trend of increasing rice production since 1945 at rates exceeding the rate of population growth, except for 1980 which was a year of very poor harvest. The rising production of rice is of particular significance to Koreans because of its absolute importance to the Korean diet. Long awaited self-sufficiency in rice was achiev-

Table VI-1. Trends of selected food productions, 1945-1983

	1945	1950	1955	1960	1965	1970	1975	1980[a]	1983
									(in 1000 M/T)
Rice[b]	1 848	2 103	2 959	3 046	3 501	3 939	4 669	3 550	5 404
Barley and wheat[b]	331	698	1 273	1 668	2 136	2 352	1 806	906	930
Other grains	78	72	92	81	120	124	92	170	115
Pulse	138	142	168	150	203	277	357	279	277
Potato	639	528	325	326				431	407
Cabbage					614	816	2 280	3 118	3 052
Radish					480	797	1 370	1 973	1 568
Apple					167	212	280	410	586
Orange					1	5	67	161	331
Fish					563	935	2 135	2 410	
Cultured fishery products					74	119	352	542	
									(in 1000 heads)
Draft cattle				1 010	1 314	1 284	1 546	1 380	1 940
Milk cattle				1	7	24	86	194	275
Pig				1 397	1 382	1 126	1 247	1 761	3 649
Chicken				12 030	11 892	23 633	20 939	39 232	49 239

Sources: MOAF (v.y.). BOK (v.y.).

[a] Data on live stocks for 1980 are from the 1980 Agricultural Census;

[b] Polished.

Others are from sample surveys.

ed in the mid-1960s and this was interpreted as the liberation from chronic starvation. The production of other crops had shown rapid increases by 1970 and fluctuations thereafter.

One of the most important developments in the agricultural economy in the 1960s is the development of the market economy. Previously cultivation of cash crops was very limited and vegetables were mostly grown for home consumption even in rural areas, but with the construction of highways throughout the country which started in the mid-1960s, the problem of transportation of perishable vegetables to cities disappeared and vegetable growing became a major income source for a significant portion of the rural population. The adoption of vinyl (or green) house farming also made it possible to supply vegetable during winter. The rapid urbanization of the Republic of Korea since 1960 also contributed greatly to the prosperity of vegetable growers. Increasing vegetable production and changes in the relative importance of vegetable cultivation in agriculture can readily be seen in table VI-1. It is also notable that this increasing vegetable farming was accompanied by a diversification of products.

Better living conditions, urbanization and technical innovations appear to have resulted in rapid increases in fruit production since the mid-1960s, and the most important event in this field was probably the initiation of extensive orange cultivation on Cheju Island. Oranges were extremely rare and expensive until the 1960s, but have now become a common and cheap fruit. Other notable developments in the food supply since the mid-1960s can be found in the areas of fishing, fishery product cultivation, milk production and poultry farming. Fish catches almost quadruppled during the decade between 1965 and 1975 owing to the launching and expansion of deep sea fishing in distant seas. During the same period, the cultivation of such fishery products as clams and oysters emerged as a profitable industry. Cow's milk was alien to Koreans until the early 1960s, but milk production is currently one of the major components of the food industry. Egg production and the number of chickens have increased fourfold during the twenty years since 1965.

2. CONSUMPTION OF FOOD

The trends and patterns of food consumption may be determined largely by availability of the food, its price and the household's income. Availability can, in turn, be divided into two components, that is, domestic and imported food. The former has been discussed above, while imported foods have been very limited in the Republic of Korea. Largely because of the then low GNP, there were rarely any significant imports of food and agricultural products until the early 1960s, except for grains, mostly rice and wheat which were donated as part of the U.S. aid programme. The food imports have gradually increased since the mid-1960s parallel with improving agricultural production and domestic food supplies, indicating that food consumption has increased faster than domestic food production has risen. It is, however, apparent in table VI-2 that the total volume of imported food or agricultural products except rice and wheat is still very small. In short, the global trends and patterns of food consumption are almost identical with those of food production in the Republic of Korea.

It is generally believed that the growth of per capita (or household) income during the last two decades has resulted in a continuous increase in per capita food consumption in the Republic of Korea. The positive relationship between income and food consumption is partially confirmed by table VI-3 which presents the income elasticity of major foodstuffs. The table shows that the consumption of major food groups such as grains, meat and vegetables rises as income grows, but the elasticity differs between rural and urban areas and in terms of the kinds of food. Among the three categories in table VI-3, income elasticity was greatest in the case of meat, while little elasticity occured with grains. According to various analyses of the income elasticity of more detailed food items, the consumption of milk appears to be most sensitive to income change and the sensitivity is reduced in that order of beef, fish, pork, eggs and

Table VI-2. Per cent rate of self-sufficiency of domestic production of foods, 1965-1983

	1965	1970	1975	1980	1983
All grains:					
A[a]	94.2	81.3	77.9	58.3	50.3
B[b]		112.4	113.4	107.7	85.5
Rice	100.7	93.2	100.1	88.8	97.7
Potatoes		100.0	100.0	100.0	100.0
Pulses		87.8	85.2	40.1	31.1
Vegetables		100.0	100.0	100.2	100.5
Fruits		100.2	101.4	98.6	100.5
Meat		100.0	100.6	97.2	92.1
Eggs		100.0	100.0	100.0	100.0
Milk		98.4	100.0	101.0	99.5
Fish and shells		110.9	138.0	132.7	120.8
Sea-weeds		108.9	124.7	177.1	141.2
Oils		43.1	24.2	60.0	44.5

Source: For 1965, MOAF (1965); For other years, KREI (1983).

Note: The rate is calculated as (total domestic production/ total domestic consumption) x 100.

[a] Total domestic consumption is used as denominator;

[b] Domestic consumption for food is used as denominator.

chicken (see Lee J-H and Cho D-R, 1984: 66). In general, the patterns of income elasticity in rural and urban areas for foodstuffs are similar, but the degree of difference between food items seems to have changed over time: the difference has widened in rural areas, while the reverse is true in urban areas. It should be noted that the income elasticity of a foodstuff may be determined mostly by the importance of the food in everyday living. Basic foods are expected to reveal little elasticity and changes in meal habits would result in a different pattern of elasticity in the consumption of foodstuffs.

The same studies show similar trends and patterns in the relationship between prices and consumption. Food prices have risen continuously during the last twenty years as shown by table VI-4, but the adverse effect of these increases on consumption was more than offset by the much greater increase in income. Based on current Korean currency values, the per capita GNP rose more than fifty times between 1965 and 1983, while consumer food prices increased about twelve times.

Although the growth of income prompted

Table VI-3. Income and price elasticity of major food groups, 1965-1975

	1965		1970		1975	
	Rural	Urban	Rural	Urban	Rural	Urban
A. Income elasticity						
All grains	0.312	0.246	0.305	0.094	0.221	0.134
Rice	0.638	0.380	0.482	0.097		
Barley	0.531	–0.924	–0.420	–0.773	–0.321	–0.236
Meat	1.126	1.471	0.812	1.204	2.156	0.948
Vegetables	0.338	1.163	0.136	0.896	1.216	0.761
B. Price elasticity						
All grains					–0.206	–0.368
Animal foods					–1.570	–0.750
Vegetables					–1.000	–0.930
Other foods					–1.032	–1.756

Sources: Moon P-R and Yoo B-S (1975: 54); Lee J-D and Cho D-R (1984: 49).

Table VI-4. Urban consumer price indices for selected items and trends of food expenditure, 1965-1983

	1965	1970	1975	1980	1983
A. Urban consumer price indices (1980=100)					
Per capita GNP ratio	2.9	8.7	29.3	100.0	149.5
All items	12.5	22.2	45.2	100.0	134.5
Food and beverage					
All	10.8	19.5	45.2	100.0	132.4
Grains	11.4	19.2	54.5	100.0	133.9
Others	10.3	19.9	39.8	100.0	131.7
B. Rate of food expenditure (based on the 1980 constant market price)					
In private consumption	59.5[a]	48.2(52.0[a])	43.5	39.2	38.2
In urban household			48.2[b]	42.9	38.9
In urban wage and salary earners' household			47.6[b]	42.6	38.8

Source: EPB (C-1984).

[a] Based on the 1975 constant market price.

[b] For 1976.

more food consumption, the share of household expenditures allocated to food (Engel's coefficient) has gone down since the early 1960s, as suggested by table VI-5. For example, about 67 per cent of the total household expenditure in urban areas was used for food in 1964 and it has been reduced to 39 per cent by 1983. This change was not, however, true for all major food items. If we compare the changes in expenditure allocation to major foodstuffs between 1964 and 1973, a marked difference can be seen between the allocation for grains and other kinds of food: there is little change in most major kinds of food except grains. As is show in table VI-6, the Engel's coefficient was also found to have been negatively related to household income both in urban and rural areas.

More detailed changes in the pattern of food consumption are illustrated in table VI-7 which presents the trends of per capita daily food supply during the period 1962-1984. According to the table, per capita grain consumption has gradually gone down since 1970, and the consumption of potatoes, which were used traditionally as the third staple food if rice and barley were in short supply, has declined sharply since 1965. Most drastic changes in food supply between 1962 and 1984 were observed with milk and fat. Marked increases in consumption were also noticed for sugar, fruits, eggs, meat, vegetables and fish. The table clearly indicates drastic changes in the pattern of food consumption during the last two decades. First, the total per capita food consumption increased more than 50 per cent and second, the major food items become greatly diversified. Until 1965, grains, potatoes, vegetables and fish constituted the major foodstuffs, but fruits, milk and meat have recently been added to the list of major items, while potatoes are no longer an important food.

Table VI-5. Per cent rates of food expenditures in urban and rural households, 1964 and 1972

	All foods	Grains	Meat	Vegetables	Others
A. In urban household					
1964	66.6	44.5	6.8	7.6	7.7
1972	47.9	23.6	7.3	6.6	10.4
B. In rural household					
1964	59.3	47.4	0.7	1.1	10.1
1972	48.2	37.4	0.9	1.5	8.4

Source: Moon P-R and Yoo B-S (1975: 53).

3. GENERAL NUTRITIONAL STATUS

The above discussion indicates with certainty that the general nutritional situation in the Republic of Korea has improved profoundly during the last two decades. According to the food balance sheets developed by the Korean Rural Economics Institute (KREI), the daily per capita energy supply is estimated to have risen from 1,943 Kcal in 1962 to 2,595 Kcal in 1983. The supply of all the essential nutrients has also increased steadily, as revealed in table VI-8. The recent improvement in the nutritional situation is also confirmed by a series of national surveys on the nutritional status of individuals conducted by the Ministry of Health and Social Affairs (MHSA) (see table VI-10), but there is a substantial gap between the two sources of data. The difference may be partly explained by the fact that the estimates in the food balance sheets are the per capita average 'supply' of food disregarding the loss of nutrition due to cooking and food handling. On the other hand, the national surveys by MHSA appear to have resulted in under-estimating the per capita

Table VI-6. Engel's coefficients in urban and rural areas by income ratings, 1964 and 1973

(Income ratings: from lowest to highest)

A. Urban areas

	I	II	III	IV	V	VI	VII	VIII
1964	78.0	74.5	72.2	69.2	66.6	63.4	61.0	56.6
1973	55.8	54.4	51.6	48.9	46.9	45.9	44.4	38.4

B. Rural areas

	I	II	III	IV	V
1964	64.5	62.5	56.4	54.8	52.7
1973	51.7	50.1	47.9	45.3	42.6

Source: Moon P-R and Yoo B-S (1975: 50).

intake of food and nutrients in view of various problems inherent in household surveys of nutrition. For example, gaps between the two sources are pronounced in the cases of milk and meat, which are frequently consumed in stores or restaurants and not as part of ordinary family meals. Considering this and in view of the per capita daily need of nutrients calculated by the government, the nutritional status of Koreans on the average is believed to have reached a satisfactory level in the mid-1970s. Among the major nutrients, calcium is the only element deficient even today.

Starches, particularly rice, are the major source of energy supply in the Republic of Korea, although the share of animal foods in the total energy intake has been growing. As is shown in table VI-8, 72 per cent of the total energy supply was estimated to come from starches in 1983, while the share of animal foods increased from 4 in 1962 to 11 per cent in 1983. During the same period, the daily protein supply rose by almost 50 per cent and the share of animal foods in the protein supply increased substantially, too. Fish and meat emerged as the major suppliers of animal protein. Very recently, the per capita consumption of eggs and milk rose considerably. Among the non-animal foods, vegetables and pulses became increasingly important protein suppliers, while the amount of protein provided by grains, still the prime protein supplier, has changed little since the early 1960s. Unlike the cases of energy supply and protein consumption, the marked increase in fat intake during the period 1962-1983 was facilitated largely by the growing consumption of oils and meat.

Table VI-7. Per capita daily supply of foods, 1962-1984

(Unit: gram)

	1962	1965	1970	1975	1980	1984
Grains	478	504	534	528	506	502
Potatoes	98	200	159	97	59	38
Sugar	5	3	17	14	28	33
Pulses	16	16	19	27	29	26
Vegetables	99	115	164	171	329	282
Fruits	15	22	28	38	44	62
Meat	13	16	23	25	38	45
Eggs	4	5	9	11	16	16
Fish & shells	37	45	40	68	61	74
Milk	1	6	5	12	29	59
Oils	1	1	4	7	14	23

Sources: KREI (1983; 1984).

Changes in the pattern of food intake and diet since the early 1960s for the most part explain the growing supplies of other essential nutrients such as calcium, minerals and vitamins. As is suggested by table VI-9, the increasing consumption of vegetables and fruits resulted in a better supply of all types of vitamins, calcium and iron. The growing intake of animal foods is also known to have been a factor in the supply of calcium, iron and vitamin A.

Table VI-8. Trends and composition of per capita daily supply of nutrients, 1962-1982

	Actual supplies						Recommended	
	1962	1965	1970	1975	1980	1983	1975	1982
Energy (Kcal)	1 943	2 189	2 370	2 390	2 485	2 595	2 100	2 200
% starch foods	89.2	89.3	84.3	80.8	76.4	71.9		
% animal foods	3.9	4.4	4.5	5.9	9.2	10.9		
Protein (g)	53.2	57.7	65.2	71.1	73.6	79.5	70.0	70.0
% animal prot.	14.1	15.9	16.3	21.4	27.4	32.0		
Fat (g)	13.1	15.2	19.7	27.4	36.6	47.7		
% oil fat	6.1	6.6	18.3	26.0	37.7	43.8		
Inorganic substance								
Calsium (mg)	299	363	390	495	511	614	600	720
Iron (mg)	10.8	12.3	13.3	15.5	12.6	15.5	13.0	14.0
Vitamin								
A (I.U)	957	1 282	2 354	2 779	3 037	3 618	2 000	1 900
B1 (mg)	1.17	1.37	1.49	1.50	1.92	1.66	0.9	0.9
B2 (mg)	0.49	0.63	0.73	0.82	1.03	1.26	1.3	1.2
C (mg)	49	74	79	74	125	110	60	50

Source: KREI (1983: 38-39 and 152-153).

Table VI-9. Components of food in per capita daily supply of nutrients, 1962-1983

	Grain	Potato	Sugar	Pulse	Vegetable	Fruit	Meat	Egg	Fish & shell	Milk	Oil
A. Energy (Kcal)											
1962	1 621	111	19	65	32	8	34	7	35	1	7
1970	1 814	180	68	87	53	14	49	14	40	3	33
1983	1 719	40	119	107	113	37	104	26	87	34	188
B. Protein (g)											
1962	36.0	1.5	0.0	6.3	1.7	0.1	1.6	0.6	5.2	0.0	0.0
1970	40.2	2.2	0.0	8.2	2.7	0.1	2.8	1.1	6.6	0.2	0.0
1983	36.8	0.7	0.0	9.2	5.7	0.5	6.9	2.1	14.9	1.6	0.0
C. Fat (g)											
1962	4.1	0.4	0.0	2.6	0.2	0.1	2.9	0.5	1.4	0.0	0.8
1970	4.5	0.5	0.0	3.5	0.4	0.1	3.9	1.1	1.6	0.2	3.7
1983	4.6	0.2	0.0	4.1	1.8	0.3	8.5	2.0	2.7	1.6	20.9
D. Others		(Sea-weeds)									
Calcium (mg)											
1970	159	34	25	27	86	4	3	6	38	7	0
1982	123	8	39	40	201	26	6	10	86	66	0
Iron (mg)											
1970	6.9	1.1	0.8	1.5	1.3	0.3	0.3	0.2	1.0	0.0	0.0
1982	4.7	0.3	0.6	1.8	2.3	0.8	0.8	0.4	2.5	0.6	0.0
Vitamin A (I.U)											
1970	0	123	810	2	313	16	0	15	2	1	0
1982	157[a]	44	422	4	2 093	420	154	137	36	67	27
Vitamin B1 (mg)											
1970	1.00	0.21	0.01	0.13	0.07	0.00	0.00	0.01	0.06	0.00	0.00
1982	0.72	0.06	0.00	0.15	0.23	0.09	0.15	0.01	0.08	0.09	0.00
Vitamin B2 (mg)											
1970	0.33	0.07	0.05	0.03	0.03	0.07	0.02	0.03	0.05	0.01	0.00
1982	0.29	0.06	0.03	0.05	0.41	0.13	0.08	0.04	0.10	0.05	0.00
Niacin (mg)											
1970	15.0	0.9	8.2	0.7	2.5	0.1	0.4	0.1	1.9	0.0	0.0
1982	8.8	0.2	0.2	0.9	4.3	0.9	2.2	0.0	3.5	0.4	0.0
Vitamin C (mg)											
1970	0	29	1	0	48	1	0	0	0	0	0
1982	0	8	0	0	104	8	0	0	0	1	0

Source: KREI (1983: 42-43 and 72-73). [a] Due to the importation of corns.

Despite the growing consumption of animal foods during the last two decades, the Republic of Korea still remains one of the countries relying most heavily on starches. The level of per capita animal food consumption is very low compared to other countries with a similar per capita income. Such a relatively heavy consumption of starchy foods and vegetables may be largely accounted for by Korean dietary habits. Basic dishes or minimum requirements in a Korean meal, whether breakfast or dinner, are steamed rice and pickled cabbage. Most Koreans feel satisfied with a meal if they have a bowl of rice at least whatever other good dishes there are. Rice consumption began to go down in the urban upper income group from the early 1970s (Moon P-R and Yoo B-S, 1975:52), signifying a change in dietary habits in a part of Korean society. This change is expected to spread soon to other urban strata, in view of the newly emerging family life styles with the development of big apartment complexes in metropolitan cities, which are known to facilitate the nuclear family and western life styles. In a nuclear family, adaptation to new ways of life including dietary habits is relatively easy because of reduced pressure from parents and relatives. In the urban, upper class apartment areas, regular family visits to restaurants serving western style foods have become a status symbol with the restaurant food industry flourishing in recent years. Overall, there is a tendency toward an increasing difference in food consumption habits among metropolitan, other urban and rural areas, between classes, and in terms of life styles.

According to an overview of various research results on the nutritional situation by the mid-1970s (Kim S-H, 1978: 1121-1179), there were substantial seasonal variations in per capita food and calorie intake. All kinds of vegetable foods were relatively abundant and calorie intake was greater during autumn and summer due mainly to the impact of weather on food production. The calorie intake was least in spring. This seasonal variation is, however, believed to have disappeared gradually with the growth of green house farming, the development of food storage techniques and the government's intervention in the major food supply systems.

The national surveys on nutrition shows regional differences in the intake of foods and nutrients, as is given in table VI-10. Even after taking into account biases due to the smallness of the samples, the surveys are enough to indicate the important regional dietary trends and patterns. In all regions (metropolitan, other urban and rural), the share of animal foods in the total intake of calories and protein has increased, but there is a considerable difference in the pattern in terms of the level of urbanization of an area. For example, the consumption of milk and fruits has grown mostly in metropolitan cities, while the most marked increase in vegetable consumption has taken place in rural areas. Overall, the diversity and balance of food intake have improved more in the more urbanized areas. The 1984 national survey on nutrition reveals that the per capita daily intake of protein, calcium, iron and thiamin remains insufficient in rural areas.

The diversity and balance of food intake appear to have been related to the incidences of diseases related to nutritional deficiencies. According to the 1978 national survey on nutrition, there were marked differences in the proportion of residents suffering from various diseases of nutritional deficiencies such as anaemia, stomatitis, scurvy, nyctalopia and glossitis among metropolitan, other urban and rural areas. The smallest proportion was reported in metropolitan cities and the highest in rural communities (MHSA, 1978: 212-213). The survey also indicates a much greater incidence of diseases of nutritional deficiency among females than males. Though information is scattered, socio-economic differences in nutrition intake and food consumption can still be found. As discussed in the next section, several recent surveys in metropolitan Seoul reveal consistently profound differences between the upper and lower classes in the nutrition and food intake of young children.

The changes in nutritional status since 1960 have been well reflected in the physical development of Koreans, as is illustrated in table VI-11. The table shows that there has been a continuous improvement in the physical development of students of all ages during the two decades between 1963 and 1983. Considering the fact that the ratios of middle and high school enrollment have increased rapidly since 1960 (see table VI-10), the actual changes in physical measures of high school age population, particularly of girls, would be expected to be more pronounced than indicated by the table. Also the national surveys on nutrition show a positive relationship between the nutritional status of an area and the physical development of its residents, as indicated by table VI-12.

4. FEEDING OF YOUNG CHILDREN

It is believed and partially confirmed by the earlier discussions on differential mortality (section III-3), that breast feeding is an

important determinant of the morality and the health of a child. In traditional Korea, lactation was universal and extended frequently to three or four years or until the next pregnancy. According to the 1974 KNFS, 94 per cent of the next-to-last births whose closed birth interval was 33 months or more and who had survived at least two years were reported to have been breastfed. As is shown in table VI-13, the lactation behaviour of mothers differs significantly in terms of their demographic and socio-economic background and this was true even in the mid-1970s. A more recent cohort, higher education and living in a more urbanized area were associated with the lower proportion of lactation and a shorter breast feeding period on the average. A few small scale surveys by individual scholars give detailed information on lactation behaviour in more recent years. Although subjected to considerable sample bias, the surveys together appear to enable us to assemble an overall picture of the Korean trends and patterns of lactation.

It is evident from table VI-14 that the absolute majority of Korean mothers still breast-feed their babies immediately after the birth. The table also indicates that there has been a considerable change in the initial methods of feeding infants. About 95 per cent of all

Table VI-10. Per capita daily intake of nutrients and its ratios to the recommended amounts by regions, 1978 and 1984

	Intake of nutrients				Per cent ratio to RDA			
	Whole country	Metro polis	Other urban	Rural area	Whole country	Metro polis	Other urban	Rural area
A. For 1978								
Energy (Kcal)	1 833	1 632	1 852	1 923	87.3	77.8	88.2	91.6
% from grains	78.0	71.2	76.2	81.8				
Protein (g)	59.5	56.1	62.4	59.8	91.5	86.3	96.0	92.0
% animal prot.	28.7	36.2	33.0	23.1				
Calsium (mg)	412	413	439	398	68.7	68.8	73.2	66.4
Iron (mg)	10.3	9.4	10.7	10.5	79.2	72.3	82.3	81.0
Vitamin A (I.U)	2 867	2 422	2 771	3 135	143.4	121.1	138.6	156.8
Vitamin B1 (mg)	1.2	1.1	1.2	1.2	133.3	122.2	133.3	133.3
Vitamin B2 (mg)	0.8	0.7	0.8	0.8	61.5	56.2	61.5	61.5
Niacin (mg)	16.1	15.0	16.7	16.4	107.3	99.2	111.3	109.3
Vitamin C (mg)	68.3	60.9	68.1	72.0	117.8	105.0	117.4	124.1
Fat (g)	22.6	28.8	24.8	18.5				
% animal fat	32.3	40.3	35.5	23.2				
% of total vegetable food intake	90.1	85.6	88.6	93.3				
B. For 1984								
Energy (Kcal)	1 900	1 925	1 968	1 829	90.9	91.0	92.2	87.6
% from grains	72.9	65.9	75.6	77.0				
Protein (g)	69.3	76.7	70.9	63.6	103.3	114.3	104.8	95.5
% animal prot.	37.8	44.0	37.9	31.3				
Calcium (mg)	480	572	466	415	78.5	93.6	75.5	68.2
Iron (mg)	13.9	15.8	14.4	12.0	101.0	113.7	103.6	88.5
Vitamin A (I.U)	1 681	1 775	1 455	1 776	73.7	77.7	63.3	78.7
Vitamin B1 (mg)	1.17	1.28	1.13	1.11	108.3	117.4	103.7	103.7
Vitamin B2 (mg)	1.04	1.17	0.99	0.97	80.6	90.7	75.6	75.8
Niacin (mg)	22.7	27.7	22.5	18.7	161.1	196.1	157.5	133.9
Vitamin C (mg)	58.6	54.6	56.1	63.8	112.7	104.9	107.6	123.7
Fat (g)	24.0	31.6	23.1	18.3				
% animal fat	33.8	39.2	31.6	27.3				
% of total vegetable food intake	85.8	80.0	86.6	90.5				

Sources: MHSA (1978; 1984).

mothers in rural area seem to have fed their babies mother's milk until the late 1960s according to Table VI-14 (see panel B), but the proportion of breast feeding mixed with bottle feeding has increased substantially since 1960. The table again confirms that breast feeding is more prevalent in rural areas than in urban areas, and the difference between social classes was found more pronounced. According to a 1982 survey of kindergarten children in an upper class apartment area in Seoul, breast-fed children and those fed cow's milk were divided equally and the majority (38 per cent) had mixed feedings. On the other hand, a heavy reliance on breast milk was observed in a lower class metropolitan residence of the same city. The reliance on mother's milk was even greater in the lower class urban area than in ordinary rural villages if the year of observation is controlled for, suggested that the lactation behaviour has been determined primarily by the socio-economic background of the family, particularly by the standard of living, recently at least since 1960.

Table VI-11. Physical development of school children, 1963-1983

(Unit: cm)

Age	1963	1965	1970	1975	1980	1983
A. For boys						
a. Height						
6	111.6	112.2	112.9	113.3	115.0	116.0
9	122.2	124.1	126.3	127.8	129.9	131.2
12	141.7	142.5	143.7	143.4	144.2	146.4
15	157.8	158.7	160.8	161.6	162.2	164.8
17	163.2	163.7	165.9	166.8	167.4	168.3
b. Weight						
6	18.3	18.4	19.3	19.2	20.1	20.3
9	23.9	24.1	24.8	25.5	26.8	27.5
12	34.2	34.3	36.7	35.0	35.6	37.3
15	49.0	49.1	51.1	51.1	51.9	53.1
17	54.6	54.3	56.6	57.5	58.5	58.7
c. Breast circle						
6	56.0	55.8	56.8	56.7	57.6	57.6
9	61.5	61.9	61.3	62.3	63.1	63.5
12	69.1	69.4	70.7	69.1	69.1	70.0
15	80.3	80.1	81.6	80.9	80.9	81.4
17	86.3	85.2	86.7	86.4	86.6	86.3
B. For girls						
a. Height						
6	110.6	110.8	111.9	112.3	113.7	114.8
9	121.4	125.2	124.8	127.3	129.4	130.4
12	141.9	141.4	144.2	145.2	146.5	147.9
15	153.5	154.0	153.4	154.9	155.7	156.4
17	156.5	156.9	156.5	156.8	157.2	157.4
b. Weight						
6	18.1	18.3	18.8	18.5	19.2	19.5
9	23.3	23.9	24.3	24.9	26.3	26.8
12	36.2	36.2	37.5	36.9	38.1	38.7
15	46.8	47.9	48.7	49.0	49.4	49.8
17	51.1	51.0	52.2	52.1	52.4	52.5
c. Breast circle						
6	55.1	55.1	55.5	55.8	55.9	55.9
9	60.6	61.9	61.2	61.7	61.4	62.5
12	69.1	69.4	70.3	70.1	71.4	71.5
15	77.9	79.0	79.5	80.3	79.4	79.7
17	81.0	82.3	83.1	82.8	82.3	82.1

Sources: MOE (v.y.); EPB (B-1984: 192-197).

Table VI-12. Physical development of Koreans for selected ages and by region, 1984

(Unit: cm)

	Whole country		Urban area		Rural area	
	Male	Female	Male	Female	Male	Female
A. Height						
6	114.4	110.4	115.9	111.6	111.2	108.9
9	127.4	129.8	126.5	130.8	130.6	128.4
12	143.9	144.6	144.5	145.6	142.9	141.7
15	159.4	156.2	162.2	156.5	155.2	155.3
17	167.7	158.5	170.2	159.3	159.8	156.7
20	170.4	158.6	170.6	158.1	169.9	160.5
B. Weight						
6	19.8	18.5	20.2	19.2	19.1	17.7
9	26.1	26.6	26.0	26.9	26.4	26.0
12	35.5	37.0	36.4	38.1	34.1	34.0
15	49.6	48.3	51.9	48.3	46.0	48.2
17	58.3	50.7	59.0	50.4	56.0	51.5
20	61.0	50.2	61.3	49.3	60.8	52.9
C. Upper arm circumference						
6	17.1	15.8	17.5	16.2	16.2	15.2
9	18.3	18.2	18.4	18.3	17.9	18.0
12	20.8	20.6	21.2	21.0	20.2	19.5
15	24.1	22.9	24.5	23.0	23.5	22.6
17	26.9	24.3	27.0	23.9	26.6	25.2
20	27.6	24.6	27.5	24.2	27.8	25.9
*(N=	43-62	27-50	28-38	15-37	10-24	9-19)

Source: MHSA (1984).

* The figures given are the minimum and maximum number of observations for the ages presented.

Table VI-13. Proportions not breastfed of the next-to-last births which survived 2 years or more and for which the next birth interval was 33 months or more, and mean length of breast feeding of the births, for selected background of mothers, the 1974 KNFS

	Proportions not breastfed (per cent)	Mean length of breast feeding (in month)
Current age of mother		
All ages	5.6	19.2
Less than 25	6.2	16.5
25-29	6.3	17.5
30-34	5.1	20.5
35 +	4.9	21.0
Current residence[a]		
City	6.3	14.6
Town	4.3	17.7
Rural	2.9	16.7
Education[a]		
No schooling	2.7	16.9
Primary	3.7	16.1
Middle	4.7	14.9
High	9.5	13.1
College +	22.5	10.1

Source: NBOS and KIFP (1977: 128-129).

[a] In calculation of the mean, those with more than 24 months are excluded.

Table VI-14. Percentage of feeding methods of young children before the onset of supplementary foods

A. Information for young children at the survey

	Urban					Rural	
	Seoul			Jeonbug		Three villages	Kangwoen mountain
	Upper class	Lower class	Lower class	Urban	Rural		
Survey year:	1982	1979	1983	1977	1977	1979	1979
Breast milk	30.8	85.0	73	70.7	82.3	72.0[a]	81.4[a]
Breast milk and cow's milk	37.8	7.8	16	15.7	9.2	19.8	9.3
Cow's milk	30.8	5.9[b]	11	12.9	5.9	6.0[b]	7.4[b]
Others	1.1	1.3	–	0.7	2.6	1.2	1.2
(N=	90		78	140	153	514	121)

B. Information for all births survived to rural women at the survey

Mother's age at 1982 survey:	35 or less	36-40	41-45	46-50	51 or more
Breast milk	76.1	85.6	89.5	93.2	94.4
Breast milk and cow's milk	17.9	7.7	6.6	1.6	0.0
Breast milk and rice gruel	1.5	2.4	0.9	3.6	3.7
Cow's milk	4.5	4.3	3.1	1.6	1.9
(N=	134	208	228	249	162)

Sources: Lee E-W and others (1982a); Mo S-M and others (1985); Kim I-S and Mo S-M (1978(; Park M-M and others (1979 and 1981); Lee B-K and others (1983).

[a] Breast milk and rice gruel included;

[b] Cow's milk and rice gruel included.

A survey in Jeonbug province in 1977 (Kim I-S and Mo S-M, 1978) reveals that the major reasons for mixed feeding in urban communities were insufficient mother's milk (56.1 per cent) and the mother's poor health (12.2 per cent). The mother's perception that cow's milk is more nutritious than breast milk, the mother's not wanting to breast-feed and mother's employment constituted the second group of major reasons (9.8 per cent each). This second group is of special significance since they explain most of the recent changes in lactation behaviour in urban area. The same survey disclosed that the mixed feeding in rural areas was confined to cases of insufficient mother's milk (96.2 per cent).

According to a survey in a rural area (Lee B-K and others, 1983), it is apparent that the supplementary feeding of babies started on the average ten months after the birth until the late 1960s and has begun sooner since then. There are considerable differences in the onset of supplementary feeding according to table VI-15 in terms of the level of urbanization and the standard of living in an area. For example, 58 per cent of the young children are reported to have received supplementary feeding in the first six months after birth in a Jeonbug urban community according to a 1977 survey, while the equivalent figure for an adjacent rural area was 28 per cent. The mean age at which supplementary feeding began was 7.5 and 9.1 months respectively in these urban and rural areas. The difference is most striking between an upper class apartment area and a lower class community in metropolitan Seoul. Most children (91 per cent) were given their first supplementary food before reaching the age of six months in the upper class area according to a 1982 survey, whereas a 1983 survey reveals that only 14 per cent of the children in the lower class neighbourhood were ever given any supplementary food within six months (see table VI-15).

The trends and patterns of weaning are almost identical with those of supplementary feeding. A 1983 rural survey indicates that women at age 51 or over at the time of the survey had mostly terminated breast-feeding their children 18 months after birth (75 per cent). For

women at age 35 or less, this went down to 21 per cent, showing a change of 5 months over a span of the 20 years approximately between 1955 and 1975. Table VI-15 also reveals a significant difference in the timing of weaning between urban and rural areas and between upper and lower classes. In short, weaning and supplementary feeding have been taken place at an increasingly earlier age and the change has been greater in the upper class and in urban areas.

The timing of supplementary feeding or weaning is apparently associated with the major reasons for it. As suggested by table VI-16, the mother's mounting concern about the baby's health and nutrition has been a major factor in the increasingly earlier start of supplementary feeding and termination of breast feeding among the urban upper class. On the contrary, the majority of mothers who started supplementary feeding because of the baby's want of other foods and listed natural weaning as the most important reason for the termination of breast feeding were in rural areas and among the urban poor (e.g., Kim I-S and Mo S-M, 1978). The timing and motivation were, in

Table VI-15. Cumulative percentages of young children by age at onset of supplementary feeding and by age at weaning

A. Onset of supplementary feeding

Information for young children at the survey

Age in month	Urban					Rural	
	Seoul			Jeonbug		Three villages	Kangwoen mountain
	Upper class	Lower class	Lower class	Urban	Rural		
Survey year.	1982	1979	1983	1977	1977	1979	1979
Upto 3 months	30.3		1				
Upto 6	91.0	16.9	14	57.9	28.1	20.0	12.0
Upto 9	98.9	78.4	37				
Upto 12			53	90.8	80.3	77.2	73.4
More than 12	100.0[a]	100.0[a]	100	100.0	96.0[b]	100.0	100.0
(N=	90		78	140	150	514	121)

B. Weaning

Information for young children at the survey

Upto 6 months	27.9	1.5		1.4		1.2	0.0
Upto 12	75.6	24.6	42	31.4	9.8	23.4	10.0
Upto 18	89.6	55.4	68	65.7	28.1	55.9	42.9
Upto 24	98.9	90.8	83	74.3[b]	48.4[b]	85.5	84.3
More than 24	100.0	100.0	100			100.0	100.0
(N=	90		78	140	153	514	121)

Information for all births survived to rural women at the survey

Mother's age at 1982 survey:	35 or less	36-40	41-45	46-50	51 or more
Upto 12 months	20.8	18.7	10.9	8.8	7.4
Upto 18	78.3	71.6	45.1	44.1	22.2
Upto 24	88.1	85.6	75.4	74.3	71.6
More than 24	100.0	100.0	100.0	100.0	100.0
(N=	134	208	228	249	162)

Sources: Same at table VI-14.

[a] Figures for more than 9 months;

[b] The remainder are those still in lactation or in lactation without food supplementation.

turn, found to have been associated with the kinds of supplementary food or those provided after weaning. According to the 1983 rural survey mentioned above, most babies had rice gruel or boiled rice as supplementary food in the more remote past, and supplementary fruit juice and eggs have increased substantially in more recent years. There was a great diversity even in the first supplementary food provided in an urban upper class area (see table VI-17).

5. CHILDHOOD AND MATERNAL NUTRITION

The pattern of lactation and the method of feeding young children would be assumed to be closely related to the nutritional status of the children. The traditional Korean pattern may well be characterized prolonged lactation, little food diversity and the exclusive intake of vegetable foods. Various recent studies of children's nutrition indicate invariably that this traditional pattern generally results in malnutrition and poor health. As is evident from table VI-18, the intake level of essential nutrients for children aged 1-12 during the late 1970s was far below the recommended level in both rural communities and urban lower class areas where the traditional pattern of lactation and children's diet still prevails. The most serious deficiency was noticed with calcium, iron, protein and riboflavin. Some research found that mothers were not aware of the need for animal foods for both bagies and mothers (e.g., Park M-M and others, 1979). On the contrary, the diet quality for all children attending a kindergarten in an upper class apartment complex in Seoul were evaluated in 1979 as good or fairly good. Their physical growth fell in the 75-90 percentile of the national sample (Hyun W-J and No S-M, 1980). The study also reports that over nutritional supply and overweight emerged as important child health problems in the area. A similar pattern, though the gap was narrower, was observed between adjacent urban and rural areas according to a survey conducted in 1977 (Kim I-S and Mo S-M, 1978).

The intake of cow's milk would be an important factor explaining the differences in the nutritional status of young children. According to a survey in Seoul in 1976, there were marked differences in milk consumption among children with different socio-economic backgrounds. For example, 72 per cent of the preschool children had milk daily in the upper class, while only 2 per cent of the extremely poor did (Choe S-H and Mo S-M, 1976). Considering the fact that there was little difference in the preference

Table VI-16. Percentages of reasons for the onset of supplementary feeding

Year of survey:	Jeonbug urban 1977	Jeonbug rural 1977	Kangweon mountain 1979
Concern on baby's nutrition or health	54.3	26.8	16.2
Insufficient breast milk	21.3	24.9	13.8
Baby's want of other foods	16.4	40.5	60.0
Mother's being pregnant	2.9	6.5	5.0
Others	5.0	1.3	5.0

Sources: Kim I-S and Mo S-M (1978); Park M-M and others (1979).

Table VI-17. Percentages of supplementary foods given to young children, 1982

	Seoul upper class	Surviving rural children mother's age at the survey				
		35 –	36-40	41-45	46-50	50 +
Rice gruel or boiled rice	18.0	53.0	70.2	86.9	87.1	83.9
Fruit juice	14.3	20.2	10.1	8.8	7.2	8.6
Egg	21.5	9.7	7.7	1.3	2.0	3.1
Others	46.2[a]	17.1	12.0	3.0	3.7	4.4
(N=	90	134	208	228	249	162)

Sources: Lee E-W and others (1982a); Lee B-K and others (1982).

[a] Included are imported baby foods (10.2 per cent), vegetables (13.8 per cent), soup (10.8 per cent) and cereal (7.2 per cent).

among the mothers for milk as an item for their children's diet, this observation can be taken as an indication that family income or the standard of living was a crucial determinant of children's nutrition and health. The situation is believed to have changed little. In addition to the socio-economic conditions, such bio-physiological, in a sense cultural, factors as birth interval, sibling's order and sex of children were found to be associated with nutritional status and physical development, according to a survey of preschool children in a lower class residential area of Seoul (Kim H-K and Mo S-M, 1977; Mo S-M and Kim H-K, 1978). The direction of the relationship is identical with the differences in the child survival ratios examined in Section III, indicating that nutrition has been a major factor in childhood mortality in the Republic of Korea.

There are very few studies on maternal nutrition in the Republic of Korea, but it is believed that the nutritional trends and patterns of young children for the most part can be applied to mothers. According to a survey on maternal nutrition in rural areas in 1977, the dietary patterns of pregnant and lactating women were almost identical with those of other women (Park H-N and Kim H, 1978). A similar observation was made in a survey on maternal nutrition in a rural family health project area in 1981. The dietary balance of mothers was grossly inadequate and there was little food diversity (Yi B-S and others, 1981), but when examined separately for the periods of non-pregnancy, pregnancy and lactation, the same study revealed that both dietary balance and food diversity were better during pregnancy and lactation than during non-pregnancy. An index of dietary balance, for example, was calculated as 72.6 for pregnant women, 71.6 for lactating mothers and 61.3 per cent for ordinary women. During pregnancy, the majority of women reportedly lost their appetites (64.8 per cent) and the symptoms were severe with the increase in parity. Of them, 42 per cent felt nauseous or queasy and could not take any food. Special consideration concerning meals was given to about 40 per cent of women during pregnancy, thanks to the encouragement of the husbands. Most common items for special diet were meat and fruits. All mothers took sea-weed soup daily immediately after the birth and during the early period of breast feeding since the soup is, according to the folk belief, supposed to purify the mother's blood after giving a birth and to facilitate the production of milk, and the practice is still universal throughout the country. A majority of mothers (76 per cent) reported having increased their total food intake during lactation, and the most common foodstuffs taken at this time were boiled rice (62 per cent) and sea-weed or meat soup (15 per cent). Overall, the survey confirmed that the interest in maternal nutrition was positively associated with the couple's education level, income and the aspirations for a modern life style (Lee B-S and others, 1981).

The study also discloses that many rural women had food taboos during pregnancy and breast feeding. Most of these involved animal foods (90 per cent of all avoided foods) such as chicken (28.4 per cent of the mothers), chicken bone (18.3), small fish (9.2) and duck (7.3 per cent). Those were avoided in fear that the baby would be disfigured in a manner resembling the tabooed animals. Food taboos were less common during

Table VI-18. Per cent ratios of per capita daily intake of nutrients of children to recommended amounts

	Seoul upper class	Seoul lower class	Rural health areas
Survey year	1979	1977	1979
Age:	5-6	7-12[a]	1-6[a]
Calorie	102.7	55.3- 67.2	61.5- 69.0
Protein	113.6	49.3- 56.7	55.1- 57.6
Calcium	123.8	25.6- 39.1	34.4- 46.5
Iron	73.0	57.0- 90.8	38.6- 62.2
Vitamin A	129.1	51.3- 97.8	50.9- 94.2
Vitamin B1	113.8	68.9- 98.8	102.0-122.0
Vitamin B2	92.2	51.4- 70.0	38.8- 62.0
Niacin	119.0		69.2- 91.6
Vitamin C	200.0	71.1-135.6	52.5- 97.5
(N=	100	138	514)

Sources: Hyun W-J and Mo S-M (1980); Mo S-M and Kim H-K (1978); Park M-M and others (1981).

[a] Range is given of the figures for each age in the age bracket.

breast feeding, but still 5-10 per cent of mothers declined to take such animal foods as pork, chicken, goose and rabbit. There were some mothers who avoided all kinds of meat and fish (2.6 per cent). The most commonly avoided food during lactation was lettuce (20.5 per cent) because of the thought that it might cause diarrhoea in the baby. Although better than in the case of children, such traditional dietary habits appear to have been responsible for an inadequate supply of most essential nutrients to mothers, particularly animal protein, calcium and iron (Park M-M and others, 1979).

VII. FINDINGS AND IMPLICATIONS

In this study, we have examined the trends and patterns of mortality and health in the Republic of Korea especially during the last quarter century. Also covered were overall societal changes, the development of health services, and changes in nutritional situation under the assumption that these are the major explanators of the trends and patterns of mortality. However, no systematic attempt has been made to determine the relationship between them due mostly to data inavailability, poor quality of data available, and the paucity of research not only on the comprehensive overall evaluation of mortality and health but also on their specific aspects. Now, in this concluding chapter, the quality of the data used is first discussed to highlight the limitations and problems of this study. Next, the major findings are summarized in order of their discussion in the main text. Then, an attempt is made to suggest based on the findings possible linkages of the changes in socio-economic conditions, the health system and nutrition with the trends and patterns of mortality and health on a global level, with the hope that it can be used as a guide for future research in the field. Finally, the overall implications of the findings are discussed with emphasis on policy related issues.

1. DATA USED AND THEIR QUALITY

In the study of mortality and health in the Republic of Korea, the most serious constraint is the paucity of relevant data and the lack of reliability of the data available. Though they existed as early as 1910, vital statistics were rarely used for estimating demographic indicators until recently due to its poor coverage. Instead, age-sex compositions from the census, which has been conducted since 1925 on an average of every five years, were adopted for calculating mortality rates for the nation as a whole, thus providing the basic information for the analysis of mortality during the last sixty years. However, no indirect method of mortality estimation could ever satisfactorily take into account the problems of data. Policy makers recognized the urgent need for reliable vital statistics in the 1970s and, as a result, marked improvement has recently been achieved in vital registration, although the usefulness of the data is still very limited.

Information is very rare regarding mortality differentials. The maternity history data from fertility surveys constitute a virtually unique source of data on the pattern of mortality differences during infancy and childhood. In this study, the 1974 Korean National Fertility Survey results were used for the extensiveness of the type of information it provides and the relatively good quality of the reporting as well as its sample size and national coverage. There are other national surveys on fertility and family planning, but their utility for analysing the patterns of mortality differences is considerably limited.

Health statistics are of questionable quality despite their relatively long history and their noticeable improvement in quality since the mid-1960s. Most health statistics gathered through administrative channels are believed to lack credibility. The reliability of reporting on causes of death are grossly suspect since about 60 to 65 per cent of the reports are still provided by non-physicians. Even the causes reported as diagnosed by doctors are often suspect. Accordingly, any conclusive discussions of mortality conditions based on health statistics should be made with great care. Recently, many surveys were conducted mostly by either the government or the Korean Institute for Population and Health to determine the health and medical behaviour of Koreans and the major problems in the national health care system.

Statistics on food and nutrition, too, pose serious problems. Government statistics on agricultural productivity have been notorious for its fabrication to conceal administrative mishaps, so the quality of nutritional statistics is also questionable. The government has regularly conducted national nutrition survey since 1969, but the results are of very limited use because of their very small sample size. Despite such serious problems, it is still possible to determine the general trends and patterns of nutrition in Korea during the last 25 years based on those statistics and survey results. Many small scale nutritional surveys have been conducted in recent years by individual researchers and these extend the scope of analysis to a substantial degree.

2. SUMMARY OF FINDINGS

a. Overall social change

Since 1960, the Republic of Korea has undergone an overall societal transformation characterized by economic development, urbanization and modernization. The average per capita GNP was 82 current US dollars in 1961 and increased to more than 2,000 dollars in 1985; 28 per cent of the population resided in a total of 27 cities in 1960, while 65 per cent lived in 50 cities in 1985, the average schooling was 7.9 years for males and 4.5 for females at ages 30-39 in 1966, but this became 10.1 and 7.9 in 1980. The country also entered a period of fertility transition in the early 1960s; the total fertility rate was about 6.0 in 1960, but went down to less than 2.2 in 1985. This drastic change in fertility was the major component in the slowdown of population growth during the last quarter century. According to the census, the annual rate of population growth was reduced from 2.85 during the period 1955-1960 to 1.56 per cent during 1980-1985.

b. Trends and age-sex patterns of mortality

Korean mortality transition began in the early years of the 20th century with the introduction of a new western medical and health system, and the mortality decline has been continuous since 1960. The crude death rate is estimated at 1.3-1.6 for 1955-1960 and 0.7-0.9 per cent for 1975-80. There were about 15 to 20 years of increase in the expectation of life at birth during the period between 1955 and 1980. The infant mortality rate was reduced from 100-115 per thousand to 35-50 during the same 25 year period.

Korean mortality consistently shows distinctive age and sex patterns. The mortality level at ages 0-9 is relatively higher than indicated by various model life tables with the same expectation of life at birth. Except for during childhood, the age pattern of Korean female mortality is very similar to the West family of the Princeton model life tables. On the other hand, the risk of dying is relatively lower at the crucial working ages 15-39 and higher at the ages beyond 40 in the case of males. The gap in male mortality relative to the levels from various model life tables widens sharply with the increase of age. These peculiarities are largely explained by the Korean life style and social norms governing the distribution of authority by age and sex. For instance, many recent nutrition surveys disclose that there are serious nutritional deficiencies among young children in rural and low class urban areas due to the traditional dietary customs. For adult men, drinking of alcohol and cigarette smoking are thought to be major factors in the increasingly higher mortality with age in relative terms. A higher risk of dying for female children was apparent until the mid-1970s because of the strong son preference and the resultant discriminatory care of children.

c. Mortality differentials

This study examined mortality differentials based on the 1974 KNFS data. The analysis revealed that the patterns of mortality differences ae clearly distinguished between infants and children aged 1-4. During infancy, mortality seems to be governed mostly by bio-physiological factors such as the birth interval, the status of breast feeding and the sex of the child, although these factors can be partially classified as cultural factors and contingent child-rearing constraints. After passing infancy, however, social, economic and cultural factors, which include the educational level of the parents, the father's occupation, the preferential ordering of children and so forth, are found to have significantly affected the risk of dying of children. The difference in the effect of bio-physiological and socio-cultural factors on the mortality level in infancy and in young childhood is easily explained by sex differentials. During infancy, females are exposed to a less risk of dying than males regardless of parity, while the mortality of female children was higher than that of male children at ages 1-4. These observations indicate that the survival of a child is governed mostly by bio-physiological conditions immediately after birth, but socio-economic and cultural factors gain importance with age.

The effect of the socio-economic background of the father in explaining the mortality differences of young children was greater than that of the mother, suggesting that the actual living standard of the family is more important than simply the mother's care in the survival of a child. Among the variables examined, child spacing or birth interval was found to have been the most crucial determinant of infant mortality. It can then be hypothesized that the fertility behaviour of individual couples is very closely associated with infant and childhood mortality and therefore the fertility transition since the early 1960s has been a major force in reducing child mortality in the Republic of Korea.

A partial analysis of adult mortality based on the 1974 KNFS shows a marked negative association with the educational level and leads to the assumption that the socio-economic

differences in adult mortality have become distinctive in more recent years, probably after the late 1960s. The assumption is apparently well supported by observations on the development of health service and the nutritional situation.

d. Causes of death and morbidity

During the last 25 years, the control of communicable diseases has been highly successful. It is estimated that the current incidence rate of Class 1 communicable diseases including cholera, dysentery, typhoid fever, diphtheria and malaria is about one per 100,000 population and the rate of Class 2 diseases like whooping cough, measles and mumps is about 20 with a negligible fatality rate. A series of surveys discloses, however, that morbidity based on the subjective judgement of the respondents has changed little or increased slightly since the mid-1970s. Morbidity was reported to be much higher in urban areas than in rural communities, which was accounted for mostly by the different perception of health and diseases in the two types of areas. Some surveys indicate an association between ecological and environmental factors and the patterns of morbidity.

Epidemiologic transition has taken place parallel with declining mortality since the early 1960s, and there was a drastic change in the major causes of death in the mid-1970s although the reliability of the statistics on the causes of death is highly questionable. The traditional pattern of leading causes which include infectious and parasitic diseases, diseases of the digestive organs and diseases of the respiratory system has faded, and a new pattern similar to that of developed countries has emerged. Currently, the most important causes are diseases of the circulatory system, neoplasms, injury and poisoning, but a different pace of the epidemiologic transition can be observed between childhood and adulthood. The traditional causes of death still prevail to a significant degree in early childhood. This observation can be explained largely by adult-centredness in the traditional social norms and system, reflection of this value in the recent development of health care system, and relatively minor changes in the methods of feeding young children. Somewhat significant differences in the cause of death have also been noted recently in terms of the type of residential area, occupation and educational level.

e. Development of health service

Modern health care service was introduced to Korea in the late 19th century mostly by foreign Christian missionaries, but the systematic development of a health system was started after 1910 by the Japanese. The system was completely destroyed during the period 1945-1955, when there was extensive social and political turmoil, and renewed development started after 1955. The government set up a nationwide health network by establishing a health centre in every 'gun' (county) level administrative unit with the initiation of the First Economic Development Plan in 1962.

The health care system has been expanded greatly through health subcentres founded in all 'myuns' (subcounties) in the mid-1960s which carry out MCH services and tuberculosis control in addition to the family planning programme. More recently, primary health posts have been opened in remote areas. Another and probably the most important development in health care service is the introduction of a compulsory medical insurance scheme beginning in 1977 to various population sectors such as employees in large business firms, public servants, teachers and their families. The proportion of population covered by medical insurance has reached about 50 per cent. With this development, medical facilities and personnel, particularly specialists and big hospitals have increased rapidly, but there remain wide disparities in the accessibility to and availability of medical care between communities and among various socio-economic groups. Chronic problems in the health system such as no vertical and horizontal role distinctions between various types of medical institutions, little control of drug sales, and overuse of drugs have not yet been eliminated at all. In addition, new problems like environmental pollution and high medical costs have recently emerged as the major national health hazards.

f. Nutritional situation

A significant change has taken place in the production and consumption of food in the Republic of Korea since the early 1960s. Previously, the kinds of food available were very limited and the majority of population lived on grains and vegetables only. Such limits on the food items available along with the shortage of major grains, rice and barley, began to disappear in the mid-1960s thanks to technical innovations and economic growth. Despite increasing production, the share of rice and other grains in total food production and consumption has shrunk sharply during the last two decades, while the consumption of vegetables, fruits and animal foods has grown considerably, indicating a substantive change in nutritional conditions and dietary habits. The greatly upgraded nutritional situation after 1960 is also confirmed by the food balance sheets and many nutritional surveys. For

example, the per capita daily energy supply was estimated to have risen from 1,943 Kcal in 1962 to 2,595 Kcal in 1983. The supply of all essential nutrients has also increased since the early 1960s and the nutritional status of an average Korean is believed to have reached a satisfactory level in the mid-1970s. This overall improvement in nutritional status has been clearly reflected in the physical development of school children during the last two decades.

Although the share of animal foods has been growing, starchy foods, particularly rice, are still the major source of energy in the Republic of Korea. During the period between 1962 and 1983, the share of animal foods in the total energy supply increased from 4 to 11 per cent. The daily protein intake rose by about 50 per cent in the same period due mostly to an increasing supply of animal protein from fish and meat. The pattern of food intake differs according to region and the level of income. The consumption of milk, fruits and meat has increased most for the urban upper class, while the most conspicuous increase in vegetable consumption was in rural areas. The level of urbanization of an area and the standard of living of a family are also found to have been positively associated with the diversity and balance of food intake. Deficiencies of essential nutrients such as protein, calcium, iron and thiamin are considerable in rural aras and among the urban poor.

Most Korean mothers still breast-feed their babies immediately after birth,but there has been a tendency to start supplementary feeding earlier, wean earlier and increase reliance on cow's milk since 1960. This tendency is more common in urban areas and in the upper class, where more mothers show keen interest in their children's nutrition. According to various recent surveys, nutritional deficiency is prevalent among young children in the urban lower class and rural areas, while an over-supply poses a problem to child health in urban upper class families. The class and regional differences in nutritional intake and food habits are evident, too, in the case of mothers. Taboos against various animal foods such as chicken, small fish, duck and pork during pregnancy and lactation are found still to be widely practiced in rural areas.

3. IMPLICATIONS OF SOCIETAL CHANGE ON MORTALITY

The initial transition of mortality started in the Republic of Korea in the early 20th century without any transformation of society. The only factor involved was the introduction of the new health and medical systems developed in the West. The decline in mortality entered a new stage in the early 1960s, and although overall societal transformation began, the social conditions for mortality and health in this period were not particularly better than in the past. Most people were poor, and the rebuilding of the medical and health systems, after their complete destruction during the post Liberation turmoil and the Korean conflict, had just started. The introduction of antibiotics and other new medicines through US aid and the United Nations Forces is evaluated as having been the only important factor in a rapid reduction in mortality in the 1960s. The statistics on causes of death, though their quality is highly questionable, indicate the role of these new imported drugs in the mortality decline, by showing the rapid elimination of deaths from infectious and parasitic diseases during the 1960s. Other important development related to mortality in this period were the adoption of the national family planning programme and the establishment of health centres in all 'guns' in 1962. As already pointed out, family planning has been a major factor in reducing infant and childhood mortality in the Republic of Korea. It is widely believed that rural health benefited greatly from the opening of health centres. These observations give rise to the surmise, though it can not be proved by the mortality estimates themselves, that a drastic decline in mortality began during the period 1965-1970 with the removal in rural areas of traditional health hazards in early childhood. An analysis of the differentials in adult male mortality (see Section III-7) appears to support this argument. The results show no urban-rural mortality differences or slightly higher mortality in urban areas in the 1960s, while child mortality for the 1960s is reported to have been much lower in urban areas due probably to the more rapid dissemination of family planning in cities. This suggests further that the pattern of mortality transition since 1960 has differed significantly between urban and rural areas.

Socio-economic development is thought to have played the major role in determining the trends and patterns of mortality in the 1970s. Rapid economic growth enabled the majority of the population to spend greater portion of their household income on health and disease treatment and prompted hospital managers to invest in large scale hospitals with highly sophisticated and expensive equipment. The heavy rural to urban migration since the mid-1960s resulted in a much larger proportion of the population being exposed to a lower risk of dying due to the concentration of good medical facilities and personnel in urban areas, particularly in metropolitan cities. It is well known in

the Republic of Korea that migrants from rural villages have occupied the lower layer of the urban social stratification, and it was mentioned earlier that the urban poor receive only inferior medical care and suffer more from malnutrition than the average rural population. Nevertheless, the availability of good medical service, though costly, can be a major factor in saving lives in critical conditions even for the poor.

The medical insurance policy pursued beginning in 1977 may be the most important single factor affecting the trends and patterns of mortality since the late 1970s. The increasing proportion of the population covered by medical insurance was presumably associated with the unexpectedly large decline in mortality in the late 1970s. Considering the fact that most insurance beneficiaries are in urban areas, the urban-rural gap in mortality is expected to have widened greatly since the late 1970s. In rural areas, the government health service provided through health centres has played a major role in dealing with health problems, but the services rendered by health centres are mostly limited to primary care and understood as greatly inferior to medical services available in cities. Other conditions surrounding health, too, support the assumption that the difference in mortality between rural and urban areas has increased further since the late 1970s. There has recently been a marked change in dietary habits in urban areas and a resultant improvement in nutrition among urbanites. The diversity and balance of foods and nutrients increased considerably with the rapidly growing consumption of fish, meat, milk, eggs, fruits and vegetables in cities, but dietary habits changed little in rural areas, despite a significant rise in per capita energy intake, due probably to the tradition of self-reliant subsistence agriculture. Farmers usually eat what they grow or produce and are very reluctant to spend income to purchase food, thus deferring changes in dietary customs. Another unfavourable development for health in rural areas may be that men at the later working ages and women, who were exempted from hard agricultural work previously, have had to fill the labour shortage created by a continuous outflow of the young labour force from rural areas.

Many recent surveys on health and nutrition indicate that household income or the standard of living is the most decisive factor in differentiating the risk of dying among individuals. Most of the urban poor are undernourished and benefit little from medical insurance because the majority are employed in informal sectors or as contract workers. In addition, they usually live and work in an extremely unsanitary environment. If controlled for the standard of living, the urban-rural difference in mortality would be very minor even today.

4. POLICY IMPLICATIONS OF THE FINDINGS

The basic societal trends of the Republic of Korea which have been observed during the last quarter century are expected to continue at least until the end of this century. Urbanization is expected to continue by the year 2000 until it reaches a point at which about 80 per cent of the population live in cities (KIPH, 1985b: 208). Fertility is thought to have already gone down to below the replacement level and is expected to decline further in the next twenty years (NBOS, 1986b). According to the long term plan for national development, the national economy will grow steadily at approximately 5 per cent annually. Although considered not feasible in the present situation, the government set a target to cover the entire population by either medical insurance or medical aid in the near future. It is natural to assume based on this plan that the national health condition will improve steadily and the level of mortality will, therefore, decline further at least by the year 2000.

This societal change does not, however, necessarily mean that major hazards to health and life in current Korean society will disappear without any intervention. This study has clearly shown many important problem areas in health and mortality which need urgent attention. It was also pointed out that some of the problems are the products of recent societal changes. Life styles, social norms and growing social class differentiation often present serious issues to national health. Other problems include a disintegrated medical system, increasing industrial disasters and accidents, environmental pollution, and a lack of comprehensive interest in mortality and health among policy makers as welll as the public.

Diseases related to the digestive organs, diarrhoea and hypertension have long been prevalent in the Republic of Korea, and this particular phenomenon is readily explained by the dietary habits of Koreans. Korean food is in general very hot and salty, and every meal includes 'bab' (boiled rice) and 'kimchi' (pickled cabbage seasoned with hot pepper and salt). Most Koreans feel satisfied with a meal if they have rice (stomach full) regardless of what other good dishes are served. At the table, each person does not have his own sauce or bowl, except his rice and soup bowls, but rather eating is done directly from common dishes. Such table habits are regarded as major barriers to

controlling such diseases as those passed on orally like hepatitis which has recently begun to receive wide public attention. Heavy alcohol drinking and smoking are known to cause various health problems to Korean men in their forties and over. Despite a general awareness of the potential effect of smoking on the health of other persons, there are few public or private places that forbid smoking. Alcohol is commonly consumed at social gatherings of men. In the past, many people suffered from parasitic diseases resulting from eating raw river fish and meat. Although such diseases have been largely eliminated owing to the development of various kinds of vermifuges, the custom still constitutes an important health hazard in some parts of the country.

The belief is shared by most Koreans that the surest way to maintain or improve health is to take 'boyak' or invigorator. The idea often leads to the neglect of such important aspects of health as nutrition, diversity of food intake and living environment. It may also partly explain the tendency of Koreans to use pharmaceuticals indiscriminately and heavily. Most people still rely on pharmacies for primary health care and initial medical treatment. These remarks should suffice to indicate that the life style of the general public and their perception of health have important implications for national health policy.

It is suggested in this study that epidemiologic transition has been delayed for early childhood compared to adulthood. The phenomenon would partially be associated with the relatively inferior status of children in the traditional Korean family and society, although the status of a child in the family differs greatly depending upon its sex and parity. Traditionally, the best food is supposed to be served to the elderly and adult men, while women and children, especially girls, eat left-overs or inferior quality food. The lagging development of supplementary foods for young children and the slight concern on the part of the government for children's diets may be a reflection of this social bias against children.

Despite the overall improvement of mortality and health conditions during the last quarter century, a significant portion of the population does not still benefit from national development. The living conditions of the urban poor, which are estimated to have accounted for 10–15 per cent of the total urban population in 1980 (Suh S-M and others, 1981: 102), have improved very little. In urban low income areas, rooms are congested sewage and toilet systems are totally unsanitary, and the risk of carbon monoxide poisoning is very high since every household uses anthracite coal briquetts for fuel. The nutritional status of the poor is far from satisfactory. Rising medical costs with the upgrading of medical care have had an adverse effect on the health of the poor although the extremely poor are aided by the free medical assistance programme. People residing in rural villages and small towns have seemingly developed an increasing dissatisfaction with, and sometimes mistrust of, the medical care provided in their own communities with growing disparities in the quality of medical services available in terms of the degree of urbanization of an area. In short, there has been a tendency in the Republic of Korea for the health status of the disadvantaged population to improve little relative to other sectors. This should have important, if not grave, implications for national health policy which concerns itself almost exclusively with aggregate development.

In addition to the need for directional changes in national health policy, the government should play a more positive role in improving health conditions of the country. From the human capital point of view, the government investment on health is very limited and has not increased much compared to the investment in education. The government's share of total national expenditures on health has shrunk as the medical industry, which is mostly directed to the upper and middle classes, has prospered. The lukeworm control of serious industrial pollution, poisonous foods and false pharmaceuticals may reflect the fact that the concern for public health is almost at the bottom of the government's list of priorities.

Although the mother and child health care programme started in the late 1960s and there were a few studies on community health, the concept of family and community health is still very alien to Koreans. Consequently, community involvement or participation in various health problems is virtually non-existent, and people rarely relate their problems of health to the family or community environment. In a word, the concept of health and disease is totally individual oriented. The concept may have been strengthened by the current medical system, which is, in turn, characterized by a capitalistic business orientation in hospital and clinic management, the fee-for-service system for all medical services, no vertical and horizontal coordination among various medical and health institutions, and severe competition among medical practitioners without clear-cut role distinctions even between general practitioners and specialists. People visit doctors only with severe ailments. They usually go

for advice on health to pharmacists or friends. Restructuring the health and medical system and the initiation of systematic health education in this regard would be of prime importance in altering such undesirable health behaviour.

The industrialization of the country since the early 1960s has created many new health problems such as air and water pollution, industrial disasters, poisoning and accidents. With urbanization and economic development, extensive work pressure and severe competition for success or survival have become the very life of Koreans. Environmental pollution is not confined to industrial areas, but are omnipresent all over the country. Metropolitan cities are covered with smog composed of dirt, briquette gas (carbon monoxide) and exhaust fumes from automobiles. Poisonous discharges from factories threaten the health of the residents in industrial and nearby areas. In farming villages, heavy reliance on chemical insecticides and fertilizers is known to cause water pollution, diseases of the respiratory system, and frequent deaths on poisoning. The Republic of Korea is increasingly notorious for its high, probably the world's highest, rate of vehicular accident. With rapidly growing car ownership in the 1980s, vehicle safety has emerged as a major social problem. Bad road conditions, an inadequate traffic system, lack of proper safety education and alcohol intoxication constitute the major factors accounting for this high accident rate.

While current health policy of the Republic of Korea is almost exclusively centred on the physical aspects of health, emerging life styles and new working conditions in urban areas suggest clearly a fast degeneration of "mental health" during the last two decades. Though no concrete data are available, it is widely believed that a significant and growing proportion of urban residents suffer from mental disorder or neuropsychosis due mainly to pressures to succeed, extreme competitiveness in everyday life, problems of continuous adjustment to new environments, pressure to work hard among high and middle school children, and so forth. In a word, the overall societal change of the last 25 years has developed two kinds of living conditions which pull in opposite directions to affect health: the newly emerging life styles and environmental conditions have had negative implications for health, whereas the conditions surrounding disease treatment and nutrition have improved profoundly.

REFERENCES

Abbreviations used in the text

BOK:	Bank of Korea
EPB:	Economic Planning Board
ESCAP:	Economic and Social Commission for Asia and the Pacific
GGK:	Government General of Korea
IPFP:	Institute for Population and Family Planning
KIFP:	Korean Institute for Family Planning
KIPH:	Korean Institute for Population and Health
KNFS:	Korean National Fertility Survey
KREI:	Korean Rural Economics Institute
MHSA:	Ministry of Health and Social Affairs
MOAF:	Ministry of Agriculture and Fisheries
MOE:	Ministry of Education
NBOS:	National Bureau of Statistics
PDSC:	Population and Development Studies Center
UN:	United Nations

Notes: (K) indicates a work written in Korean and (J) in Japanese. The symbols used in this reference, "v.y.", "A", "B" and "C" stands for 'various years'.

Bank of Korea
v.y. *Economic Statistical Yearbook.*

Chang Yunshik
1966 *Population in Early Modernization: Korea* (Ph. D. Thesis, Princeton Univ.).
1985 'The rise of commercial farming in Korea', *Bulletin of the Population and Development Studies Center* XIV, Seoul: Seoul National University.

Cho Lee-Jay, Fred Arnold and Kwon Tai-Hwan
1982 *The Determinants of Fertility in the Republic of Korea,* Washington D.C.: National Academy Press.

Choe Sun-Hae and Mo Sumi
1976 'Consumption of milk and milk products', *Korean Journal of Nutritional Society* 8.2 (K).

Choi Hi-Young
1939 'Korean life tables', *Korean Medical Journal* 29, Seoul (J).

Chun Tae-Yun
1980 *Impact of Biological, Economic and Social Factors on Infant Mortality,* Seoul: Korean Institute for Family Planning, (K).

Coale Ansley J., Lee-Jay Cho and Noreen Goldman 1980 *Estimation of Recent Trends in Fertility and Mortality in the Republic of Korea,* Washington D.C.: National Academy of Sciences.

Economic and Social Commission for Asia and the Pacific
1975 *Population of the Republic of Korea,* Bangkok.
1980 *Migration, Urbanization and Development in the Republic of Korea,* Bangkok.

Economic Planning Board, Republic of Korea
A *Korea Statistical Yearbook.*
B *Social Indicators in Korea.*
C *Major Statistics of Korean Economy.*
1984 *Korean Economic Indicators.*

Goldman, Noreen
1980 'Far Eastern pattern of mortality', *Population Studies 34. 1.*

Government General of Korea
A *Population Census Reports* (J).
B *Statistical Yearbook of Korea* (J).
1939 *Korean Vital Statistics 1939* (J).

Han Sung-Hyun
1973 *The Study of Induced Abortion,* Seoul: Korean Institute for Family Planning (K).

Hong Sawon
1978 *Population Status Report,* Seoul: Korea Development Institute.

Hong Sung-Bong and Walter B. Watson
1976 *The increasing Utilization of Induced Abortion in Korea,* Seoul. Korea University Press.

Hyun Wha-Jin and Mo Sumi
1980 'The dietary status of kindergarten children from a high socio-economic apartment compound in Seoul'. *Korean Journal of Nutritional Society* 13:1 (K).

Keyfitz, Nathan
1968 *Introduction to the Mathematics of Population,* Monlo Park: Addison-Wesley.

Kim Doo-Jong
1966 *Medical History of Korea,* Seoul: Tam-gu Dang (K).

Kim Hee-Kyung and Mo Sumi
1979 'Study on dietary intake and physical development of preschool children from the low socio-economic group in the suburbs of Seoul', *Journal of Korean Public Health Association* 5:1 (K).

Kim Il-Soon and others
1977 *Development and Organization of Myun Level Health Care Service in Korea,* Seoul: Dept. of Preventive Medicine & Public Health, Yonsei University.

Kim In-Sook and Mo Sumi
1978 'Studies on nutrition of infants and young children in rural and suburban areas of Jeonbug Province', *Journal of Korean Public Health Association* 4:2 (K).

Kim Jong-Soo (ed.)
1985 Status of Medical Service in Korea: *A Critical Review of the Reality of Alienation from Medical Service,* Seoul: Han-Wool (K).

Kim Jung-Soon
1977 'Patterns of deaths and diseases of Koreans', Korea Development Institute (ed.), *Problem of Health and Its Solutions in Korea,* Seoul (K).

Kim Sook-Hee
1978 'Nutritional status', in Lee Hae-Young and Kwon Tai-Hwan (eds.), *Korean Society: Population and Development,* Seoul: Population and Development Studies Center, Vol. 4, Seoul National University (K).

Kim Yun
1966 *The Population of Korea* (Ph. D. Thesis, Australian National University).

Kong Se-Kwon, Lim Jong-Kwon and Kim Mi-Kyum
1983 *Mortality and Causes of Death in Korea,* Seoul: Korean Institute for Population and Health (K).

Korean Institute for Family Planning
1978 *Statistics on Population and Family Planning,* vol. I, Seoul.

Korean Institute for Population and Health
1984a *Indicators and Statistics on Population and Health,* Seoul.
1984b *Report on National Health Survey 1983,* Seoul (K).
1985a *Study on the Medical Insurance System for the Entire Population,* Seoul (K).
1985b *Configuration of the Long-term National Development Toward the Year 2000: For Population, Health and Medical Sectors,* Seoul (K).
1985c *The 1985 National Fertility and Family Planning Status Survey,* unpublished materials.

Korean Rural Economics Institute
v.y. *Food Balance Sheet* (K).

Kwon Tai-Hwan
A 'Estimates of net internal migration for Korea', *Bulletin of the Population & Development Studies Center,* vols. IV, VII & XII, Seoul: Seoul National University.
1975 'Constructing life tables for Korea 1925-70', *Bulletin of the Population and Development Studies Center,* vol. IV, Seoul: Seoul National University.
1977 *Demography of Korea,* Seoul: Seoul National University Press.
1980 'Population change', in Chang Yunshik (ed.), *Korea: A Decade of Development,* Seoul: Seoul National University Press.
1981 'The historical background to Korea's demographic transition', in Robert Repetto and others, *Economic Development, Population Policy, and Demographic Transition in the Republic of Korea,* Cambridge: Council on East Asian Studies, Harvard University.
1982 'Differentials in Korean fertility' in Chang Yunshik and others (eds), *Society in Transition: with Special Reference to Korea,* Seoul: Seoul National University Press.

Kwon Tai-Hwan, Lee Hae-Young, Chang Yunshik and Yu Eui-Young
1975 *The Population of Korea:* A CICRED Monograph, Seoul: Population and Development Studies Center, Seoul National University.

Lee Bo-Kyung, Lee Jung-Soo and Mo Sumi
1983 'Change in infant feeding method and weaning practices of rural women by age groups', *Journal of Korean Public Health Association* 9:3 (K).

Lee Dong-Woo and Kim Il-Soon
1977 'Development and measurement of mortality indices', *Health Studies II* (K).

Lee Eun-Sul
1985 'Epidemiologic transition in Korea: a new perspective in population and development studies', *Bulletin of the Population and Development Studies Center,* vol. XIV, Seoul National University.

Lee Eun-Wha, Mo Sumi and Seo Jung-Sook
1982a 'An ecological survey of early

childhood nutrition in the Youido apartment compound in Seoul" *Journal of Korean Public Health Association* 8:2 (K).

Lee Eun-Wha, Seo Jung-Sook and Mo Sumi
1982b 'Nutrition and parasitic survey of kindergarten children from a high socio-economic apartment compound in Seoul', *Journal of Korean Public Health Association* 8:1 (K).

Lee Hae-Young and Kwon Tai-Hwan (eds.)
1978 *Korean Society: Population and Development,* Seoul: Population & Development Studies Certer, Seoul National University (K).

Lee Heung-Tak and Han Dae-Woo
1978 *Age at First Marriage and Fertility,* Seoul: Korean Institute for Family Planning (K).

Lee Jung-Hwan and Cho Duk-Rae
1984 *Analysis of Demand on Agricultural Products in Korea: Model Development and Policy Experimentation,* Seoul: Korean Rural Economics Institute (K).

Ministry of Agriculture and Fisheries, Republic of Korea
v.y. *Statistical Yearbook of Agriculture, Forestry and Fisheries.*
1965 *The 1965 Grain Survey* (K).

Ministry of Education, Republic of Korea
v.y. *Statistical Yearbook of Education.*

Ministry of Health and Social Affairs, Republic of Korea
A *Yearbook of Public Health and Social Statistics.*
B *White Paper on Public Health and Social Affairs* (K).
1978 *Report of the 1978 National Survey on Nutrition* (mimeo.) (K).
1982 *Health and Social Affairs* (K).
1984 *Report of the 1984 National Survey on Nutrition* (mimeo.) (K).

Mo Sumi and Kim Hee Kyung
1978 'Survey of physical growth and dietary intake of sponcered school-age children in a redeveloping community, suburb of Seoul', *Jr. of Korean Public Health Association* 4:2 (K).

Mo Sumi and others
1985 'Food habits and nutritional status of young children in day-care center, located in the low income area of Seoul', *Journal of Korean Public Health Association* 11-1 (K).

Moon Hyung-Sang, Ham Hee-Soon and Shin Sung Hee
1982 *Report of National Survey on the Status of Family Health,* Seoul: Korean Institute for Population and Health (text:K).

Moon Ok-Ryun
1985 'Role of finance in the health and medical sector', in Democratic Justice Party (Korea), *Role of Finance in Social Development Sectors* (K).

Moon Ok-Ryun and Hong Jae-Woong
1976 'Health service outcome data: a survey of data and research findings on the provision of health services in Korea', *Journal of Family Planning Studies* 3, Seoul: Korean Institute for Family Planning.

Moon Pal-Ryong and Yoo Byung-Suh
1975 *Price Analysis of Agricultural Products,* Seoul: Korean Rural Economic Institute (K).

National Bureau of Statistics, Republic of Korea
A *Population (and Housing) Census Report.*
B *Annual Report on the Economically Active Population Survey*
C *Cause of Death Statistics.*
1965 *Vital Statistics of Korea.*
1980 *Life Table for Koreans 1978-79,* (mimeo) (text: K).
1981 *Report on the Continuous Demographic Survey 1980* (K).
1986a *Tentative Results of the 1985 Population and Housing Census* (mimeo., K).
1986b *Projected Population: Long-Term Projection based on the 1985 Population Census Results* (mimeo., K).

National Bureau of Statistics, Republic of Korea and Institute for Population and Family Planning, Yonsei University.
1981 *Final Report on Vital Statistics Improvement Project,* Seoul (K).

National Bureau of Statistics, Republic of Korea and Korean Institute for Family Planning
1977 *The Korean National Fertility Survey 1974: First Country Report* , Seoul.

Park Byung-Tae
1980 *Infant and Childhood Mortality in Korea,* Seoul: Korean Institute for Population and Health (text: K).

Park Byung-Tae, Choi Byung-Mok and Kwon Ho-Yun
1979 *The 1976 National Fertility and Family Planning Evaluation Survey,* Seoul: Korean Institute for Family Planning.

Park Chan-Moo
1984 'Historical development of the Korean medical system', Paper presented in Semi-

nar on Medical System in Korea and Japan held on 28-30 November 1984, Seoul (K).

Park Hong-Nai and Kim Harriet
1978 'Food and nutrition intake studies of rural population in Korea', in Interagency Coordinating Committee, *Korea/USAID Health Planning Projects* vol. III, Seoul.

Park Jae-Bin
1961 Statistical observation on death and causes of death in Korea, *Statistical Bulletin* 3:6-7, Seoul (K).

Park Jae-Bin and Park Byung-Tae
1981 *Infant Mortality in Korea,* Seoul: Korean Institute for Population and Health (K).

Park Jae-Young
1980 *Study on Estimation of the Levels of Fertility and Mortality, and Their Relationships with Economic and Social Variables,* National Bureau of Statistics, Republic of Korea and Korean Institute for Family Planning (K).

Park Jong-Ki
1979 *Insurance Finance and Medical Insurance in Korea,* Seoul: Korea Development Institute (K).
1982 'Medical insurance and national economy', *Medical Insurance,* July, Seoul (K).

Park Michael Myunghyun, Kim Young Sook and Mo Sumi
1979 'Overall assessment of nutrition surveys of young children', *Journal of Korean Public Health Association* 7:1 (K).

Park Michael Myunghyun, Tchai Bum-Suk, Kim Young-Nam and Mo Sumi
1979 'Nutrition survey of pre-school children in rural areas of Kangweon Province', *Journal of Korean Public Health Association* 5:2 (K).

Population and Development Studies Center, Seoul National University.
1985 'Summary report of the base-line survey', in *Work-in-Progress Report of the Project on Water Supply and Sanitation in Korean Villages* submitted to the International Development Research Center, Canada (unpublished, Mimeo.).

Pyun Jong-Wha
1982 'Morbidity patterns and medical service utilization', in Moon H-S and others, *Report of National Survey on the Status of Family Health,* Seoul: Korean Institute for Population and Health (text: K).

Ro Kong-Kyun and Kim Mo-Im
1978 'Analysis of Health Resources in Korea' in Interagency Coordinating Committee, *Korea/USAID Health Planning Projects* vol. I, Seoul.

Song Kun-Yong and Kim Hong-Sook
1982 *Report of Survey on Needs and Uses of Medical Facilities in Korea,* Seoul: Korean Institute for Population and Health (K).

Song Kun-Young, Kim Hong-Sook and Kim Young-Im
1983 *Study on Health and Medical Service in Remote Agricultural and Fishing Villages,* Seoul: Korean Institute for Population and Health (K).

Suh Sang-Mok and others
1981 *Status of Poverty and Measures for the Poor,* Seoul: Korea Development Institute (K).

United Nations
1982 *Model Life Tables for Developing Countries,* New York.

Yang Jae-Mo
1982 'Major trends in health policy and health care organization in the Republic of Korea, 1950-75' in *Mortality in South and East Asia: A Review of Changing Trends and Patterns, 1950-75,* Manila: WHO/ESCAP.

Yi Bo-Sook, Lee Kyung-Ju, Lee Mee-Sook and Mo Sumi
1981 'A survey of maternal health and family planning in rural family health project area of Korea, *Journal of Korean Public Health Association 7:2.*

Yu Eui-Young
1978 'Migration and urbanization', in Lee Hae-Young and Kwon Tai-Hwan (eds.), *Korean Society: Population and Development,* Seoul; Population and Development Studies Center, Seoul National University, vol. 4 (K).