LEVELS AND DIFFERENTIALS OF INFANT AND CHILDHOOD MORTALITY IN PAKISTAN

by

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DECLARATION

Except where otherwise indicated,this thesis is my own work

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ABSTRACT

The aim of this study is to find the mortality levels, and based on those levels suggest the estimates for infant ($_{i}q_{o}$) and childhood ($_{4}q_{1}$) mortality for the population of Pakistan. Moreover, also to identify the groups of population having differentials in mortality. The data used for the study were collected in the "Housing Economic and Demographic (HED) Survey 1973" conducted as part of the 1972 Population Census. The analysis is based on Trussell's method of indirect estimation of childhood survivorship, using the West family of model life tables wherever required. The findings of the study suggest that the mortality situation in Pakistan had remained constant during 1967-72 period, and variations in mortality do exist among various groups of population. The estimates suggest that the infant mortality ($_{1}q_{o}$) and childood mortality ($_{4}q_{1}$) was 107 and 54 per thousand respectively. The expectation of life at birth ($^{o}e_{o}$) (based on survivorship of children of both sexes under the age of five years) was around 52.5 years (based on accepted level of 14.7 of west model life tables) during 1967-71. But it seems that as compared to other estimates, the findings of this study is at the lower side of the actual mortality situation. On the differential side, it was noticed that the children (under the age of five years) of women in rural areas, of low socio-economic status and who live in Baluchistan are exposed to higher mortality than their respective counterparts. Moreover, the mortality among the male children (under the age of five years) is higher than among the female children.

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CHAPTER 1

INTRODUCTION

The topic of this thesis is the 'Levels and Differentials of Infant and Childhood Mortality in Pakistan'. The aim of this chapter is to explain objectives and organization of the study, to introduce the topic and to study the population, area and sources of data to be employed.

1.1 Objectives and Organization of the Study

The objectives of the study are to determine the levels of infant and childhood mortality for the country's population and investigate the variations in mortality by sex, province, urban-rural and socio-economic status. The study has therefore been organized into the following chapters:

Chapter 2: Levels of Infant and Childhood Mortality on a National Basis

Chapter 3: Mortality Differentials
- Section 1: Sex
- Section 2: Province
- Section 3: Urban-Rural
- Section 4: Socio-Economic Status.

Chapter 4: Summary and Conclusions

1.2 Study Area and the Population

Pakistan came into being on August 14, 1947. The eastern wing of the country now known as Bangladesh, seceded in December, 1971. The Islamic Republic of Pakistan now occupying the former western wing of the country comprises four provinces: the Punjab, the North West Frontier (NWFP), Sind, Baluchistan and the Federally Administered Tribal Areas (FATA).

Pakistan (Fig. 1) is situated between latitudes 24^{o} and 37^{o}N and longitude 62^{o}E. The greatest north to south and east to west distance is 1600 and 885 kilometers respectively (Finance Division, 1979, p.1). The total area of the country is 796095 square kilometers (Statistics Division, 1979, p.61). Islamabad is the capital city of the country.

The country is bordered by Iran in the west, India in the east, Afghanistan in the north and north-west, People's Republic of China in the north-west to north-east and close across the northern border lies the Soviet Union.

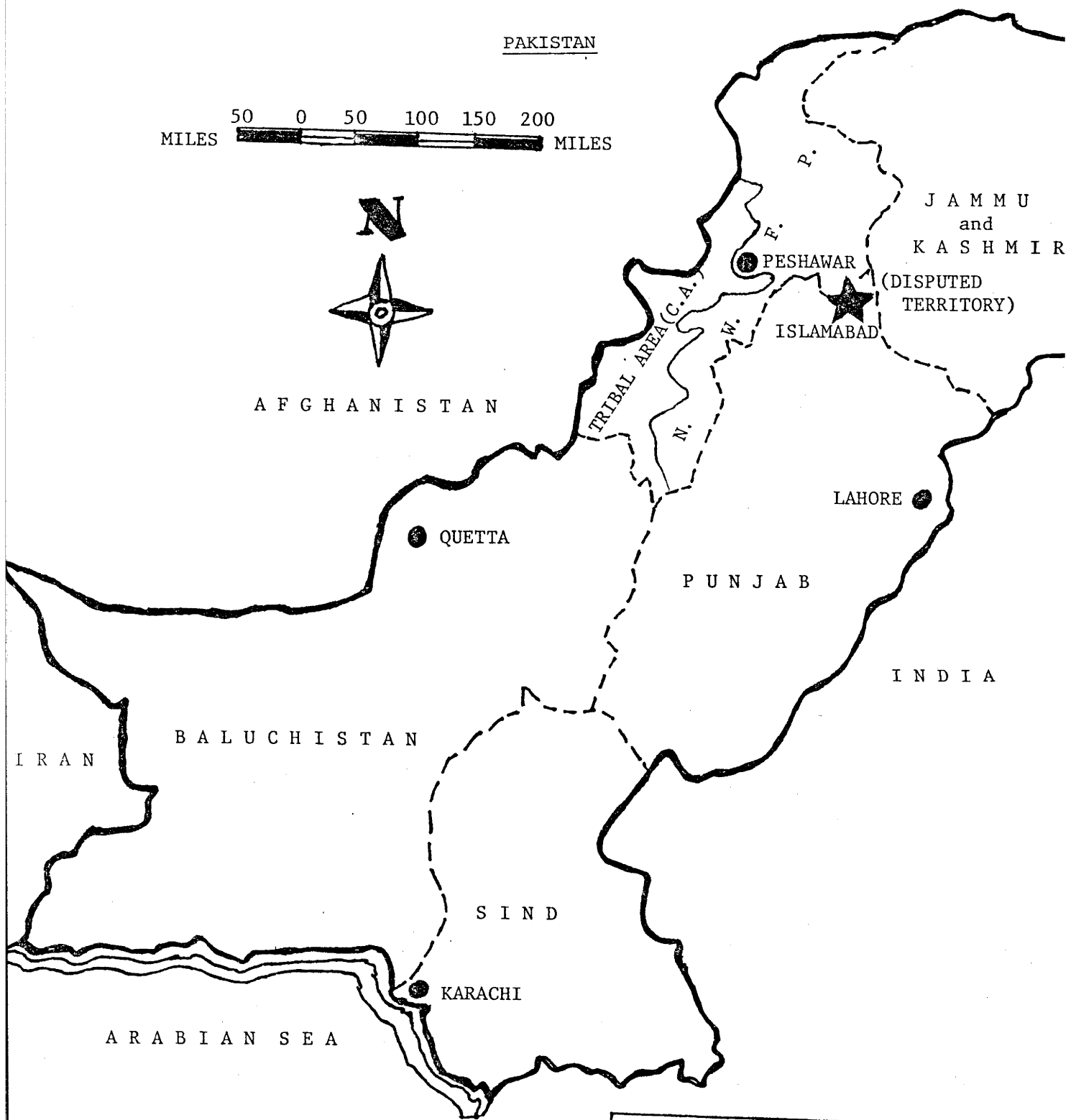
Three distinct features mark the geography of Pakistan: (a) the north to north-western mountainous belt; (b) the arid Baluchistan Plateau to its west; and (c) the fertile plain of the Indus River basin spreading from north-east to south-west down to the Arabian Sea. The mountainous belt is largely barren and is well known for some of the highest peaks in the world. The Baluchistan Plateau is mostly desert. Rainfall in both these areas and the mountainous regions is negligible, but the mineral resources known and untapped are immense. Agricultural activity is limited to scattered subsistence farming and cattle grazing. The valleys of Kaghan, Swat, Hunza, Dir and Chitral in the north and north-west have valuable tourist potential.

The vast plain of the River Indus, covered by an extensive irrigation network connected with the Indus and its tributaries, the Jhelum, Ravi and Chenab, spread across the provinces of the North West Frontier (NWFP), Punjab and Sind. It is thickly populated and extensively farmed, producing the main food and cash crops of the country. The region also has the main urban industrial complexes.

The country has four seasons: cold weather season (December to March); hot weather season (April to June); monsoon season (July to September); and post monsoon season (October to November). January is the coldest month of the year. In winter the temperature falls below freezing point in the hilly areas, and varies between $16^{o}C$ and $32^{o}C$ in the plain areas. The mountains are snowbound until April, and some of them have a permanent snow cover. June is the hottest month of the year, and the temperature varies between $35^{o}C$ and $43^{o}C$ on the plains. Summer is quite pleasant in the hilly areas. The monsoon rains sometimes pose a seasonal danger of floods.

Agriculture is the largest sector of the economy and contributes more than thirty per cent towards the gross national product (Statistics Division, 1979, p.147). Wheat, cotton, rice, sugar cane and tobacco are the principal crops. Although Pakistan is mainly an agricultural country, self-sufficiency in food is still to be attained. A large proportion

FIGURE 1



Source: Census Organization, 1973.

of the annual budget is spent on the import of food commodities. Pakistan is also one of the leading exporters of cotton and rice. Forests occupy only 4 per cent of the country area. Fruit orchards of mango, citrus, plum, pears and banana are found in the Indus basin, while grapes, apples, almonds and other nuts are planted in the mountainous belt.

The second largest contributor to the economy is the industrial sector, which constitutes more than fifteen per cent of the gross national product. Various large and small scale industries utilizing the locally produced raw materials are in operation. The industrial activities include cotton textile, jute textile, cement, sugar, fertilizer, cigarettes, steel products, paints and varnishes, paper, newsprint, board, matches, vegetable products, bicycles, tyres, tubes, sewing machines, beverages, surgical and sports goods, electrical and electronic appliances, and cosmetic manufacturing industries. A giant steel mills project is near completion in Karachi.

The country is fairly rich in minerals. The major minerals of the country are marble, china clay, chromite, coal, crude oil, natural gas, gypsum, iron ore, copper, bauxite and silica. However, this sector has yet to be fully exploited.

The people of Pakistan are the descendants of several racial groups and sub-groups. The dominant racial type is the Indo-Aryan. The population of the country is not homogeneous ethnically. Punjabi, Sindhi, Pushto and Baluchi are the major languages. The provincial boundaries roughly correspond to these different linguistic areas. The national language is Urdu, but English continues to be the working language in government and commercial organizations.

According to the 1981 Census, the population of Pakistan was 84 million. About 72 per cent of the population was found in rural areas. The population density was 105 persons per square kilometer. Educational level of the population is very low particularly among the females. According to the 1972 Census, the literacy rate (10 years and above) was 22 per cent. The rate for urban and rural areas was estimated as 42 and 14 per cent respectively (Statistics Division, 1979, p.147).

Pakistan is predominantly a Muslim country and more than ninety-seven per cent of the population is Muslim. The dependency ratio[1] is high, mainly because a high proportion of the population is under the age of 14 years. The social and cultural norms of the country favour early and universal marriage for females with almost all getting married before the age of 30 years. Although there is evidence that a progressive increase in age at marriage is taking place, it is still very low for both sexes. It has been suggested that the average age of marriage for females has increased from 14.3 years in 1945-50 to 16.5 years during 1970-75 (Booth and Alam, 1980).

According to the traditional customs, a girl could be married on attaining puberty. However, the legal minimum age of marriage for males and females is 18 and 16 years respectively. Child marriages are totally prohibited by the Muslim family laws. Though there are provisions for divorce under certain circumstances, the incidence of divorce is very small. This is due to pressure from the society, which keeps the husband and wife association as long as possible. Polygamy, though permitted, is discouraged since its acceptance is a threat to the security of women. Childbearing takes place within marriage and early pregnancy is encouraged. It is a matter of concern if the woman does not conceive by the end of her first year of marital life. Marriages are arranged, and usually take place between first cousins within the family.

The joint or extended family system is prevalent in urban as well as in rural areas of the country. But there are indications that with more widespread education and other socio-economic developments the nuclear family system is gaining ground in the society. However, the institution of the larger kinship group is more important than the family unit. All important decisions, like the selection of marriage partners, are influenced by the kinship group. The husband-wife unit is given little importance in the larger kinship set up.

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1 Dependency Ratio: $\frac{\text{Population aged less than 15 years + population aged above 65 years}}{\text{Population between 15 and 65 years}}$

The society is male centered. A wife is for the husband, a person over whom a man builds a house, with whom he engages in sexual relations, who provides his meals and for whom he provides. For the wife her husband is a venerated god, he is the only person of whom the chaste wife could think of, he is the warp and woof all her life. However, as they get older, the dominance of women in the family and kinship matters increases. The degree of communication between husband and wife is very low.

1.3 Review of Mortality Situation in the Area

Indo-Pak Sub-Continent was the homeland of famines and epidemics for centuries. There was hardly any year when these calamities did not affect some parts of the area. The variation in mortality was therefore dependent upon the intensity and frequency of the natural disasters. In view of the geographical changes in the area as a result of the partition of British India in 1947 and the emergence of Bangladesh in 1971, the prevailing mortality situation will be covered in two parts. The first part will deal with the pre-partition period and the second the post-partition period.

1.3.1 Mortality During Pre-Partition Period

Statistics on vital events for the area in general and during the pre-partition period in particular are deficient. About the quality of available information, it has been observed that:

> 'Vital statistics in India are notoriously defective. In the urban areas they are maintained by the municipal authority, which is often uninterested; in rural areas they depend on reports made by village headmen or watchmen who are illiterate as well as uninterested and having as a rule to travel a considerable distance to make their reports, are apt to neglect a troublesome duty'. (Blunt, 1946, p.31).

Information about deaths from starvation and epidemics, unless they become too serious, was often suppressed by the local authorities, and even the people themselves hesitated to report deaths from smallpox and cholera (Ahmad, 1962, p.142). In such situations the deaths caused by famines, epidemics and other man-made or natural disasters could not be exactly estimated. However, some scattered and fragmentary studies on mortality may provide a useful guide to the conditions which prevailed in the area in the past.

The Census data for United India show that the growth of population was slow and fluctuating during the pre-1921 period and steady and accelerating during the post 1921 period. This variation in the population growth rate was largely explained by the unusual number of deaths caused by the famines and epidemics. The intensity and frequency of these calamities varied from decade to decade. The decades of 1881-1891 and 1891-1901 saw two major famines. The damage was so extensive that the population during these decades did not grow at all. (Davis, 1951, p.40). The decade of 1901-1910 was comparatively normal. The most outstanding catastrophe of the 1911-1920 decade was the great influenza epidemic of 1918, which is conservatively estimated as claiming the lives of fifteen million people (Davis, 1951, p.33). This was followed by the epidemics of cholera, plague, malaria and the failure of two successive crops. Since 1921, the area has not faced any major calamity except for the Bengal famine of 1943, which involved the loss of 1.5 to 3 million lives (Davis, 1951, p.40). However, the area continued to suffer from sporadic outbreaks of cholera, smallpox, malaria and kala-azar in an epidemic form, even though none of these was comparable to the devastation caused by the influenza epidemic of 1918.

Direct estimation of mortality for the area was hampered by the lack of appropriate statistics. However, some attempts were made to investigate the mortality estimates by indirect methods. Some findings are shown in Table 1.1.

The estimates in the table suggest that mortality in the area was very high and fluctuating before the 1920s, and afterwards the situation improved.

On a provincial basis, the data for the former province of West Bengal (India) support the observed national trend, while in the Punjab (now partly in India and partly in Pakistan) the mortality had been declining throughout the first four decades of the present century (Table 1.2).

Other indices of mortality are expectation of life at birth and infant mortality. The available information included in Table 1.1 shows that the life expectancy at birth was 25 years during 1881-1891, declined to 20 years by the second decade of this century, and then

Table 1.1

Mortality in British India 1881-1941

Period	Life Table Estimates *	Reverse Survival Method	Official Estimates **	Expectation of Life at Birth e_o^o	Infant Mortality Estimates
1881-1891	40.0	41.3	n.a.	25.0	n.a.
1891-1901	42.0	44.4	n.a.	23.8	n.a.
1901-1911	42.7	42.6	n.a.	22.9	n.a.
1911-1921	49.8	48.6	34.3	20.1	212
1921-1931	37.3	36.3	25.4	26.8	176
1931-1941	31.5	31.2	23.0	31.8	168

Notes: n.a. = not available

* based on life tables prepared for each intercensal period

** based on the official registration system

Source: Davis, 1951, pp.34-36.

Table 1.2

Estimated Crude Death Rates by Province in British India 1901-1941

Period	West Bengal	Punjab
	(a)	(b)
1901-1911	34.0	44.0
1911-1921	35.0	36.6
1921-1931	26.0	30.4
1931-1941	21.0	24.8

Sources: (a) Census of India, 1951, Vol.VI, part I-B.

(b) Das, Vital Statistics of the Punjab 1901-1940.

increased to 32 years by 1931-1941. Similarly, infant mortality was 212 at the earlier period and declined to 168 per thousand by 1931-1941.

The 1940-1950 decade was unfavourable for the reduction of mortality in the sub-continent. The outbreak of the second World War resulted in the removal of many key officials from the civil service to be deputed on war assignments. Consequently the administrative machinery of the country was handicapped, public health programmes were abandoned. The distribution of food and other essential commodities of daily use was badly hampered. This time the administrative rather than the monsoon failure caused the 1943 famine in Bengal (Robinson, 1967, p.27). It was estimated that the overall death rate for India during the 1941-1950 period was around 27 (Jain, 1959).

1.3.2 Mortality During Post-Partition Period

Pakistan was founded as a separate country after the partition of British India in 1947. Partition was followed by religious rioting, murder, arson and mass migration across the newly established borders. In this process the functions of the government and other social organizations responsible for the welfare of the people was shattered. The already imperfect registration system of vital events went from bad to worse. The actual number of deaths which resulted from these man-made and natural catastrophies is therefore difficult to estimate. However, Davis claimed that the total number of deaths caused from starvation, exhaustion, diseases and murders as a result of partition stands as one million (1951, p.197). Robinson estimated the death rates for the areas comprising Pakistan during the 1941-1951 decade as 30 per thousand population (1967, p.28). This evidence suggests that the declining trend in mortality as observed before the partition had halted.

Statistics for the early period after partition are not available. For the later period most of the estimates are either based on population census or the data collected in national or sub-national surveys. For 1950, Khan (1962) used the adjusted registration data of the Punjab and found the death rates and expectation of life as 30 per thousand and 33 years respectively; and deaths under the age of 5 years were 40 per cent of the total deaths. The estimates based on the data collected in a dual record system of the Population Growth Estimation Experiment during 1962-1965 suggested death rates ranging from 16 to 20 (Brackett and Askers, 1965; Kroti and Ahmed, 1963, p.75; Farooqui and Farooq, 1971, p.103). Similarly the death rates for the period 1968-71

were 11 to 12 as indicated by the Population Growth Survey (Statistics Division, 1974, p.IV). The indicated death rates reported by the official and international agencies for 1979-80 and 1980 were 12 and 13 respectively (Finance Division 1980a, p.219; Population Reference Bureau, 1980).

The infant and child mortality in Pakistan are very high. It is estimated that nearly half of the married women, who had at least one birth, experienced the loss of at least one child (Population Planning Council, 1976). For the 1950-60 decade an infant mortality of 150 was estimated for the country (Robinson, 1967, p.32). The data on pregnancy history collected in the 'National Impact Survey' indicated an infant mortality between 112-113 for 1961-67 (Training Research and Evaluation Centre, n.d., p.130). The data of the Population Growth Estimation Survey suggested the infant mortality of 139 and 145 for the 1962-65 period (Farooqui and Farooq, 1971). The data from other surveys found the infant mortality between 106 and 124 for the 1968-71 period (Statistics Division, 1974, p.IV). Employing different methodologies to 'Population Growth Survey' data of 1971 and the 'Pakistan Fertility Survey' 1975, Yusuf and Rukanuddin suggested the infant mortality of 150 and 142 respectively (1981, p.95; 1981, p.9).

The life tables for Pakistan which are mostly based on the data collected in the dual record system in 1962-65 suggest a life expectancy varying between 46 and 50 years for both sexes (Yusuf, 1967; Afzal, 1974). The official sources claimed the expectation of life at birth for 1980 as 55 years for both sexes of the population (Finance Division, 1980a).

The available evidence indicates that mortality in the country has improved since the turn of the century. There are indications that after independence, the decline was very rapid during 1950-65, and later the decline had either slowed down or halted altogether.

1.4 Factors Associated with the Trends in Mortality

The available studies on the subject (Davis, 1951; Robinson, 1967) suggest that mortality in the area decreased as a result of the elimination of plague, smallpox, cholera and famines. But while health programmes have made some progress, particularly in the big cities, great environmental hazards to health, such as low levels of nutrition,

impure drinking water, insects, dirt and improper waste disposal still exist. The diseases which directly or indirectly affect the infants and children remain as potent as before. Robinson (1967) suggested that a further reduction in death rates will depend upon the continued epidemiological attacks on malaria, typhoid and tuberculosis, improvement in sanitation and water supply, increases in the level of nutrition and real income and a reduction in the present excessively high levels of pregnancy and childbearing.

Presently the major contributors to mortality in Pakistan are gastro-intestinal, parasitic and respiratory diseases. The frequently associated malnutrition goes unrecorded on clinic visit charts as well as on death certificates. The Population Growth Survey (1971) collected information on causes of death in the country, which suggests (Table 1.3) that the leading causes of deaths were infectious and parasitic diseases.

Table 1.3

Estimated Deaths by Cause of Death 1971

Serial No.	Disease	Total Deaths (Per cent)	Infant Deaths (Per cent)
1	Infective and Parasitic Diseases (others)	63.8	59.7
2	Malaria	10.4	8.7
3	Congenital Anomalies, Birth Injury, Difficult Labour and Causes of Pre-Natal Mortality	7.4	20.1
4	Tuberculosis of all forms	5.6	3.1
5	Unknown Causes	2.9	5.2
6	Bacillary Dysentery and Amoebiasis	2.5	2.1
7	Accidents, Poisoning and Violence	1.9	0.5
8	Diseases of Heart and Circulatory System	1.8	0.3
9	Peptic Ulcer, Appendicitis, Intestinal Obstruction and Hernia	1.2	0.3
10	Diabetes Mellitus	1.1	-
11	Complications of Pregnancy and Childbirth	1.1	-
12	Tumors	0.3	-

- = No cases.

Source: Statistics Division, 1974.

The high infant mortality is usually linked with a low socio-economic status, an unhealthy environment, malnutrition and infectious diseases. The standard of living of the country's population is deplorable. The basic food needs of an individual is 1744 calories for a child of 0-9 years; 2512 calories for males 10 years and above; and 2011 calories for females 10 years and above (Johnson, 1979, p.79). Compared to this standard, the majority of people suffer from malnutrition. More than seventy five per cent of the population live below the poverty* line (Alaudin, 1975, pp.434-441).

In most developed countries of the world, life expectancy for females is higher than for males. In Pakistan the reverse situation has been suggested by some studies. This is a reflection of the low socio-economic status of women, high fertility, closely spaced pregnancies, and home deliveries. Deliveries at home are attended by unskilled mid-wives. Maternity and child care hospitals are either not accessible to most of the population or are beyond their financial capacity. Moreover, in places where hospital facilities are available, women are not encouraged to expose themselves to medical treatment due to prevalence of the 'purdah' (seclusion) system, even if their lives are endangered at childbirth.

The malnutrition among the children in the country may be the result of many factors. For example, the distribution of food in the family does not take place according to the needs of different members of the households. Pregnant and lactating women whose nutritional needs are greater are particularly vulnerable to malnutrition, as they are at a disadvantaged position within the family. This affects the diet requirements of babies. Other crucial factors in the nutritional development of a child are unsupplemented breast feeding, and among the women, the uncontrolled fertility and closely spaced pregnancies. As in most of the developing countries, lactation in Pakistan is universal and prolonged. Based on Pakistan Fertility Survey data, the mean number of months for breast feeding was 16.2, and about twenty per cent of the respondents did not introduce supplementary food in the

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* This study considered an average urban income of Rupees 300 (US $30.0) per month and rural income of Rupees 250 (US $25.0) per month as indicators of the poverty line.

first year of life (Population Planning Council, 1976). It is generally believed that breast feeding can only provide the infant diet requirements for the first six months, and after that the breast milk can no longer provide an adequate food supply (Harrington, 1971, p.22). Due to the lack of child-care education, this requirement is seldom met in the country. As a result the child is exposed to the risk of malnutrition and illness.

The weaning stage in the life of children often results in complications. When the child is breast-fed for a long time without supplementary food he is exposed to diarrhoeal diseases at this transitional stage of life.

The high mortality and morbidity situation can also be attributed to the lack of investment in the development of medical and health services. During 1975, it was claimed that the health sector made up only 1.8 per cent of the total public expenditure or 0.6 per cent of the gross national product and the per capita health expenditure was US$1.00 per annum (Rukanuddin, 1981, p.22). Similarly the population per hospital bed was 2070, per physician 3920, per nurse and mid-wifery personnel 5680, per dental surgeon 73352 and per para-medical/auxiliary staff 3144 (Planning Division, 1979). The situation in rural areas is even worse, where one practitioner serves a population of 15,000-20,000 (Johnson, 1979, p.28). The requirements of rural based medical establishments are either not adequately met or beyond the means of the common people.

1.5 Gaps in Mortality Studies

Mortality estimates for Pakistan are available from a number of sources. These estimates are based on different methodologies, different data sets and represent different points in time. At most they indicate the mortality trends of the country. But the real level of mortality is still unknown.

The causes of mortality decline in the world's population have been the subject of continuous research among social scientists. In European countries the reasons for mortality decline are usually attributed to socio-economic developments (McKeown and Ricard, 1962; McKeown and Brown, 1955). With the exception of some Asian countries, the situation in developing countries is, however, different because

in countries of Africa, Asia and Latin America, the mortality decline took place without a significant improvement in their economies. Therefore the hypothesis that mortality is determined by socio-economic development is questionable in the developing countries. Some studies attribute the mortality decline, which took place more rapidly in the developing nations, to the introduction of medical technology, which did not exist in the period of pre-industrial Europe (Stolnitz, 1956; Davis, 1956). The United Nations claimed that the improvement in mortality is the product of development in socio-economic conditions as well as the introduction of medical technology (1953, p.60). However, no specific contribution of each of these factors has been identified. Although Pakistan is still one of the backward countries of the World, it has also benefited from medical knowledge and the living standard of her people has improved. But no attention has been paid to investigating the association of mortality with these developments.

It is a matter of common observation that deaths are not uniformly distributed in a given society. In the case of Pakistan, due to a lack of required statistics, very few studies of mortality differentials by regions, sex and socio-economic status have been conducted in the past.

This study is therefore an attempt to investigate the level of mortality for the country, and explore the mortality differences by sex, province, urban-rural and socio-economic groups of population. It is believed that this study will contribute to the understanding of future prospects for a reduction in mortality and morbidity within the population of the country.

1.6 Sources of Data

The three important sources of data in Pakistan are the continuous vital registration system, population censuses and periodic sample surveys. The first source of data has the advantage that it records the vital events as they occur. However, the registration system in Pakistan has been evaluated from time to time by different social scientists, and it was the unanimous opinion that the registration data is poor in quality and deficient in coverage (Ishaque, 1977, p.26). Therefore, the estimates of the vital rates are either derived from censuses or survey data.

This study will be mainly based on the data collected in the Housing, Economic and Demographic (HED) Survey 1973. This survey was conducted as a part of the 1972 census. The HED sample consisted of 255,000 households, 122,000 in urban areas and 133,000 in rural areas, and covered the whole of the country with the exception of the tribal areas. The selection of the households was based on a two-stage stratified sampling process. The HED Schedule (Appendix 1) asked questions on housing conditions, internal migration, education, fertility, employment and physical disability. The question on fertility was based on the children ever born (CEB) and children still living (CSL) by sex and was asked of the ever married women. As no direct information on mortality was collected, the estimates will therefore be derived from the fertility information indirectly. The data tape of the HED survey is not accessible, therefore the study will be purely based on the published reports of the survey. The quality of data obtained through the 1972 census and the subsequent HED Survey was not validated against a post-enumeration quality check. The data tape of the Pakistan Fertility Survey (PFS) 1975 was also unavailable. Although the published first report of the survey has some tabulations, their utility in the present study is very limited. However, some statistics and results from it have been used in this study for comparative purposes.

CHAPTER 2

LEVELS OF INFANT AND CHILDHOOD MORTALITY

2.1 Method

Many indirect methods for the estimation of infant and childhood mortality from the incomplete and defective data have been developed in the recent past. The method employed for the purpose of this study was developed by Trussell (1975) and is a variant of the Brass (1968) method. Statistics required are the number of children ever born (CEB), children still living (CSL) and the total number of women classified in five-year age groups. The advantages of this method are:

a) data required are easily available from censuses and surveys:
b) data are subjected to less recall lapse than data which require the respondents to mention the exact dates or age of births and deaths of the children; and
c) the method is suitable for the detailed investigation of mortality trends.

The method is adequately described elsewhere (Trussell 1975, pp 97-107). The basic idea behind the Brass method was that assuming a standard age pattern of mortality and for a given age pattern of fertility, there is a fixed relationship between the age of the mother and the distribution in time of births they have experienced. For each group of mothers there is also on average a fixed relationship between the proportion of children still living and the probability of surviving from birth to a certain specific age. From the CEB and the CSL the proportion of dead children D(i) (where i indicates the mother's age group, for example i = 1 indicates the age group 15-19; i = 2 signifies the age group 20-24 and so on) to women in each age group can be estimated. The estimated proportion of dead children is multiplied by an adjustment factor k(i) to yield the life table probability of dying 'q(x)' from birth to exact age 'x'. The adjustment factor k(i) which depends on the shape and location of the fertility schedule was tabulated by Brass (1968) and subsequently modified by Sullivan (1972) and lately by Trussell (1975). The size of D(i) depends on the age at onset of childbearing. "In general, the earlier

that age is in a population, the older are the children ever born to women in each age group. The older the women, the longer the exposure to the force of mortality" (Sullivan, 1972, p. 81). Therefore, the proportion of children dead among children ever born to women in each age group would tend to be higher, if the childbearing starts at an earlier age than when it starts at a later age. The accuracy of the estimates depends upon the following conditions:

a) Age-specific fertility and mortality rates have remained constant for age groups of mothers in the period under consideration;

b) The underlying pattern of infant and child mortality is consistent with the selected family of model life table;

c) The underlying fertility schedule conforms to the Coale and Trussell (1974) model of fertility schedule;

d) Age data of women are accurate;

e) The mortality of the children of deceased mothers is the same as that of surviving mothers;

f) There is no association between the mortality among infants and children, and the ages of the mothers;

g) The extent or omission of dead and surviving children is the same.

Trussell (1975) developed four sets of regression coefficients based on model life tables (1968). These coefficients along with $\frac{P_1}{P_2}$ and $\frac{P_2}{P_3}$ (where Pi is the average parity of women in the ith quinquennial age group) were used to compute the adjustment factors k(i) through the equation:

$$k(i) = a(i)\ \frac{P_1}{P_2} + b(i)\ \frac{P_2}{P_3} + c(i)\ \log_e \frac{P_1}{P_2} + d(i)\ \log_e \frac{P_2}{P_3} + e(i)$$

where a(i), b(i), c(i), d(i) and e(i) are the regression coefficients for the ith age group. This method has the advantage over Brass' and Sullivan's methods for the following reasons:

i) the adjusting factors 'k(i)' are based on both $\frac{P_1}{P_2}$ and $\frac{P_2}{P_3}$ fertility indices covering a larger part of the childbearing span than other methods; and

ii) the early part of the fertility schedules, under-represented in Sullivan's method is well represented in this method.

2.2 Evaluation of HED Survey Data

The reliability of estimates of the vital rates depends on input data.

For the derivation of infant and childhood mortality the input data used is the children ever born and living to women in conventional five-year age groups. In highly illiterate societies like Pakistan, the women do not know their actual ages and the information on age is usually based on guess. Moreover, the mothers often under or over-report the number of children ever born and still living either by not reporting the deceased children, particularly those who died in early infancy or by recording the still births as live births and vice versa. Although the question on children ever born is asked on a retrospective basis without seeking the exact ages of the children and the timings of births, the data are still affected by recall lapse, especially on the part of older mothers.

2.2.1 Age Distribution of Respondents

In this study the proportion of dead children of women in various age groups will be used for the estimation of the level of mortality. Therefore, the reliability of the estimates is partially dependent upon the accuracy of the age distribution. A comparison of the age distribution of all females as revealed by the HED survey 1973 and 1972 population census is shown in Table 2.1. Both sources of data suggest a consistent age structure. The percentage distribution of females in three age groups, 20-24, 25-29 and 30-34 by some characteristics is shown in Appendix 2.

Table 2.1

Age Distribution of Females Aged 10-49 in Pakistan

Age Group	Per cent distribution	
	HED Survey	Population Census 1972**
10-14	21	21
15-19	15	15
20-24	13	14
25-29	13	14
30-34	11	12
35-39	11	9
40-44	10	9
45-49	7	6
ALL	101*	100

* Does not add to 100 due to rounding
** Statistics Division, 1980, p. 51

Source: HED Survey 1973.

2.2.2 Mean Number of Children Ever Born

The mean numbers of children ever born to ever married women by current ages as shown in the HED Survey 1973 and PFS 1975 are given in Table 2.2.1. The estimates suggest that the average parity in the various age groups increases very rapidly up to age group 35-39 and slows down afterwards. The highest parity of 5.6 and 7.2 was recorded for women in age groups 45-49 and 40-44 in the HED Survey and PFS respectively.

The slow increase of parity of women in older ages in HED data seems to be due to memory lapse. The other reason for this situation may be the lesser fecundity and secondary sterility among the older women. The interesting point suggested by the fertility pattern is that the PFS 1975 data indicated higher parity of women than the HED Survey 1973 for all age groups. This situation does not mean that the ferility during the 1973-75 period has increased. Before drawing any conclusion, the sample size and the execution period of these surveys may be taken into account.

Table 2.2.1

Mean number of Children Ever Born to Ever Born Married Women

Age Group	Mean Number of Children Ever Born	
	HED Survey 1973[a]	PFS 1975[b]
15 - 19	0.438	0.6
20 - 24	1.379	1.9
25 - 29	2.691	3.4
30 - 34	3.877	5.1
35 - 39	4.819	6.2
40 - 44	5.303	7.2
45 - 49	5.631	7.1

Sources: (a) HED Survey 1973

(b) Population Planning Council, 1976

The HED Survey 1973 covered a sample size of 255,00 households, which was completed in a four-month period (August-November, 1973). The PFS consisted of only 5,000 households, the enumeration of which continued

for eight months (May-December, 1975). Moreover, it is unlikely that fertility change occurred in a short period of three years without any change in the social life of the people. Therefore the observed differences in the two parity distributions is entirely the result of better coverage in the PFS and under-enumeration in the HED Survey. The estimates for the mean number of children ever born by regions/characteristics suggested little difference in the fertility behaviour of women in age groups 20-24, 25-29 and 30-34 (Table 2.2.2), presuming that the level of understatement was similar across the various groups.

Table 2.2.2

Mean Number of Children Ever Born by Region/Characteristics to Ever Married Women in Three Age Groups

Region and Characteristics	20 - 24	25 - 29	30 - 34
Pakistan	1.379	2.691	3.877
Urban	1.523	2.927	4.261
Rural	1.327	2.605	3.738
Illiterate	1.373	2.692	3.871
Below Matric	1.450	2.859	4.257
Matric and Above	1.380	2.371	3.366
Punjab	1.321	2.644	3.914
Sind	1.463	2.729	3.800
NWFP	1.468	2.888	4.025
Baluchistan	1.368	2.659	3.492

Source: HED Survey 1973

2.2.3 Sex Ratio

In this study the sex ratio is defined as the number of males per 100 females. It is used to detect possible differential omission of births according to the sex of the children. The universal experience has suggested that there is an excess of male over female births. The studies on sex ratio in various countries have shown that there are usually 102-107 male births for every 100 female births (McMahan, 1951; Myers, 1954;

Rukanuddin, 1967a; Rukanuddin, 1976). Any major deviation from this range would indicate that there has been either misreporting of sex or sex selective under or over-enumeration.

It is being suggested that in traditional societies, the under or over-reporting is sex selective. It has further been observed that sons are better remembered than daughters (Mauldin and Hashmi, 1960, p. 64; Rukanuddin, 1968, p. 218). The reasons attributed to this sex selective behaviour of the parents is the higher socio-economic and cultural values associated with males than females (Rukanuddin, 1967, p. 159).

The sex ratios among children ever born, still living and dead as suggested by the HED Survey data are shown in Table 2.3. The overall sex ratio for all these groups of children range from 112-122, which is quite off the expected range of 102-107. The highest sex ratios for the children ever born and still living are found for the women in older age groups. The sex ratios of the children dead is higher than the sex ratios for the children ever born and still living. This pattern indicates that male children are exposed to a relatively higher force of mortality than the female children or that deaths of female children are more likely to be not reported.

The sex ratios of children ever born, still living and dead to women in the age groups 20-24, 25-29 and 30-34 by various sub-groups of population are shown in Appendix 3. The estimates suggest that with the exception of 'below matric' and 'matric and above' categories, the sex ratios by characteristics are quite compatible with the observed national estimates. The observed deviation for the educated categories can be attributed to a small number of cases (Appendix 4). The sex ratio among the ever born children of mothers in the age groups 20-34 revealed by the PFS 1975 is consistent with the expected range of between 102-107. In this study therefore, a sex ratio of 105 will be used against the observed 113.

The proportion of dead children by sex and by characteristics of mother in age groups 15-19, 20-24, 25-29 and 30-34 are shown in Appendix 4. The estimates suggest that the variation in proportion of dead children may be the effect of either the sex selective reporting of deaths or the sex selective mortality.

Table 2.3

Sex Ratios Among the Children Ever Born, Still Living and Dead to Ever Married Women by Current Age

Age Group	Sex Ratios* Among Children			
	Still Living HED Survey 1973	Dead Children HED Survey 1973	Ever Born HED Survey 1973	Ever Born PFS 1975**
15 - 19	109	138	113	118
20 - 24	106	136	110	104
25 - 29	110	118	111	106
30 - 34	111	115	112	104
35 - 39	113	113	113	110
40 - 44	116	117	116	114
45 - 49	118	118	118	112
ALL	112	122	113	109

* Sex Ratio $\frac{\text{Males}}{\text{Females}} \times 100$

** Booth and Alam, 1980

Source: HED Survey 1973.

2.3 Proportion of Dead Children D(i) Among CEB

The distribution of proportion of dead children by sex to all women by age is shown in Table 2.4. Some of the D(i) values for male and female children seem to be inconsistent. The D(1) and D(2) estimates for males show higher values than D(3) [D(1) is also higher than D(4)]. Similarly, the D(1) is higher than D(2) for females. Estimates for both sexes combined show a higher D(1) than D(2) value. This type of unexpected pattern in D(i) estimates usually originates from the age misreporting of mothers causing clustering of deaths in certain age groups. The actual statistics related to total women, children ever born and children still living by sex are shown in Appendix 5(A).

Table 2.4

Proportion of Dead Children D(i) by Current Age of All Women

Age Group	i	Average Parity of Women P(i)	Proportion of Dead Children D(i)*		
			Male	Female	Both sexes
15 - 19	1	0.1250	.1566	.1279	.1431
20 - 24	2	1.0356	.1502	.1212	.1364
25 - 29	3	2.5159	.1487	.1340	.1444
30 - 34	4	3.7585	.1551	.1512	.1533
35 - 39	5	4.7416	.1614	.1612	.1613
40 - 44	6	5.2189	.1787	.1777	.1782
45 - 49	7	5.5880	.1893	.1895	.1894

* $D(i) = 1 - \frac{CSL(i)}{CEB(i)}$; where i = 1, 2, 3, 4, 5, 6, 7.

Source: HED Survey 1973.

2.4 Estimates for Mortality Levels

The parameters of the fertility schedule $\frac{P_1}{P_2}$, $\frac{P_2}{P_3}$, the age pattern of fertility and Trussell's regression coefficients based on the West family of life tables have been used to derive the adjustment factors 'k(i)' (where i = 1, 2, 3...7). These k(i) values, which are different for various age groups are then used in conjunction with the 'D(i)' values for the derivation of probability of dying 'q(x)' from birth to exact age x (where x = 1, 2, 3, 5, 10 and 20). As no age pattern of mortality for the population under study is available, the West pattern of model life tables is assumed to be applicable (Sullivan, 1972, p. 82). The mortality estimates and levels are shown in Table 2.5.

The observed mortality levels with the exception of the first two age groups fluctuate in a narrow range of 14.4 to 14.9. The mortality levels based on q(3) and q(5) are almost the same. Moreover, the D(5) values for males and females in Table 2.4 are not much different from each other. Therefore, mortality levels (based on q(5) of 15.0 for males,

14.3 for females and 14.6 for both sexes combined, are indicators for the population of Pakistan for the late 1960s from these data.

Table 2.5

Mortality Estimates and Suggested Levels by Sex

Age Group	Exact Age	Adjustment Factor	Probability of Dying between birth and exact age x q(x) *			Mortality Levels***		
	x	k(i)**	Male	Female	Both Sexes	Male	Female	Both Sexes
15-19	1	1.031	.1616	.1326	.1475	11.62	11.94	11.78
20-24	2	1.072	.1613	.1304	.1462	13.50	14.15	13.82
25-29	3	1.017	.1515	.1419	.1468	14.65	14.17	14.42
30-34	5	1.013	.1575	.1523	.1550	14.96	14.33	14.64
35-39	10	1.022	.1653	.1645	.1649	15.23	14.45	14.85
40-44	15	1.007	.1804	.1786	.1795	14.97	14.32	14.65
45-49	20	1.000	.1897	.1892	.1895	15.20	14.53	14.87

* $q(x) = D(i) \times k(i)$

** $k(i) = a(i) \frac{P_1}{P_2} + b(i) \frac{P_2}{P_3} + c(i) \log_e \frac{P_1}{P_2} + d(i) \log_e \frac{P_2}{P_3} + e(i)$

*** Mortality levels are based on West model life tables and were calculated for both sexes by assuming sex ratio at birth as 105.

Source: HED Survey 1973.

2.5 Time Reference

If mortality in a population is constant then the q(x) estimates indicate the current mortality situation. But is has been observed that in most developing countries the mortality has been declining since the second world war. In such circumstances the q(x) estimates indicate the past mortality in a population. In changing mortality conditions the q(x) estimates could give an indication of the mortality trend, if the particular periods to which they refer are determined. Brass and Coale (1968) suggested that the q(2) estimates roughly refer to a period of five to six years prior to the date of survey enumeration. Sullivan observed that if rate of decline of mortality is five per cent per year, then the q(2) estimate

refers to a period of 2 to 2.5 years prior to the enumeration date (1974, p. 129). But the method of calculation of the period prior to the survey suggested by Sullivan was very complicated (Hull and Sunaryo, 1978, p. 12).

In association with the mortality estimation, Trussell (1978) suggested an easy regression method for the calculation of time reference t*(x) (where x refers to the exact ages). The original regression coefficients were revised recently, and the original and revised values have been reproduced from Hull and Sunaryo (1978) in Appendix 6. The t*(2), t*(3) and t*(5) estimates are calculated through the following equations:

$$t^*(2) = 1.3187 + 5.6158\left(\frac{P1}{P2}\right) + .2645\left(\frac{P2}{P3}\right)$$

$$t^*(3) = 1.5413 + 2.6451\left(\frac{P1}{P2}\right) + 4.8783\left(\frac{P2}{P3}\right)$$

$$t^*(5) = 1.9978 - 2.4053\left(\frac{P1}{P2}\right) + 10.5208\left(\frac{P2}{P3}\right).$$

The estimated t*(x) values for the corresponding estimates are shown in Table 2.6. The reference period has been computed with respect to the survey period of August- November 1973. The q(x) estimates refer to the overall reference period 1967-71.

Table 2.6

Time Reference of the Estimates

Exact Age	q(x) Estimates	Mortality Levels	Years Prior to Survey t*(x) a/	Calender Year
2	0.146	13.8	2.1	1971
3	0.147	14.4	3.9	1969
5	0.155	14.6	6.0	1967

a/: t*(x) has been calculated with respect to August-November, 1973

Source: HED Survey 1973.

The mortality levels based on West model life tables (Coale and Demeny, 1966) for q(2), q(3) and q(5) suggest that mortality in Pakistan had been increasing during 1967-71. But this is unlikely as developments (although very slow) in socio-economic conditions, health facilities and in environment are taking place in the country.

2.6 Estimates Based on Brass and Sullivan Methods

The underlying assumptions of the Brass (1968) method are: that the underlying mortality pattern conforms to the 'General' pattern and the underlying fertility schedule follows the polynomial model. The first modification of the Brass technique was suggested by Sullivan (1972). He formulated an equation through which the relationship of q(x) and D(i) was regressed for specific age groups of women. The assumptions of this technique were: that the underlying mortality follows the mortality pattern of model life tables and the underlying fertility schedule conforms with the actual fertility schedule as observed in several countries. In this way four new sets of coefficients for different families of model life tables were developed.

The basic difference in the two methods is the specification of the shape of the fertility schedule and the determination of the indices of early or late commencement of childbearing. Brass (1968) used $\frac{P_1}{P_2}$, $\frac{P_2}{P_3}$, $\bar{m}$ (mean age of fertility schedule) and m (median age of childbearing). Sullivan used only $\frac{P_2}{P_3}$ in the regression equation. Brass's method provides an estimation for q(1), q(2), q(3), q(5), 9(10), q(15) and q(20), while Sullivan's regression method gives the estimates for q(2), q(3) and q(5). Mortality estimates 'q(x)' by Brass's (1968) and Sullivan's methods (1972) have been computed and produced in Appendix 5, panels 'B' and 'C'. These estimates have been compared with the estimates derived by Trussell's method (1975) in Table 2.7. The percentage deviation has been calculated through the relation:

$$\text{per cent deviation} = \left(\frac{\text{Brass/Sullivan estimate}) - \text{Trussell estimate}}{\text{Trussell estimate}}\right) \times 100$$

The observed difference between Trussell's and Brass/Sullivan's estimates at a particular age using different families of life tables suggest that:

a) the deviation is not more than eight per cent for all ages with different model life tables;

b) the differences between Sullivan and Trussell estimates are lower than the corresponding difference between Brass estimates and Trussell estimates;

c) Brass estimates in most cases are on the higher side; and

d) variations observed in the West pattern of mortality lie between a narrow range of -1.2 to 3.9 per cent for all ages.

It is therefore concluded that the estimated level of mortality for the

population of Pakistan as indicated by the HED data is little affected by the schedules of mortality and fertility, or by the choice of indirect method of estimation.

Table 2.7

Per Cent Variations of Brass/Sullivan From Trussell Estimates

Mortality Pattern	q(2)		q(3)		q(5)	
	Sullivan	Brass	Sullivan	Brass	Sullivan	Brass
North	-0.2	7.7	-1.8	7.3	-4.4	3.6
South	-0.6	3.4	-1.9	1.3	2.8	0.6
East	0.1	4.1	1.8	2.9	1.7	2.3
West	0.5	3.9	-1.2	3.5	1.9	3.1

Note: See Appendix 2 (B,C) for the estimation procedure of Brass/Sullivan methods

Source HED Survey 1973.

2.6.1 Accuracy of the Estimates

The q(x) estimates derived by Trussell's method (1975) depict the mortality on a cohort rather than cross-sectional basis. Therefore, these estimates suggest the average mortality experienced by the children of women in different cohorts at various points in time.

One common source of error in the retrospective single round surveys is the under-reporting of births and deaths of children. The general experience suggests that mothers have a tendency to omit the births and deaths of their children living somewhere else. This differential reporting causes a spurious picture of the mortality in a population. The reporting of women in older age groups is also often severely deficient, more severe for dead than living children. Moreover, the q(x) estimates from the children of women in the older cohorts refer to mortality in the remote past, and are therefore of limited use when studying the recent mortality in a population. The q(1) estimates are also subjected to errors arising from the onset of childbearing and small samples.

Therefore, it is suggested that they are shaky and not suitable for mortality analysis (Brass and Coale, 1968), It has been observed that q(2), q(3) and q(5) estimates are less exposed to errors arising from memory lapse, sample fluctuations and age at onset of childbearing and are the indicators of the mortality of a population in the recent past.

The data from the published tabulations of the first report on The Pakistan Fertility Survey 1975 were used for the estimation of mortality level by Trussell's method. As can be seen from the Appendix 7, with the exception of q(1) and q(10), the other q(x) values are high and fluctuating. These q(x) estimates yield mortality levels in the range of 10 to 14.5. However, the levels suggested by q(2), q(3) and q(5) are 10.1, 11.2 and 12.3 respectively.

The q(3) and q(5) estimates of this study suggest a consistent mortality level. Based on the HED Survey data, a level of 14.96 for males, 14.33 for females and 14.65 for both sexes is indicated for Pakistan. The translated expectations of life at birth are 51.8 for males, 53.3 for females and 52.5 years for both sexes combined. These estimates are on the higher side, when compared with the estimates of PFS 1975 data. In this situation it is more plausible to conclude that the mortality level in Pakistan ranged from 12 to 14.5 for both sexes around 1970.

The ascribed values from the West model life tables for the infant '$_1q_0$' and childhood '$_4q_1$' mortality are shown in Table 2.8 for males and females separately. Again the infant mortality of 107 of this study must be regarded as being on the lower side, as compared to PFS estimates of 136 and 146 for the 1965-69 and 1970-73 period respectively.

Table 2.8

Ascribed Values of Infant '$_1q_0$' and Childhood '$_4q_0$' Mortality by Sex for Pakistan

Sex	$_1q_0$	$_4q_1$	$_5q_0$
Both sexes***	.1068	.0539	.1550
Male*	.1115	.0514	.1575
Female**	.1015	.0565	.1523

* Based on mortality level of 14.96 of West model life tables
** Based on mortality level of 14.33 of West model life tables
*** Based on sex ratio of 1.05
Source: HED Survey 1973.

2.7 Comparison with Other Estimates

The available estimates of infant mortality based on various sources of data are given in Table 2.9. The estimates are derived from different sets of data, sample sizes and refer to different points in time. Therefore, any conclusion based on the comparison of these estimates must be interpreted carefully. The given estimates refer to 1945-73 period.

It can be seen from the table that the estimates of infant mortality found in this study are the lowest when compared with other studies. Whether the infant mortality rate in Pakistan is low (as found in this study) or whether the observed low mortality is due to reporting errors causing lower values of D(5), or due to wrong imposition of West family of life tables to split $_5q_0$ into '$_1q_0$' and '$_4q_1$' cannot be uncovered from the present investigation. But it is most probable that the lower mortality suggested by the HED Survey may be due to data inadequacy as discovered in the 2.2 to 2.2.3 sections.

Table 2.9

Infant Mortality '$_1q_0$' Estimates for Pakistan 1945-1973

Period	Booth and Alam, 1980 p. 36	TREC, n.d, p. 130	Aslam, Hashmi and Seltzer, 1967, pp. 103-104	Yusuf, 1967, p. 540; Yusuf, 1981 pp. 189-196	Farooqui and Farooq 1967, p. 107	Statistics Division, 1973-75	Arriaga and Hobbs 1980	Present Study HED Survey 1973
1945-49	221							
1950-54	194							
1955-59	163							
1960-64	145	109-131[a/]	152-159[c/]		135[e/]			
1965-69	136	121-127[b/]		142[d/] *150[j/]		106-124[f/]		107[h/]
1970-73	146						139[g/]	

a/: 1961-64; b/: 1965-67; c/: 1962; d/: 1962-64; e/: 1962-65;
f/: 1968-71; g/: 1970-73; h/: 1967; j/: 1968-69**

* Separate rates for males and females are available. For both sexes, the estimate is based on sex ratio of 1.05.

** Reference period of the estimate was not known. The survey period was 1971, the estimate is based on q(2), therefore a period of 2-3 years prior to the survey is assumed.

CHAPTER 3

MORTALITY DIFFERENTIALS IN PAKISTAN

3.1 Introduction

This part of the study is concerned with the investigation of mortality variation between different groups within the national population. Due to the unavailability of the data tape, the scope of cross-tabulations of mortality by sub-groups of population is very limited. From the published reports of the HED Survey, the cross-tabulations of mortality by population sub-groups like male-female, province, urban-rural and educational level is feasible. For other factors which could affect mortality like medical facilities, nutrition, income, literacy and physical environment, the discussion is mainly based on the possibility and not on empirical evidence. The study has therefore been arranged into various sections. Throughout this part of the study, the q(5) estimates based on the median value (rather than the mean values, which may be influenced by extreme cases) of the level of mortality as derived through q(2), q(3) and q(5) has been used as the indicator of mortality differentials.

SECTION I

Mortality Differentials by Sex

3.I.1 Introduction

Mortality by sex is known to follow a typical pattern of a higher male than female mortality in most of the world's populations. Studies relating to mortality of animals have also suggested the higher life expectancy for female than male species. The sex selective mortality bias is usually attributed to biological and social reasons. According to the United Nations: 'If only because more boys than girls are born in the world every year and because all must eventually die, the annual number of male deaths would normally always exceed the number of female deaths. The actual excess of male mortality is all the greater because age specific death rates are, as a rule, higher among males than among females and this difference produces a greater life expectancy of the female sex. With few exceptions, this is the common finding throughout the world'. (1953, p.16).

Many studies on the subject are available for the western countries and all of them indicate that the females have higher life expectancy than males (UN, 1953, p.54; UN 1975; UN, 1967). The available evidence for Australia suggests that females have been enjoying a higher life expectancy at birth than their male counterparts for the last century (ending 1970) (Young, 1976). Similarly it was quoted, infant mortality among males in Africa, Asia, Europe, Oceania, North and South America was higher than for females (UN, 1967). This higher male than female mortality pattern has not been found to exist in some developing countries. It was observed that in India, Egypt, Costa-Rica, Guatemala, Mexico, Taiwan, Ceylon and Pakistan, girls in the age group 1-4 had higher death rates than boys (UN, 1973, p.115). The sex ratio in the total population in India as suggested by the successive censuses increased from 104 in 1911 to 108 in 1971 and was presumably determined by higher female than male mortality (Cassen, 1978, p.114). Commenting on this situation it was observed that: 'The female infant is definitely better equipped by nature for survival than the male, but in India the advantages she has at birth are probably neutralized in infancy by comparative neglect and in adolescence by the strain of bearing children too early and too often' (Chandrasekhar, 1967, p.76). The available life tables for India prepared for the intercensal period 1951-61 and 1961-71 indicate that the life expectation at birth for the males was higher than for females, and the differential is more significant for the later period (Coale and Demney, 1967; Visaria, 1969; Adlakha and Kirk, 1974; Ambannavar, 1975; Cassen and Dyson, 1976). Studies of sex mortality differentials for Pakistan show that the mortality among females was higher than among males. This was indicated by the unusual higher sex ratio in the 1961 Census data for the total population (Rukanuddin, 1967, p.218). The crude death rates derived by different researchers indicate that females in Pakistan are more exposed to death than the males (Aslam, Hashmi and Seltzer, 1967, p.72; Farooqui and Farooq, 1971, p.102). Similarly it was noticed in other studies that the expectation of life at birth for males was higher than for females (Bean, Khan and Rukanuddin, 1968; Yusuf, 1967; Aslam, Hashmi and Seltzer, 1967).

3.1.2 Mortality Estimates by Sex

The mortality estimates suggested by q(5), which are based on median value of mortality level, derived through q(2), q(3) and q(5) are shown in Table 3.I.1. The estimates show that the mortality among the male children is higher than for female children. The difference in

Table 3.I.1.

Mortality Estimates by Sex and by Place of Residence of Mother

Region	Derived Mortality Levels Based on q(x)* Values						Median Value of Levels		q(5) Estimates as Suggested by Median Levels of Mortality	
	Male			Female						
	q(2)	q(3)	q(5)	q(2)	q(3)	q(5)	Male	Female	Male	Female
Pakistan	13.50	14.65	14.96	14.15	14.17	14.30	14.65	14.17	.1639	.1555
Urban	14.12	15.19	15.42	14.76	15.12	15.15	15.19	15.12	.1530	.1365
Rural	13.26	14.43	14.78	13.91	13.81	13.95	14.43	13.91	.1684	.1609
Punjab	12.60	14.24	14.58	13.18	13.74	13.76	14.24	13.74	.1722	.1648
Urban	13.00	14.71	15.12	13.70	14.79	14.64	14.71	14.64	.1627	.1460
Rural	12.46	14.08	14.39	13.01	13.39	13.49	14.08	13.39	.1755	.1727
Sind	15.86	16.08	16.13	15.92	15.24	15.53	16.08	15.53	.1356	.1286
Urban	15.94	16.08	15.99	16.08	15.58	15.87	15.99	15.87	.1373	.1220
Rural	15.84	16.08	16.23	15.85	15.00	15.23	16.08	15.23	.1356	.1343
NWFP	12.74	14.28	15.11	14.11	14.59	14.92	14.28	14.59	.1714	.1471
Urban	11.97	14.85	14.96	13.76	15.26	14.90	14.85	14.90	.1598	.1408
Rural	12.91	14.16	15.14	14.20	14.44	14.92	14.16	14.44	.1739	.1500
Baluchistan	12.75	12.96	13.73	14.83	13.06	13.85	12.96	13.06	.2014	.1801
Urban	14.46	12.78	14.84	16.38	14.72	16.34	14.46	16.34	.1678	.1638
Rural	12.39	13.01	13.51	14.52	12.75	13.39	13.01	13.90	.2002	.1612

* q(x) estimates are based on west family of life tables (Coale and Demeny, 1966).

Source: HED Survey, 1973.

mortality as noted at national level suggests that the male children are around 5 per cent more at risk of death than female children. The consistently higher male than female mortality was also found among the children of mothers in various educational groups in Table 3.I.2. The estimates of infant mortality derived from the Pakistan Fertility Survey and the Population Growth Survey also suggest higher male than female mortality (Booth and Alam, 1980; Statistics Division, 1975; Yusuf, 1981).

The findings of this and other studies pertaining to the late sixties and early seventies do not follow the classical pattern of higher female than male mortality as was observed until the mid-sixties. This reversal of mortality pattern in favour of females may be either due to the biological supremacy of the female children or may be due to under-reporting of female child deaths. But studies based on different sets of data and relating to the same period (Statistics Division, 1975; Booth and Alam, 1980; Yusuf, 1981) also suggest the higher male than female mortality among the children, which does restore some confidence at the findings of this study.

Table 3.I.2

Mortality Estimates by Sex and by Educational Level of Mothers

Region	Mortality Levels *		q(5) Estimates Suggested by Median Level. **	
	Male	Female	Male	Female
		ILLITERATE		
Pakistan	14.43	13.96	.1684	.1599
Punjab	14.01	13.53	.1770	.1695
Sind	15.84	15.27	.1402	.1336
NWFP	14.29	14.59	.1713	.1471
Baluchistan	12.87	13.70	.2037	.1658
		BELOW MATRIC		
Pakistan	17.12	16.31	.1160	.1140
Punjab	16.04	16.20	.1363	.1160
Sind	17.40	17.19	.1109	.0982
NWFP	15.05	18.01	.1558	.0841
Baluchistan	18.42	18.29	.0927	.0727
		MATRIC AND ABOVE		
Pakistan	17.50	17.08	.1091	.1000
Punjab	17.08	16.20	.1167	.1160
Sind	19.05	18.20	.0817	.0810
NWFP	13.5	13.16	.1888	.1779
Baluchistan	15.31	***	.1506	***

* The mortality levels are the median values of levels derived from the q(2), q(3) and q(5) estimates in Appendix 8.

** Estimates are based on west family of life tables (Coale and Demeny, 1966).

*** Estimates suggest a level of more than 20, which is unacceptable.

Source: HED Survey 1973.

SECTION II

Mortality Differential by Province

3.II.1 Introduction

The four provinces of Pakistan, Punjab, Sind, NWFP and Baluchistan have been in existence for a long time. After independence in 1947, they constituted the confederating units of the country. In 1955, their status as federating units was dissolved, and the whole country was bound together in a single unit, governed by one central government. In 1969, the pre-1955 status of the provinces was again restored through an official decree. Apart from being separate administrative federating units, these provinces also represent groups of population which are linguistically different. The lack of data in the past did not permit a study of mortality differentials by provinces. However, some evidence of mortality differentials can be obtained from information on children ever born and surviving collected in the HED Survey.

3.II.2 Distribution of Population by Provinces

According to the 1981 Provisional Census data, Punjab turned out to be the most populous province of the country contributing more than fifty per cent of the country's population. Baluchistan has the smallest proportion of population, but is the largest province by area. It contains more than forty per cent of the land of the country. The intercensal growth rate indicates that Baluchistan is the fastest growing province of the country. Population distribution, growth rate and density by provinces are indicated in Table 3.II.1.

3.II.2.1 Distribution of Women and Mean Number of Children Ever Born by Age Groups

Table 3.II.2 indicates the distribution of respondents in different cohorts and mean number of children they have borne. The statistics indicate that there is a negligible difference in the fertility behaviour of the women in all provinces. Similarly the total fertility rate was around 6.2 in all the provinces based on the Pakistan Fertility Survey data (Booth and Alam, 1980).

TABLE 3.II.1

POPULATION DISTRIBUTION AND OTHER CHARACTERISTICS BY PROVINCES 1981

Province	Population in (000)		Per Cent Change 1972-81	Per Cent of Country Population	Density Per Square Kilometer
	1972	1981			
Punjab	37610	47451	25.3	56.6	229
Sind	14156	18966	34.0	22.6	134
NWFP	8388	13060	30.0	15.6	146
Baluchistan	2429	4305	77.0	5.1	12

Source: Census Bulletin 1, 1981

TABLE 3.II.2

DISTRIBUTION OF MOTHERS AND MEAN NUMBER OF CHILDREN EVER BORN BY PROVINCE

Age Group	Punjab	Sind	NWFP	Baluchistan
15 - 19	20.0 (.10)	18.3 (.19)	19.7 (.15)	18.4 (.14)
20 - 24	15.8 (1.0)	17.7 (1.9)	17.1 (1.0)	15.8 (1.1)
25 - 29	16.3 (2.5)	17.5 (2.6)	16.9 (2.6)	17.4 (2.5)
30 - 34	13.9 (3.8)	14.4 (3.7)	14.4 (3.8)	14.3 (3.4)
35 - 39	13.0 (4.8)	12.9 (4.6)	12.0 (4.8)	15.1 (4.3)
40 - 44	11.0 (5.4)	10.8 (4.8)	11.4 (5.3)	9.6 (4.8)
45 - 49	9.9 (5.7)	8.4 (5.2)	8.5 (5.9)	9.6 (5.0)

Note: ( ) = Mean number of children ever born.

Source: HED Survey 1973

Table 3.II.3

Mortality Estimates* by Province of Pakistan

Province	Mortality Levels Based On			Median Level	q(5) Values Suggested by Median Level
	q(2)	q(3)	q(5)		
Punjab	12.88	14.00	14.01	14.00	.1683
Sind	15.89	15.67	15.84	15.84	.1317
NWFP	13.41	14.43	15.02	14.43	.1595
Baluchistan	13.76	13.01	13.79	13.76	.1738

* Estimates are based on west family of model life tables (Coale and Demeny, 1966), assuming a sex ratio of 1.05 for both sexes.

Source: HED Survey 1973.

3.II.3 Mortality Estimates by Province

The estimates in Table 3.II.3 suggest that the lowest and highest mortality occurs in the provinces of Sind and Baluchistan. The difference in mortality between these two provinces is around 25 per cent. The observed variation in the provinces of the Punjab and NWFP is not as per expectation, because it is believed that Punjab is economically more advanced that NWFP (Kureshy, 1975, p.157). The mortality differential is sometimes attributed to the variation in fertility behaviour of groups of population. But in case of provinces of Pakistan, there is no great variation in mean number of children ever born as shown in Table 3.II.2.

The mortality variation in national and sub-national population is closely associated with the socio-economic and environmental conditions (UN, 1953, p.61). But due to lack of data, it is not possible to investigate the differentials of the factors, which may account for the variation in the provincial mortality situation. However, to get the best out of the worst situation, some of the possible factors have been employed from indirect sources.

It has been established in the third section of this chapter that urbanization and mortality in the population under investigation have an inverse relationship with each other. According to the preliminary figures of the 1981 Population Census, Sind is the most urbanized province of the country, and more than forty percent of her population

live in urban centres. The least urbanized provinces are NWFP and Baluchistan, where around 15 per cent of the population was found in urban areas.

The distribution of medical facilities which have a direct influence on mortality and the morbidity situation in a population has been indicated in Table 3.II.4. The statistics suggest that Sind is the best

Table 3.II.4

Distribution of Health Care Facilities by Province

1978

Province	Population Per Facility			Development Expenditure in Health Per Person
	Hospital Beds	Doctors/Dental Surgeons	Nurse/ Auxilaries	
				(Rs)
Punjab	2088	7208	3227	6.8
Sind	1548	3184	2039	3.7
NWFP	2238	13953	5499	9.0
Baluchistan	1943	17083	2102	4.7

Source: Finance Division, 1980a.

served province in respect of health care facilities, while Baluchistan and NWFP are the poorly served provinces in most cases. The number of persons per hospital bed varies from 1548 in Sind to 2238 in NWFP.

In terms of Doctors/Dental Surgeons/Nurse/Auxiliaries, NWFP has the highest ratio of persons per facility. The poor state of health care facilities has been realized in official circles and in development expenditure health care in NWFP has been receiving more attention than in other provinces.

The figures for literacy rate as shown in Table 3.II.5 suggest that Sind and Punjab have the highest rates and are above the national level.

The lowest literacy of 12 per cent was found in Baluchistan. Beside uniform distribution of educational institutions in the provinces, the lower rate of literacy in Baluchistan can be attributed to several factors. One such factor is the low level of enrolment in Baluchistan, which may probably be related to the low density of population. To get

Table 3.II.5

Distribution of Literates and Enrolment in Schools by Province

Province	Literacy	School Enrolment (%)	
		Primary	Secondary
Punjab	28	62	63
Sind	30	23	24
NWFP	22	13	11
Baluchistan	12	2	2

Sources: HED Survey 1973 and Finance Division, 1980a.

benefits from schooling facilities, the people have to travel longer distances as compared to other provinces. Moreover, due to the nomadic nature of the population, the available facilities are also under-utilized. As such, a very small proportion of the population is benefitting from education.

The overall condition of housing in terms of quality and quantity in all provinces is deplorable. The observed habitation density is higher than the over-crowding level of 1.4 to 2.0 persons per room as recommended by the United Nations (1955, Annexure 1). A very small proportion of the housing units have the basic requirements of a household. The indicated statistics in Table 3.II.6 show that most of the houses in Baluchistan are kutcha built. This situation further reflects the high rural character of the province. The proportion of pucca built houses is almost the same in Punjab, NWFP and Baluchistan. However, the Sind has a good proportion (24 per cent) of pucca houses. The habitation density in the Punjab, Sind and NWFP is almost the same, while Baluchistan has the lowest habitation density of 5 persons per

Table 3.II.6

Habitation Density and Type* of
Construction of Housing Units by Province

Province	Habitation** Density (H.D)	Pucca (%)	Pucca-Kutcha (%)	Kutcha (%)	Others (%)
Punjab	5.8	4.7	32.5	61.9	0.9
Sind	5.8	23.7	14.6	60.9	0.8
NWFP	6.0	5.4	35.6	58.8	0.2
Baluchistan	5.0	3.4	9.2	86.1	1.3

Note: * See Appendix 9

** H.D = Number of persons per room

Source: HED Survey 1973.

room. Table 3.II.7 indicates the availability of housing facilities in the households. The statistics suggest that although the overall situation within the households is bad in all provinces, the housing units in Baluchistan are in a worse condition. For example, the majority of the housing units in Baluchistan have no bath and toilet facilities. People use the traditional means for fueling and lighting, and half of the streets are kutcha. The physical conditions in the households of the other three provinces is relatively better.

The investigation in this section suggests the mortality differentials within the provinces of Pakistan are the result of urbanization, availability of health-care facilities, literacy and environmental conditions as existing in those provinces.

TABLE 3.II.7

DISTRIBUTION OF HOUSING FACILITIES BY PROVINCE

Housing Facility	Punjab (%)	Sind (%)	NWFP (%)	Baluchistan (%)
Bath				
Bath Room	17.6	38.7	22.5	38.1
No Bathroom	82.4	61.3	77.5	61.9
Toilet				
Flush	2.5	9.1	1.6	1.5
Without Flush	19.4	49.2	52.2	32.4
No Toilet	78.1	41.7	46.1	66.1
Water Supply				
Piped	10.7	31.2	11.2	12.2
Hand Pump	57.5	25.8	4.2	1.4
Well	23.3	19.2	52.4	42.8
Others	8.4	19.9	32.2	43.5
Kitchen				
With Kitchen	20.6	20.4	22.9	38.5
Without Kitchen	79.4	79.6	77.1	61.5
Lighting				
Electricity	16.5	21.3	24.3	5.3
Kerosene	83.3	78.5	74.8	92.2
Others	0.2	0.2	0.9	2.5
Fuel				
Gas & Electricity	1.5	4.8	0.4	0.3
Wood, Charcoal & Kerosene	72.3	85.3	82.7	98.5
Cowdung	21.0	9.6	13.5	1.2
Others	5.2	0.3	3.4	-
Surface of Approach Street (Urban)				
Pucca	29.4	37.5	51.9	21.1
Pucca-Kutcha	31.8	13.4	19.8	17.5
Kutcha	29.2	25.0	17.7	48.9
No regular street	8.2	22.3	8.6	10.8
Others	1.4	1.9	2.0	1.6
Garbage Disposal (Urban Areas)				
Collected from the housing units	13.3	10.4	18.3	26.3
Filth Depot	35.4	30.7	26.4	32.8
No Arrangement	51.3	39.0	55.3	40.9

Source: HED Survey 1973

SECTION III

Mortality Differentials by Urban-Rural Areas

3.III.1 Introduction

Urban-rural mortality differentials have been observed in many populations of the world. The studies investigating these differentials are mainly based on the socio-economic and environmental conditions of the populations living in these areas (UN, 1953, p.61). However, the factors influencing the mortality and morbidity situation are not uniformly found in either national or sub-national populations. For example, urban areas throughout the world have different characteristics. Some of them, particularly in developing countries are well known for their over-population, congestion, contaminated drinking water, inadequate sewage system and slum areas. This kind of city environment serves as a breeding place for disease. In comparison, urban areas in developed countries are considered as the places which offer best health facilities, good sanitation and sewerage and other hygienic environments. These are the factors which are mainly responsible for influencing the mortality and morbidity conditions in a population. There may also be variation within groups of population of urban and rural areas, but due to a lack of necessary information, this aspect will not be covered in this study.

3.III.2 Urban-Rural Differentials

Urban-rural variation in mortality has been under investigation since the seventeenth century. However, the subject was not fully explored due to a lack of required data and the inconsistent definition of urban-rural areas (UN, 1954, p.14).

It was first noticed in the middle of seventeenth century that the death rates in the urban areas of Europe were much higher than in the rural areas. In 'Natural and Political Observations on Bills of Mortality', Graunt in 1658 observed that the death rates in the city of London were higher than the countryside (Willcox, 1939, p.70). With the advancement of the industrial revolution the difference in mortality between the urban and rural areas was so enormous that the cities were called the graveyards of mankind, as they attract the young people from rural areas and kill them in a matter of a few years (UN, 1954,p.13).

Statistics related to the mid eighteenth and nineteenth century indicate that the life expectancy at birth in Stockholm was lower than

the rest of the country; the infant mortality rate was double in the rural than in urban areas and this situation continued until the first quarter of this century (UN, 1953, p.13). The situation in the big cities of the United States of America was worse and it was observed that around 1900, in the big cities of Massachusetts, the infant mortality was 164, while in smaller places the infant mortality was 130 (Bailey, 1906, p.321). Similarly, it was noticed during 1930-60 that with only one exception, the age adjusted death rates for each colour, sex and age group in the City of Chicago was higher than the whole country (Kitagawa and Hauser, 1972, p.56). In England and Wales, statistics indicate that death rates in urban and rural areas were 17 and 13 respectively during the first decade of this century (Benjamin, 1964, p.22), and the life expectancy in urban areas was lower than in rural areas during 1911-12 and 1920-22 (Glass, 1964, p.265). Studying mortality in pre-industrial London, it was observed that the death rates of urban areas were higher than in rural areas (Jones, 1980, p.250); and during 1881-90 Daley and Benjamin found the infant mortality of 152 and 125 for both these localities of London (1964, p.254). Investigations of the 'US National Centre for Health Statistics' indicated that higher urban than rural mortality persisted till around 1950 in Norway, Denmark and the Netherlands (1967, p.34; 1968, p.81; 1968, p.66).

Statistics for 1959-60 indicate that mortality in the urban areas of Ceylon, Philippines and the Federation of Malaysia was lower than the rural areas (Johnson, 1964, p.295). In the City of Madras the death rates have been lower than the rates for the adjoining rural areas for one hundred years ending 1961 (Chandrasekhar, 1967, p.408). The statistics for Korea indicate that in 1973 the crude death rates in urban and rural areas were 6.0 and 9.2 respectively (UN, 1975, p.182). A universally higher mortality situation in the rural areas of several African countries has also been cited (Sembajwe, 1977, p.287; Harrington, 1971, p.227).

This higher mortality in rural areas of developing countries has not always been supported. The available evidence suggests that the infant mortality during 1959-60 in the cities of El Salvador and India were higher than for the whole country (Johnson, 1964, pp.295-96). Similarly, the registration and survey data for 1948-58, 1952-54 and 1959-74 suggests that mortality in the urban areas of Sri Lanka was higher than in the rural areas (UN, 1976, p.143; Meegama, 1980: Arriaga, 1980). For Pakistan the available studies on urban-rural

mortality differentials indicate higher rural than urban mortality (Farooqui and Alam, 1974; Arriaga and Hobbs, 1980).

The review of mortality differentials of the urban-rural areas of developing countries suggests that with few exceptions, mortality in rural areas has always been higher than in urban areas. There are also indications that mortality declined more rapidly in the urban areas of these countries. The causes of reduction of mortality in the urban areas of developing countries can mainly be attributed to the concentration of health services and some improvement in the supply of safe drinking water and sewage systems and easy access to these facilities

3.III.3 Population Distribution by Urban-Rural Areas

The basis of urbanization in Pakistan is its administrative set-up (Municipality, Town Committee, Cantonments, Civil Lines) and population size (5000 persons or over with the exception of a few places, where a lower population size is treated as urban on the basis of the urban characteristics of the settlements). According to the 1981 Census 28.3 per cent of the population was enumerated in the urban areas of the country. Table 3.III.1 shows the population distribution by urban-rural areas as enumerated in various censuses. The estimates indicate that the urban population of the country has been growing faster than its rural counterpart.

The urban areas of Pakistan are classified into cities and towns. An urban centre with a population of 100,000 and above or with a lesser population but a high administrative status like the capital of the province is classified as a city in the census. All other urban areas are known as towns. Table 3.III.2 indicates the names of urban centres, which were classified as cities in the 1972 Census. More than sixty per cent of the urban population of the whole country was enumerated in these cities. An interesting feature of the urban areas for the past few decades is that the cities are growing faster not only at the expense of rural areas, but also by attracting people from small and medium sized towns (Burki, 1973, p.20). The growth rate of the cities show that urban populations have been increasing very rapidly. Between the intercensal period of 1961-72, eight towns achieved the status of cities, bringing the total number of cities in Pakistan to twenty.

Table 3.III.1

Population Distribution by Urban-Rural Areas of Pakistan 1951-81

Region	Population During the Censuses				Per Cent Growth Per Year		
	1951	1961	1972	1981	1951-61	1961-72	1972-81
Urban	6018975	9614004	16742534	23693549	5.97	6.74	3.26
Rural	25203750	29828435	43767001	60088451	1.83	4.25	3.02

Sources: Censuses of Pakistan 1951, 1961, 1972 and 1981.

Table 3.III.2

POPULATION OF CITIES IN ORDER OF POPULATION SIZE (In Thousands)

City	1961	1972	Per Cent Increase 1961-72
Karachi	1913	3469	81.3
Lahore	1296	2148	65.7
Lyallpur	428	820	92.7
Hyderabad	435	624	43.4
Rawalpindi	340	615	80.9
Multan	358	544	52.0
Gujranwala	196	366	86.7
Peshawar	219	273	24.7
Sialkot	164	212	26.9
Sargodha	129	203	57.4
Sukkur	103	159	54.4
Quetta	107	156	45.8
Jhang	95	136	43.2
Bahawalpur	84	134	59.5
Sahiwal	75	115	53.3
Mardan	78	109	39.7
Wah Cantonment	37	109	194.6
Kasur	75	103	37.3
Gujrat	60	100	66.7
Islamabad	-	77	-

Note: 1981 Census figures were not available at the time of this analysis.

Source: Census of Pakistan 1972, Bulletin 1.

3.III.4 Distribution of Respondents, Mean Number of Children Ever Born and Mean Age at Marriage, by Urban-Rural Areas

The percentage distributions of ever married women by mean number of children ever born and mean age at marriage are given in Table 3.III.3. The statistics from HED and PF Surveys suggest that the fertility in the urban areas of the country is slightly higher than in rural areas. Moreover, the mean age at marriage in both areas is almost the same and rising over time. The overall mean age at marriage for urban and rural areas, however, was found to be 16.5 and 16.4 years respectively.

Table 3.III.3

Distribution of Ever Married Women (Per Cent), Mean Number of Children Ever Born and Mean Age at Marriage by Urban-Rural Areas

Age Group	Mean No. of CEB (HED 1973)		Mean No. of CEB (PFS 1975)*		Mean Age at Marriage PFS 1975)*	
	Urban	Rural	Urban	Rural	Urban	Rural
15 - 19	0.514 (22)	0.420 (19)	0.634	0.602	-	-
20 - 24	1.560 (17)	1.354 (16)	1.923	1.900	-	-
25 - 29	2.988 (16)	2.653 (17)	3.488	3.326	17.1	16.9
30 - 34	4.418 (13)	3.863 (14)	5.382	4.815	16.8	16.5
35 - 39	5.568 (13)	4.783 (13)	5.433	5.979	16.4	16.2
40 - 44	6.313 (10)	5.458 (11)	6.995	6.979	15.7	15.7
45 - 49	6.890 (7)	5.914 (10)	6.933	6.844	16.2	16.2

( ) = Percentage of ever married women.

* = Population Planning Council, 1976.

Source: HED Survey 1973.

3.III.5 Mortality Estimates by Urban-Rural Areas

The mortality estimates for urban-rural areas of Pakistan and her provinces are shown in Table 3.III.4. These estimates suggest that the mortality in all rural areas of the provinces and the whole country is higher than for respective urban areas. The observed variation in urban-rural areas of the country is around 14 per cent, while in the provinces the variation ranged from 4 to 29 per cent.

Table 3.III.4

Mortality Estimates* by Urban-Rural Areas of Pakistan and Provinces

Region	Mortality Levels Derived from q(x) Estimates						Median Level		q(5) Estimates as Suggested by Median Level	
	Urban			Rural						
	q(2)	q(3)	q(5)	q(2)	q(3)	q(5)	Urban	Rural	Urban	Rural
Pakistan	14.43	15.16	15.29	13.58	14.13	14.38	15.16	14.13	.1449	.1656
Punjab	13.34	14.75	14.89	12.73	13.74	13.95	14.75	13.74	.1632	.1742
Sind	16.01	15.83	16.05	15.84	15.55	15.74	16.01	15.74	.1284	.1336
NWFP	12.84	15.05	14.93	13.54	14.30	15.03	14.93	14.30	.1466	.1581
Baluchistan	15.40	13.73	15.57	13.43	12.88	13.45	15.40	13.43	.1402	.1814

* Estimates are for both sexes combined and are based on West family of life tables (Coale and Demeny, 1966), assuming a sex ratio of 1.05.

Source: HED Survey 1973.

The mortality variation between the urban-rural areas is sometimes due to poor reporting in rural areas, different pattern of childbearing, difference in age at marriage and family formation. If the rural population is suspected of under-reporting of deaths, then the observed differential between the two areas will become more significant. The mean number of children ever born as shown by the HED and PFS data in Table 3.III.3 suggests that the parity of women in the urban areas is marginally higher than for rural women. This situation indicates that the observed differential is not due to a different pattern of fertility. The age at marriage in urban and rural areas was found to be almost equal (urban - 16.5 and rural - 16.4 years). Moreover, the data of the PFS suggest that 43.5 and 38.2 per cent of urban and rural women had a first birth interval of less than two years. Similarly 72.4 and 68.9 per cent of urban and rural women had a first birth interval of 4 years. This suggests a tendency among rural women to spend a longer time on average between marriage and first birth. There is a possibility that this pattern of fertility may be due to sub-sterility and a higher pregnancy wastage in rural than urban areas (Sattar, 1979).

According to the 1981 census (preliminary figures) the urban population by province was found to be 27.5, 43.4, 15.2 and 15.6 per cent in the Punjab, Sind, NWFP and Baluchistan respectively. These statistics reveal that Sind is the most urbanized province of the country.

Comparing the mortality with the level of urbanization in Pakistan, it is obvious that these variables have an inverse association with each other.

3.III.6 Factors Influencing the Mortality Situation in Urban and Rural Areas

The inverse association of mortality with urbanization is usually attributed to the concentration of health services in cities and large towns, and easier accessibility to them; lack of communication and costly transportation in rural areas (UN 1954, p.115; Ruzicka, 1980); and availability of safe drinking water and adequate sewage facilities in urban areas (UN, 1971, p.115). But urbanization in developing countries is also the reason for the poor health of the population due to congestion, unhygienic living conditions, pollution, traffic hazards and so forth. In these circumstances, it is plausible to believe that better health measures and the socio-economic and environmental state

play an important role in the urban-rural mortality variation. In the following section the influence of some of the factors for which data are available on urban-rural mortality variation will be taken into consideration.

3.III.6.1 Health Standard

The accessibility of health care facilities can be measured in terms of distance. Statistics in Table 3.III.5 suggest that in 1978, fifty per cent of the country's population was within two miles distance of the outlets of the modern health services of public and semi-public sectors. Moreover, the estimates suggest that almost 100 per cent of the urban population was within 2 miles distance of the health care facilities, while the proportion of rural population within the same range was only 32 per cent. About 21 per cent of the rural population had no access to any health facilities within two miles and five miles radius of public and semi-public institutions. This situation suggests that the scale on which health services are available for the population of rural areas is comparatively poorer than for urban areas, even if allowance is made for the fact that many hospitals and other health institutions located in urban areas may also serve people living in rural areas. There are also imbalances between preventive and curative measures; general health services, doctors and other para-medical personnel.

Table 3.III.5

Per Cent of Population Falling Within 2 and 5 Miles Radius of Public and Semi-Public Health Institutions 1977-78

Region	Per Cent of Population on 2-Miles Radius			Per Cent of Population on 5-Miles Radius		
	Urban	Rural	Total	Urban	Rural	Total
Pakistan	99.78	32.10	50.29	99.89	78.61	84.34
Punjab	99.58	32.14	49.17	99.73	82.41	88.73
Sind	100.00	24.20	55.50	100.00	69.50	82.10
NWFP	100.00	41.20	49.40	100.00	88.40	90.00
Baluchistan	100.00	28.70	40.46	100.00	28.70	40.46

Source: Planning Commission, 1978.

Statistics based on official sources suggest that during 1977-78, on average, there was one doctor available for every 2500 population in major urban centres, and this ratio also fluctuated between urban centres (for example, the population to practitioner ratio in Quetta, Lahore, Multan and Karachi was 1090, 1367, 1388 and 1439 respectively) (Finance Division 1980a). A similar variation has also been observed in rural areas of the country. In the high density rural areas, one physician served a population of five to ten thousand persons, while in less populated rural areas, the population to doctor ratio was between 15,000 and 20,000 (Finance Division, 1980a). Despite the rural oriented population of the country, most of the hospitals, maternity and child-care clinics are located in urban areas. These medical facilities are not easily accessible to the rural population in general and the people living in far-flung areas in particular, due to poor and costly transportation systems.

The women in rural areas receive no skilled attention at childbirth. The babies are born in an unhygienic environment, and it is a miracle that so many of them do not die. The lack of medical attention in the villages when the people are affected by other diseases is almost equally shocking. In 1971-72, about seventy-four per cent of hospitals, eighty-two per cent of hospital beds and ninety five per cent of the tuberculosis clinics were situated in the urban areas for catering for the medical needs of twenty-five per cent of the country's population (Health and Social Welfare Division, 1974, p.40).

Homoeopaths and hakeems are the practitioners other than qualified doctors associated with the medical profession. Their method of treatment is based on indigenous herbs. They were not popular as health healers in the past, but recently they have gained substantial ground and have been recognized by the government as professionally qualified people. Their schooling is usually below the secondary level and they gain their knowledge of diseases and prescription through self study of books. The available statistics indicate that 63 per cent of registered and 55 per cent of enlisted homœopaths are found to be practising in the urban areas of the country (Finance Division, 1980a). The distribution of hakeems by urban-rural areas is, however, unknown.

Because of the greater poverty in the villages, poor communication and lack of trained personnel, it is extremely difficult to narrow the gap in terms of medical facilities between twenty-five per cent urban

and seventy-five per cent rural population. The rural areas cannot attract the trained technical personnel to man the medical and health services due to the almost impossible conditions under which most of the people in the rural areas have to live. Therefore the burden of running the rural based health-care centres falls on the shoulders of those who are not professionally up to the mark. These people are usually dressers or dispensers who work as fully fledged practitioners. They have attended some basic courses of medical education and their main qualification is the experience which they have gained in the same hospital or in privately owned clinics in cities. Therefore the services provided in these medical institutions are sub-standard and of a limited nature.

The supply of medicines in the remote rural located hospitals are very difficult to maintain due to poor means of communication. Usually these centres are short of supplies of medicines for months. The available medical equipment is also out-dated and sometimes very difficult to maintain and operate properly. Moreover, the establishments related to medical care are not accessible to a major proportion of population, and the people have to travel long distances before being treated.

3.III.6.2 Literacy and Education

Education is an essential element of the development and enlightenment of the society. But like the provision of medical facilities, education is also very expensive and cannot be evenly provided to all sections of the population. As in other developing societies, literacy in the urban segment of the population in Pakistan is higher than in rural areas. According to the HED Survey, 31 per cent of the urban population was literate, while in rural areas the proportion of literates was less than 5 per cent (Table 3.III.6). The proportion of highly educated population in rural areas was negligible.

Estimates based on the PFS 1975 suggest that 95 per cent of the rural respondents had no formal education against 74 per cent of the urban sample. The proportion of women who had 'below primary', 'primary and secondary' levels of education in rural areas was 4 and 1 per cent respectively, while women having the same level of education in urban areas was 14 and 13 per cent respectively (Population Planning Council, 1976, p.82).

Table 3.III.6

Per Cent of Literates (10 Years and Above)
By Educational Level and By Urban-Rural Areas 1973

Educational Level	Urban	Rural
Illiterate	68.5	95.5
Below Primary	5.8	1.5
Primary and Middle	17.3	3.1
Matric and Intermediate	7.4	1.1
Degree and Above	1.0	.03
Total	100	101.23*

* Due to rounding, the total does not add to 100.

Source: HED Survey 1973.

Statistics on the number of schools by urban-rural areas for Pakistan are not available, but like other developing countries, the institutions of higher learning are mostly located in the urban areas of the country. The rural areas have only primary and secondary schooling facilities, which are again inferior to the urban based institutions in fulfilling the aspiration of learning. The educational facilities of the urban areas are only available to a few rich people in rural areas due to the high cost involved in lodging and boarding in urban areas.

The observed difference in literacy between urban and rural areas in Pakistan can be attributed to uneven distribution of educational facilities at all levels, a lesser desire and willingness among the rural parents to send their children to cities for higher education due to financial constraints and the migration of literates to urban areas for employment and higher education (Khan and Bilqees, 1976).

3.III.6.3 Nutrition and Income

The dietary habits among the urban and rural populations in Pakistan have been found different from one another. This situation is comparable with the other countries of the world. For example, it has been noticed that in several countries of the Mediterranean region, more meat and fish is consumed in urban than rural areas (Johnson,1964, p.307). These dietary variations are responsible for the nutritional levels of the population of the two areas. The difference in consumption

may be the result of income variation and also the availability of particular food items.

Table 3.III.7 indicates the consumption of selected food items in urban and rural areas. The statistics in the table suggest that the people in urban areas consume more fish, meat, sugar, potatoes, fats and oils than their counterparts in the rural areas.

Table 3.III.7

Monthly Per Capita Consumption of Selected Food Items by Urban-Rural Areas; 1963-64

Food Item	In Seers	
	Urban	Rural
Rice and Wheat	12.65	16.07
Wheat	11.30	14.61
Rice	1.35	1.46
Sugar	0.98	0.67
Pulse	0.76	0.74
Potatoes	0.54	0.22
Meat	0.73	0.41
Fish	0.16	-
Milk	3.31	4.16
Fats and Oils	0.53	0.36
Tea	0.11	0.06
Total	19.77	22.69

Note: One Seer = .94 kilograms (approximately).

Source: Statistics Division, 1965.

The calorie intake distribution by urban-rural areas in Table 3.III.8 suggests that the people extract most of their daily calorie requirement from cereals. However, the proportion of cereal based calories in the rural areas is higher than in urban areas.

Table 3.III.9 indicates that the calorie intake of populations in urban and rural areas increases with the rise of income level. The dependency for daily per capita calorie intake on cereals also decreases;

Table 3.III.8

Calorie Intake and Per Cent Gained From Cereals by Urban-Rural Areas

Period	Urban		Rural	
	Calorie Intake	Per Cent From Cereals	Calorie Intake	Per Cent From Cereals
1963 - 64	1731	86	1988	90
1968 - 69	1713	83	1974	87
1969 - 70	1707	83	1983	85
1970 - 71	1734	85	1950	88
1971 - 72	1702	84	1898	86

Source: Statistics Division, 1965,1970,1971,1972, 1973.

Table 3.III.9

Daily Per Capita Calorie Intake by Income and by Urban-Rural Areas

Monthly Income (Rupees)	Urban		Rural	
	Calorie Intake	Per Cent From Cereals	Calorie Intake	Per Cent From Cereals
300	1625	85	1730	86
750	1687	81	1909	83
1650	1744	72	2107	80
2000+	2179	63	2527	80

Source: Statistics Division,1973.

but more significantly in urban than rural areas. This pattern of consumption suggests that the urban strata of population have a wider range of food available in shops and markets and their food is more

balanced qualitatively than the rural population's. However, the percentage consumption of calories/proteins by urban-rural population is not available.

3.III.6.4 Housing and Other Physical Conditions

The availability of water supply and excreta disposal facilities in Pakistan and some other developing countries as shown in Table 3.III.10 suggests that the rural areas in respect of these facilities are the most neglected. Water which is one of the basic items for survival is not available to both populations uniformly. Moreover, the excreta disposal arrangements, which is the cause of many diseases, is inadequately available in the rural areas. A similar situation prevails in most of the Latin American countries (Johnson, 1964, p.306).

Table 3.III.10

Per Cent of Population by Urban-Rural Areas Who Have Access to Water Supply and Excreta Disposal in Some Selected Countries

Country	Water Supply		Excreta Disposal	
	Urban	Rural	Urban	Rural
Iraq	100	11	25	1
Turkey	74	64	13	5
Malaysia	100	6	100	43
Philippines	82	31	76	44
Tanzania	59	36	100	4
India	80	18	27	2
Pakistan	75	5	21	-

Note: - Indicates none

Source: Rukanuddin, 1981, p.20.

The HED Survey collected information on housing conditions and other available information in urban and rural areas, and the findings are shown in Table 3.III.11. The statistics show that most of the houses in rural areas are kutcha built (Appendix 8) and have negligible facilities of piped water supply. More than eighty per cent of houses in the rural areas have no bath and latrine facilities, and a small proportion had

Table 3.III.11

Per Cent Distribution of Housing Units With Facilities by Urban-Rural Areas

Housing Condition	Urban	Rural
a. Housing Structure**		
Pucca	32.0	1.1
Semi-Pucca	43.0	22.3
Kutcha	25.0	76.6
b. Portable Water		
Piped	54.7	0.7
Hand Pump	33.1	44.9
Wells and Other	12.2	54.4
c. Latrine		
Inside	75.0	12.8
Outside	8.0	4.2
None	17.0	83.0
d. Bath		
Independent	45.6	13.3
Sharing	3.9	1.5
None	50.5	85.2
e. Lighting		
Electricity	54.6	4.9
Kerosene Oil	45.4	95.1
f. Habitation Density*	6.0	6.3

* H.D. = Number of persons per room

** See Appendix 8.

Source: HED Survey 1973

electricity supply in their houses. The habitation density is also higher in rural areas.

The analysis in this section of the study suggested that urban-rural differentials in mortality exist in Pakistan. An attempt has been made to discuss and associate the observed mortality variation in urban-rural areas in terms of the availability of health care services, literacy and education, nutrition and income, housing and other physical conditions in very loose terms. The evidence suggests that in all these services,

the rural population is poorly served as compared to the urban population of the country. However, the individual influence of all these factors is very complicated and difficult to investigate. Some of the factors discussed in this section of the study can be associated with the observed differentials, but again due to lack of information required for such types of study, it is not possible to conclude that these are the determinants of urban-rural mortality differentials in Pakistan.

SECTION IV

Mortality Differentials by Socio-Economic Status

3.IV.1 Introduction

In this section the influence of socio-economic factors on mortality has been investigated. The children have no socio-economic status of their own, and their well-being is entirely looked after by their parents. Therefore, the mortality among the children is indirectly influenced by the socio-economic status of their parents.

The socio-economic status in the analysis of mortality usually refers to different groups of population with respect to level of education, income, employment, occupation and so on. But all of these characteristics are inter-dependent, therefore, their analysis is a complicated task (Johnson, 1979). Kitagawa and Hauser, however, suggested that the level of education is the most reliable indicator of the several indices of socio-economic status (1973, p.6).

From the HED survey data, the respondents can be categorised by employment status and by level of education. The employment status further consists of 'employed' (civilian labour force) and 'other than employed' (unemployed and those not in the civilian labour force) groups of women. The statistics from the HED survey 1973 suggest that only 5 per cent of the women in the age group 15-49 responded as 'employed', while 95 per cent were classified in the 'other than employed' category. Furthermore, the classification of women by employment status is very vague and misleading. According to the definition of labour force adopted for the HED survey:
"All persons aged ten completed years or over, who work, or are looking for work, for profits, wages or salary, or who help any member of the family in agriculture, trade or profession". This definition includes unpaid family helpers in the labour force, but excludes housewives.

Keeping in view the low proportion of employment among females and the definitional problem, the analysis of mortality variation by employment status of women has been excluded from this study. In this section, therefore, the level of education of mothers will be considered as the socio-economic status of women.

3.IV.2 Education of Mother

Education plays a vital role in the mortality and morbidity condition of a population. Mortality in early childhood and particularly in infancy has been found one of the most sensitive indices of the social and economic level of the population (UN, 1954, p.13). The causes of mortality are usually associated with the general living conditions like proper care of the baby, correct feeding and the sanitary situation within the household. The provision of these factors depends upon the ability of the population and also upon the families being able to take advantage of the available facilities through intelligent planning.

Apart from being a proxy for the general social status of the family, the women's level of education is also an indicator of a change in the traditional balance of familial relationships through which the child care is mediated. It has been recognized that 'the institution of free and universal compulsory schooling, resulting in the mass literacy, and the inclusion of lessons in personal hygiene in the school curriculum have created a far greater awareness of health matters among the population, encouraging the application of basic good health practices and leading to early recognition of and treatment of disease' (UN, 1973). In a study on health care of children in Newcastle, in respect of the capacity of mothers it was observed, 'if she failed her children suffer, if she coped with life skilfully and pluckily she was a safeguard of their health; and a family with a good mother can withstand a feckless or even vicious father, but rarely can a family survive if the mother fails' (Spencer, et al, 1954).

In Third World countries, education enhances the skills, knowledge and ability to deal with new ideas and acts as a carrier for different cultures. Educated mothers in these countries are less 'fatalistic' about illness, able to manage the feeding and child-care in a better way without imposing significant extra cost on the household, are more aware of the use of available medical facilities (Caldwell, 1979).

They are more aware of the roles they have to play in their life ahead - marital, occupational and parental - and are expected to bring up their children with scheduled meal times and bed times, unlike those who have not got the experience of school life (Masemann, 1974, p.483). The mother is the immediate shield for protection after birth, who takes care and looks after the child. Apart from the basic importance of the natural instinct of the mother to love and protect her child (UN, 1954, p.22), the educated mother is supposed to provide a more healthy environment for the growth of a child than the illiterate mother.

Estimates based on the World Fertility Survey data for ten developing countries, have suggested that the probability of dying between birth and age two years decreases with the increase in the level of maternal education (Caldwell and McDonald, 1981). The census and survey data for Indonesia suggest that the proportion of deceased children to mothers with no schooling was much higher than the children whose mothers had primary and secondary levels of schooling (Sunaryo, 1978). The estimates based on the greater Bombay Survey 1966 show that the infant mortality was double and three times higher among the children of illiterate mothers than the children whose mothers had elementary and beyond elementary level of education (Ruzicka and Kanitkar, 1972). This relationship was also supported by the data of the special survey for India 1978 (Director General, 1979). The inverse association of childhood mortality with the maternal education has also been observed in the population of African countries (Gaisie, 1969; Harrington, 1973; Caldwell, 1979). For Pakistan, the infant mortality among the children of mothers having 'none', 'incomplete primary', 'completed primary and above' level of education was found to be 142, 122 and 100 respectively (Arriaga and Hobbs, 1980).

3.IV.3 Statistics on CEB by Mother's Education

The available evidence as discussed in the last section suggests that the level of maternal education has a direct and independent impact on the mortality of children. As has been mentioned in Chapter 1, the literacy rate for the country in general and among females in particular is very low. According to the 1972 census, the literacy rate in the country was 22 per cent of all the population (10 years and above), 30 per cent of all male population (10 years and above) and 12 per cent of all female population (10 years and above).

The estimates based on the HED survey suggest that 87 per cent of the women had no schooling, while the proportion in the 'Below Matric' and 'Matric and above' categories was 8 and 5 per cent respectively. There is also a group of women who had 'specialized' educational levels.

Table 3.IV.1

Distribution of Women, Mean Number of Children and Children Ever Born by Educational Level-Pakistan

Age Group	Illiterate		Below Matric		Matric and Above	
	Number of Women	CEB	Number of Women	CEB	Number of Women	CEB
15 - 19	1838377 (0.15)	272814	388548 (0.06)	21389	163526 (0.03)	4660
20 - 24	1677451 (1.10)	1846673	174893 (0.88)	154352	158321 (0.50)	79263
25 - 29	1814379 (2.55)	4634363	143118 (2.53)	362442	86481 (1.62)	140050
30 - 34	1575336 (3.77)	5944756	100191 (3.99)	400259	51433 (2.73)	140597
35 - 39	1469053 (4.73)	6955585	88444 (5.11)	452115	32520 (3.88)	126150
40 - 44	1265528 (5.21)	6598171	57204 (5.68)	325055	24980 (4.29)	107052
45 - 49	1092439 (5.58)	6090987	43245 (6.08)	263002	13065 (4.88)	63716

( ) indicate mean number of children ever born.

Source: HED survey 1973.

But this group constituted only 0.2 per cent of the respondents, therefore they have been excluded from the analysis. Statistics in Table 3.IV.1 suggest that the parity of women in 'below matric' educational group is higher than the rest of the two groups.

3.IV.4 Mortality Estimates by Education of Mothers

Mortality estimates by educational groups of women in Table 3.IV.2 suggest that in most cases the mortality among the children of educated mothers is lower than their counterpart in the illiterate

TABLE 3.IV.2

Mortality Estimates** by Region and by Educational Level of Mothers

Region/ Educational Level	Mortality Levels Based On			Median Level	q(5) values as Suggested by Median Level
	q(2)	q(3)	q(5)		
Pakistan					
Illiterate	15.65	14.20	14.43	14.20	.1642
Below Matric	15.61	16.81	16.84	16.81	.1135
Matric and Above	15.20	17.10	17.87	17.10	.1082
Punjab					
Illiterate	12.68	13.78	13.98	13.78	.1733
Below Matric	15.03	16.07	16.95	16.07	.1272
Matric and Above	15.37	16.65	16.65	16.65	.1165
Sind					
Illiterate	15.79	15.55	15.72	15.72	.1339
Below Matric	16.87	17.31	17.31	17.31	.1045
Matric and Above	16.81	18.64	18.84	18.64	.0815
NWFP					
Illiterate	13.41	14.44	14.95	14.44	.1593
Below Matric	16.41	15.77	17.22	16.41	.1209
Matric and Above	11.43	13.33	18.70	13.33	.1836
Baluchistan					
Illiterate	13.72	12.91	13.67	13.67	.1758
Below Matric	16.33	18.29	18.83	18.29	.0875
Matric and Above*					

* No. of cases are very small

** Estimates are based on the West family of life tables (Coale and Demeny, 1966) for both sexes, assuming a sex ratio of 1.05.

Source: HED Survey 1973

group. The estimates further indicate that with some exceptions, the survival of children increases with the rise in the level of mother's education. At national level the difference in mortality between the 'illiterate, and matric and above' and 'illiterate, and below matric' level was found to be around 34 and 20 per cent respectively. The deviation observed in the NWFP in 'matric and above' group may be due to small number of cases involved.

The mortality differentials in sub-samples are sometimes related to the difference in fertility. Although the parity data in Table 3.IV.1 suggest that the mean number of children ever born to women of age 20-34 years in higher educational group is lower than the women in 'illiterate' group, it is unlikely that the observed mortality variation by mother's education may be due to their fertility behaviour.

3.IV.4.1 Mortality Estimates by Educational Level and Place of Residence

Mortality estimates by educational level and place of residence (urban-rural) of mother in Table 3.IV.3 suggest that the mortality of children in urban-rural areas is inversely associated with the educational attainment of mothers. However, this association does not hold true for the 'matric and above' category of women in the rural areas due to the small number of cases.

Besides education, other factors like health facilities, hygienic environment etc., which are relatively more easily available in urban than in rural areas may also be the determinants of the observed differentials in mortality.

In this study, it has been established that the maternal education has an inverse relationship with the mortality of their children.

TABLE 3.IV.3

Mortality Estimates* by Urban-Rural Areas and by Educational Level of Mothers

Educational Level	Mortality Levels Based on q(x) values						Median Level of Mortality		q(5) Estimates as Suggested by the Median Level	
	Urban			Rural						
	q(2)	q(3)	q(5)	q(2)	q(3)	q(5)	Urban	Rural	Urban	Rural
Illiterate	13.82	14.64	14.77	13.60	14.07	14.33	14.64	14.07	.1553	.1669
Below Matric	16.32	16.74	16.87	14.79	17.05	16.05	16.74	16.05	.1148	.1276
Matric and Above	16.97	18.35	19.20	11.96	14.37	14.79	18.35	14.37**	.0864	.1607**

* Estimates are based on West model life tables (Coale and Demeny, 1966), and are for both sexes combined, assuming a sex ratio of 1.05.

** Estimates are based on 2 per cent of respondents.

Source: HED Survey 1973

CHAPTER 4

SUMMARY, CONCLUSIONS AND SUGGESTIONS

4.1 Summary

This study was based on the data collected in the 'Housing, Economic and Demographic Survey 1973', which was conducted as a part of the 1972 Population Census. The objective of this thesis was to obtain reliable mortality levels for the national population of the country, as well as infant and childhood mortality estimates, and to probe the variation in mortality by sex of the children; provincial, urban-rural places of residence and socio-economic status of mothers. For this investigation data from the published tabulations were utilised as the data tape of the survey was not accessible. The survey questionnaire did not seek any direct information on mortality. Therefore the estimates are based on data of children ever born and still living to all women in the conventional five-year age groups. These estimates refer to different points in time in the past from the survey. The West family of life tables were used, wherever required.

With the exception of q(1) and q(2) (estimates based on children of women in the age groups 15-19 and 20-24), all other q(x) values (for x = 3, 5, 10, 15, 20) suggested a consistent mortality level. These estimates are based on the mortality experience of children in different cohorts of women ranging from 15-19 to 45-49, therefore all of them cannot be accepted as reliable or rejected as unreliable. But as one of the objectives of this study was to suggest rate for infants and childhood mortality for the survey period, the estimates which refer to the remote past lose their significance. Although the q(x) estimates with the exception of q(1) and q(2) are not much different from one another, for this study the level suggested by q(5) is considered as the mortality level prevailing in the population of Pakistan during the late 1960s. The suggested mortality level for the late sixties in this study was 14.7 for both sexes combined assuming the West model life table for the population under study. The implied infant mortality was found to be 107 per thousand live births and the expectation of life at birth was 52.5 years. The indicated childhood mortality '$_4q_1$' was 54 per thousand, on the other hand the mortality estimates derived from PFS data are high

and the level as suggested by q(5) value was found to be 12.3 (Appendix 7). Similarly the infant mortality suggested by the pregnancy method for 1965-73 period ranges from 136-146 per thousand live births (Booth and Alam, 1980). This comparison suggests that the estimates of this study are at the lower side of the actual mortality situation.

To investigate the influence of other indirect methods and the North, South, East and West patterns, the mortality estimates were also derived by Brass and Sullivan methods from the HED data. It was noted that indirect methods of mortality estimation and various mortality patterns have little effect on mortality estimates of HED data.

The differential part of this investigation consisted of four sections, dealing with the mortality variation by sex; province; urban-rural; and socio-economic status of mothers. For this purpose (variation in mortality), q(5) estimates suggested by the median level derived from q(2), q(3) and q(5) values have been used as the indicators of mortality differentials for these groups of population.

Studies on sex differentials for Pakistan indicate a mixed pattern. The estimates based on the data collected up to the mid-sixties suggest that the female children are exposed to death more than their male counterparts (Rukanuddin, 1967; Bean, et al, 1968; Yusuf, 1967; Aslam, et al, 1967), but the data pertaining to the early seventies in most cases show the reverse pattern (Booth and Alam, 1980; Statistics Division, 1981; Yusuf, 1981). An investigation related to childhood mortality for early 1970 in Bangladesh revealed that the male children (under the age of 5 years) have higher mortality than the female children (Mitra, 1979, p. 62; Census Commission, 1977). In India, the estimates suggested by the Census Actuaries show that the infant mortality rates for males and females were 191, 153, 135 and 175, 138, 130 respectively for 1941-51, 1951-61 and 1961-71. The estimates based on data schemes for 1976, 1977 and 1978 however, indicate higher infant mortality among females than males. (Dutta, 1980, p. 2). From these observations, it appears that the higher male mortality till 1971 in India was reversed into higher female mortality afterwards. In Afghanistan, the survey data for 1972-74 suggest higher survival among male than female children under the age of five years (Trussell and Brown, 1979, p. 140). The findings of this study show that in Pakistan, its urban-rural areas, provinces and various educational groups of population,

the male children are subjected to death more than the female children. This pattern of mortality by sex supports the reversal of mortality pattern suggested by the estimates based on the data of Pakistan Fertility Survey and Population Growth Surveys.

The differential by province suggests that mortality in Baluchistan is the highest, while in Sind, it is the lowest. The difference in mortality between the Sind and Baluchistan provinces was found to be around 25 per cent. However, the higher mortality in the Punjab than NWFP, as observed in this study is not according to expectation, because the Punjab has a higher level of urbanisation and literacy and is considered economically better off than the NWFP.

The observed differentials in mortality between the provinces of Pakistan can be explained in terms of socio-economic disparities among the provinces. For example, more than forty per cent of Sind population lives in urban areas and the majority of them are in metropolitan cities of Karachi, Hyderabad and Sukkur, while the urban population of Baluchistan is approximately sixteen per cent, the literacy rate in Sind was 30, while in Baluchistan it was only twelve per cent. The population per medical facility is also higher in Baluchistan than Sind. The physical conditions of the houses in Sind are much better than Baluchistan. Moreover, due to lower population density and the nomadic nature of the population, the available facilities are under-utilised in Baluchistan.

The findings of this study suggest that the mortality in the rural areas of the country and provinces is consistently higher than in the respective urban areas. The variation between the urban and rural areas of the country was around fourteen per cent. This finding suggests that urbanisation and mortality in the population under study are inversely associated with each other. A similar relationship between urbanisation and mortality also exists in India and Bangladesh. The estimates based on data collected in sample registration schemes during 1970-78 suggest infant mortality rates of 70-90 and 136-150 for the urban and rural areas of India (India, Office of the Registrar General). Mitra (1978) also found consistently higher rural than urban mortality for Bangladesh during the early part of the 1970s. The lower mortality in the urban areas of Pakistan can be attributed to relatively better medical and health care facilities, better socio-economic conditions and a safe

drinking water supply to these areas.

The mortality differentials by educational level indicate that with the rise in education of mothers, the mortality among their children decreases. The observed variation between 'illiterate and below matric' and 'illiterate and matric and above' groups of women was found to be twenty and thirty four per cent respectively. This relationship is found in the urban areas of the country and all provinces. However, the observed pattern is not followed in the rural areas. The deviation in the rural areas may be due to the small size of sub-samples. The estimates based on the Pakistan Fertility Survey data show that mortality among children aged 0-4 years of mothers with no schooling was fourteen and thirty per cent higher than those whose mothers had 'incomplete' and 'completed primary and above' levels of education (Arriaga and Hobbs, 1980). The Bangladesh Fertility Survey revealed that the childhood mortality (under the age of five years) among the children of 'illiterate' and 'literate' groups of mothers ranges from 215-251 and 160-201 respectively (Mitra, 1978, p. 87). In another study related to the early 1970s, it was observed that in Bangladesh the infant mortality decreases with the rise in education of mothers (Arriaga and Hobbs, 1980).

4.2 Conclusion

The mortality levels based on q(2), q(3) and q(5) in this study suggest that the mortality in Pakistan had been increasing during the 1967-71 period. But this is unlikely, as improvement in the socio-economic conditions, health care facilities and other factors which could affect the mortality and morbidity situation is taking place in the country. It has been observed that the countries which had high infant mortality in the early sixties have had a slow decline during the whole decade of 1960-70, and during this period the annual rate of change of infant mortality was less than one per cent (Arriaga and Hobbs, 1980). Under these circumstances, it is plausible to conclude that the observed decline in mortality till the mid of 1960s had reached the state of stagnation by the early seventies.

The suggested mortality level (based on q(5)) for both the sexes combined in this study is 14.6, which refers to life expectancy at birth as 52.5 years; infant '$_1q_0$' and childhood '$_4q_0$' mortality is 107 and 54 respectively. These estimates refer to the 1967 period and it should be noted that because of data deficiencies they are undoubtedly low.

The groups of women whose children face higher mortality than average have also been identified. These are the women living in rural areas, Baluchistan province and the uneducated women. The evidence available in this study suggests that the socio-economic status of these groups of population is very low and the environment surrounding them is deplorable. Moreover, these are categories of population which constitute a major portion of the female population.

4.3 Suggestions

The findings of this study suggest that:

a) The existing public health programmes have proved inadequate in improving the health conditions of the population of the country in general, and in the rural areas and the province of Baluchistan in particular. In these areas the need for health care services seem to be greater than in urban areas and other provinces of the country.

b) The infant and childhood mortality estimates are a good indicator of socio-economic status of a society in terms of its standard of living. The population of rural areas and Baluchistan province and especially the females are the disadvantaged groups. The reduction in mortality rates in these regions might be achieved through improved socio-economic conditions as well as improved medical facilities.

c) The higher infant and childhood mortality level also represents higher fertility (Khan, 1973; CICRED, 1975; McGreevy, 1974; Rukanuddin, 1975; Afzal et al, 1976). This association suggests that the replacement of deceased children is a determinant of higher fertility, which adversely affects the performance of the family planning programmes in the country. Therefore, the reduction in infant and childhood mortality is an essential pre-condition for the success of the family planning programme in Pakistan.

BIBLIOGRAPHY

ADLAKHA, A. and KIRK, D. 1974. "Vital Rates in India 1961-71 Estimated from 1971 Census Data", Population Studies, Vol.28, No.3.

AFZAL, Mohammad. 1974. The Population of Pakistan. Pakistan Institute of Development Economics, Islamabad.

AFZAL, Mohammad, KHAN, Zubeda, CHAUDHRY, Naseer A. 1976. "Age at Marriage, Fertility and Infant - Child Mortality in a Lahore Suburb", The Pakistan Development Review, Vol. XV(2), Islamabad.

AHMAD, A.S.M. Mohiuddin. 1962. "The Population of Pakistan: Past and Present", Unpublished Ph.D. Dissertation, Department of Economics, Duke University, Durham.

ALAUDIN, Talat. 1975. "Mass Poverty in Pakistan", The Pakistan Development Review, No.4, pp. 431-45.

AMBANNAVAR, Jaipal P. 1975. Second India Studies Population. The Macmillan Company of India Limited, Delhi.

ARRIAGA, Eduardo E, HOBBS, Frank. 1980. "Infant Mortality Differentials in Selected East and South Asian Countries", WHO/ESCAP Meeting on Mortality in Asia: A Review of Changing Trends and Patterns 1950-1975, Manila.

ARRIAGA, Eduardo E. 1980. Direct Estimates of Infant Mortality Differentials from Birth Histories. World Fertility Survey Conference, Paper No. 6.1, London.

ASLAM, M., HASHMI, S.S. and SELTZER, W. 1967. "Abridged Life Tables of Pakistan and Provinces by Sex, 1962", The Pakistan Development Review, Vol. VII, No. 1, pp.66-106.

BAILEY, William B. 1906. Modern Social Conditions. The Century Co., New York.

BEAN, L.L., KHAN, Masihur Rahma and RUKANUDDIN, A.R. 1968. Population Projections for Pakistan, 1960-2000. Pakistan Institute of Development Economics, Karachi.

BENJAMIN, B. 1964. "The Urban Background to Public Health Changes in England and Wales", Population Studies, No.17, Vol. XVII, pp. 225-48.

BLUNT, Sir Edward. 1946. Social Service in India. His Majesty's Stationery Office, London.

BOOTH, Heather and ALAM, Iqbal. 1980. Fertility in Pakistan: Levels, Trends and Differentials. World Fertility Survey Conference, 7-11 July, London.

BOURGEOIS-PICHAT, J. and PAN, C.L. 1956. "Trends and Determinants of Mortality in Under-Developed Areas", 1955 Annual Conference of the Milbank Memorial Fund, New York.

BRACKETT, J.W. and ASKERS, Donald S. 1965. Projections of the Population of Pakistan by Age and Sex: 1965-1986. U.S. Department of Commerce, Bureau of the Census.

BRASS, William and COALE, Ansley J. 1968. "Methods of Analysis and Estimation", in William Brass et al (ed). The Demography of Tropical Africa. Princeton University Press, Princeton.

BRASS, William. 1975. Methods for Estimating Fertility and Mortality from Limited and Defective Data. University of North Carolina.

BURKI, Shahid Javed. 1973. Population Bulletin of the Population Reference Bureau, Washington, D.C.

CALDWELL, J.C. 1978. "A Theory of Fertility: From High Plateau to Destabilization", Population and Development Review, No. 4, pp. 553-77.

CALDWELL, J.C. 1979. "Education as a Factor in Mortality Decline: An Examination of Nigerian Data", Population Studies, Vol.33 No. 3, pp. 395-413.

CALDWELL, J.C. and McDONALD, Peter. 1981 "Influence of Maternal Education on Infant and Childhood Mortality: Levels and Causes", in Contributed Papers, Manila Conference, December 1981, Manila. IUSSP.

CASSEN, R.H. 1978. India: Population Economy, Society. Unwin Brothers Ltd., London.

CASSEN, R.H. and DYSON, T. 1976. "New Population Projections for India", Population and Development Review, Vol. 2, No.1.

CENSUS COMMISSION 1977. Report on the 1974 Bangladesh Retrospective Survey of Fertility and Mortality. Statistics Division, Dacca.

CENSUS ORGANIZATION. 1973. Population Census of Pakistan, Census Bulletin-1 (Provisional Tables). Islamabad.

CHANDRASEKHAR, S. 1967. Asia's Population Problems. George Allen & Unwin Ltd., London.

CHANDRASEKHAR, S. 1967. "Infant Mortality in Madras City", in United Nations (ed.) Proceedings of the World Population Conference, Belgrade, pp. 406-9.

CICRED. 1975. "Seminar on Infant Mortality in Relation to the Level of Fertility", (held at Bangkok, 6-12 May, 1975). Paris.

COALE, A.J. and DEMENY, Paul. 1966. Regional Model Life Tables and Stable Populations, Princeton, Princeton University Press.

COALE, A.J. and DEMENY, Paul. 1967. Methods of Estimating Basic Demographic Measures from Incomplete Data. UN Manual IV, New York.

DALEY, Allen and BENJAMIN, B. 1964. "London as a Case Study", Population Studies, Vol. XVII, 1963-64. The Population Investigation Committee, London.

DAS, Dial. 1943. Vital Statistics of the Punjab, 1901-40. Board of Economic Inquiry of the Punjab, Lahore.

DAVIS, Kingsley. 1951. The Population of India and Pakistan. Princeton University, USA.

DAVIS, Kingsley. 1956. "The Amazing Decline of Mortality in Underdeveloped Areas", American Economic Review, Vol. XLVI, No. 2, pp.305-26.

DUTTA, M. 1980. "Trends and Differentials in Infant Mortality in India: 1950-1978", WHO/ESCAP Meeting on Mortality in Asia, A Review of Changing Trends and Patterns 1950-75, Manila.

FAROOQI, M.N. Iqbal and FAROOQ, G. Muntaz. 1971. Final Report of the Population Growth Estimation Experiment: 1962-65. Pakistan Institute of Development Economics, Dacca, Pakistan.

FAROOQI, Naseem Iqbal and ALAM, Iqbal 1974. "Provisional Abridged Life Tables for Urban and Rural Areas in Pakistan, Based on PGS 1968 and 1971", The Pakistan Development Review, Vol. XIII, No. 3, pp.335-52.

FINANCE DIVISION. 1980a. Pakistan Basic Facts 1978-79. Government of Pakistan, Islamabad.

FINANCE DIVISION. 1980b. Pakistan Economic Survey: 1979-80. Printing Corporation of Pakistan, Islamabad.

GAISIE, S.K. 1969. Dynamics of Population Growth in Ghana. Population Studies, No. 1, University of Ghana, Legon.

GAISIE, S.K. 1976. "Levels and Patterns of Infant and Child Mortality in Ghana", The Population Association of Africa, Nairobi, Kenya.

GLASS, D.V. 1964. "Some Indicators of Differences Between Urban and Rural Mortality in England and Wales and Scotland", Population Studies, Vol. XVII, 1963-64.

GRAUNT, John. 1939. Natural and Political Observations Made Upon the Bills of Mortality, London. Johns Hopkin University, USA.

HARRINGTON, J.A. 1971. "A Comparative Study of Infant and Childhood Survivorship in West Africa", Unpublished Ph.D. Dissertation, Department of Sociology, Cornell University.

HASHMI, Sultan S. 1965. The People of Karachi: Demographic Characteristics. Pakistan Institute of Development Economics, Karachi.

HEALTH AND SOCIAL WELFARE DIVISION. 1974. Annual Report of the Director of General Health: July 1972-June 1973. Islamabad.

HULL, Terrence H. and SUNARYO. 1978. Levels and Trends of Infant and Child Mortality in Indonesia. Yogyakarta. Population Institute, University of Gadjah, Mada.

INDIA, OFFICE OF THE REGISTRAR GENERAL. 1971. Infant Mortality in India. SRS Analytical Series, No.1, New Delhi.

ISHAQUE, S.M. 1977. "Survey as a Permanent Data Source of Pakistan's Vital Events", Issues in Demographic Data Collection in Pakistan, Proceedings of a Seminar, Rawalpindi, 11-13 August, 1975. pp. 26-46.

JAIN, S.P. 1959. "Mortality Trends in India". World Population Conference, Rome (1954), Vol. 1

JOHNSON, B.L.C. 1979. Pakistan. Heinemann London.

JOHNSON, G.Z. 1964. "Health Conditions in Rural and Urban Areas of Developing Countries", Population Studies, Vol. XVII, No.17, Part 3, pp.293-310.

JONES, R.E. 1980. "Further Evidence on the Decline in Infant Mortality in Pre-Industrial England: North Shropshire 1561-1810", Population Studies, Vol. 34, No.2, pp.239-50.

KHAN, A.F.M. Atiqur Rahman. 1973. "Relationship Between Child Mortality and Subsequent Fertility Experience", Unpublished Thesis submitted to the School of Hygiene and Public Health of the Johns Hopkin University for the Degree of Doctor of Public Health, Baltimore, Maryland.

KHAN, Samina Anwar and BILQUEES, Faiz. 1976. "Environment, Attitudes and Activities of Rural Women: A Case Study of a Village in Punjab", Pakistan Development Review, Vol. XV, No. 3, pp. 237-271.

KOBAYASHI, Kasumasa. 1958. The Sex Ratio at Birth in India by Regions. (Unpublished) paper submitted to the Demographic Training and Research Centre, Bombay.

KROTKI, K.J. and AHMAD, Nazir. 1963. "Simultaneous Estimates of Population Growth: The Pakistan Experiment", Pakistan Development Review, Vol. III, No.1.

KURESHY, K.U. 1977. A Geography of Pakistan. Oxford University Press, London.

MASEMANN, Vandra. 1974. "The Hidden Curriculum of a West African Girls Boarding School", Canadian Journal of African Studies, No.3, pp. 479-94.

MAULDIN, W. Parker and HASHMI, S.S. 1960. "Illustrative Estimates and Projections of the Population of Pakistan 1951-1991", in Qureshi, M.L. (ed.) Population Growth and Economic Development With Special Reference to Pakistan. Summary of Seminar, September 8-13, 1959, Karachi.

McDONALD, P.F., YASIN, M., JONES. G.W. 1976. Levels and Trends in Fertility and Childhood Mortality in Indonesia. Monograph No.1, Lembaha Demografi FEUI, Jakarta.

McDONALD, Peter F. 1980. Class Notes (Unpublished). Department of Demography, Australian National University, Canberra.

McGREEVEY, William P. 1974. The Policy Relevance of Recent Social Research on Fertility. Occasional Monograph Series No.2, Interdisciplinary Communication Program, Smithsonian Institution, Washington, D.C.

McKEOWN, Thomas and BROWN, R.G. 1955. "Medical Evidence Related to English Population Changes in the Eighteenth Century", Population Studies, Vol. 9, Part 2, pp. 119-41.

McKEOWN, Thomas and RECORD, R.G. 1962. "Reasons for the Decline of Mortality in England and Wales during the Nineteenth Century", Population Studies, Vol.16, Part 2, pp.94-122.

McMAHAN, C.A. 1951 "An Empirical Test of Three Hypotheses Concerning the Sex Ratio at Birth in the United States 1915-1948", Milbank Memorial Fund Quarterly, Vol. 29, No.3.

MITHRA, A. and CHOUDHURY, G.P. 1952. "Vital Statistics; West Bengal: 1941-1950", Census of India, 1951, Vol. VI, Part 1-B.

MITRA, Satindra Nath. 1979. Infant and Childhood Mortality in Bangladesh - Levels and Differentials. (Unpublished M.A. Thesis), The Australian National University, Canberra.

MYERS, Robert J. 1954. "The Effect of Age of Mother and Birth Order on Sex Ratio at Birth". The Milbank Memorial Fund Quarterly, Vol. 32, No.3.

NATIONAL CENTRE FOR HEATLH STATISTICS. 1967. Infant and Perinatal Mortality in Denmark. Health and Vital Statistics Series 3(8), Washington D.C. US Department of Health, Education and Welfare.

NATIONAL CENTRE FOR HEALTH STATISTICS. 1967. Infant Mortality Problems in Norway. Health and Vital Statistics Series 3(8), Washington D.C. US Department of Health, Education and Welfare.

NATIONAL CENTRE FOR HEALTH STATISTICS. 1968. Infant and Perinatal Mortality in England and Wales. Health and Vital Statistics Series 3(12), Washington D.C. US Department of Health, Education and Welfare.

NATIONAL CENTRE FOR HEALTH STATISTICS. 1968. Infant Loss in the Netherlands. Health and Vital Statistics Series 3(11), Washington D.C. US Department of Health, Education and Welfare.

OFFICE OF THE CENSUS COMMISSIONER. 1952. Census of Pakistan 1951: Urban and Rural Population and Area. Bulletin No. 3, Ministry of Interior, Karachi.

OLUSANYA, P.O. 1969. "A Note on Estimates of Mortality from Reproductive Histories of Women in Two Nigerian Communities", NISER, University of Ibadan (Mimeograph).

PLANNING COMMISSION. 1978. The Fifth Five Year Plan (1978-83), Islamabad.

POPULATION PLANNING COUNCIL. 1976. Pakistan Fertility Survey 1975. First Report, Lahore.

POPULATION REFERENCE BUREAU. 1980. World Population Data Sheet. Washington D.C.

POPULATION CENSUS ORGANIZATION. n.d. Housing Economic and Demographic Survey - 1973. Vol.II, Part I (Pakistan), Islamabad.

POPULATION CENSUS ORGANIZATION. n.d. Housing Economic and Demographic Survey - 1973. Vol.II, Part II (NWFP), Islamabad.

POPULATION CENSUS ORGANIZATION. n.d. Housing Economic and Demographic Survey - 1973. Vol.II, Part III (Punjab), Islamabad.

POPULATION CENSUS ORGANIZATION. n.d. Housing Economic and Demographic Survey - 1973. Vol.II, Part IV (Baluchistan), Islamabad.

POPULATION CENSUS ORGANIZATION. n.d. Housing Economic and Demographic Survey - 1973. Vol.II, Part V (Sind), Islamabad.

POPULATION CENSUS ORGANIZATION. 1981. Housing and Population Censuses of Pakistan 1980-1981 (Provisional Tables). Islamabad.

RAMCHANDARAN, K.V., DESHPANDE, V.A. 1964. "The Sex Ratio at Birth in India By Regions", The Milbank Memorial Fund Quarterly, Vol.43, No.3.

RASHID, A. 1964. Census of Pakistan Population 1961. Vol.1, Home Affairs Division, Karachi.

ROBINSON, Warren C. 1967. "Recent Mortality Trends in Pakistan", in W.C.Robinson (ed.) Studies in the Demography of Pakistan, Pakistan Institute of Development Economics, Karachi.

RUKANUDDIN, A.R. 1975. "The Effect of Sex Preference and Infant and Child Mortality on Fertility Behaviour of Couples in Pakistan", (Unpublished) Thesis submitted to the School of Hygiene and Public Health of the Johns Hopkin University for the Degree of Doctor of Science, Baltimore, Maryland.

RUKANUDDIN, A.R. 1981. "Demographic Situation in Pakistan: Its Implications for Socio-Economic Development of the Country", (Unpublished) Paper Contributed for the Seminar on "The Importance of Population Census in Socio-Economic Development", 15-16 February, Islamabad.

RUZICKA, L.T. 1980. "Mortality in Selected Countries of South and East Asia". WHO/ESCAP Meeting on Mortality in Asia: A Review of Changing Trends and Patterns 1950-75, Manila.

RUZICKA, L.T. and KANITKAR, Tara. 1972. "Infant Mortality in an Urban Setting: The Case of Greater Bombay", in K.E.Vaidyanathan (ed.) Studies on Mortality in India, Monograph Series No.5. The Gandhigram Institute of Rural Health and Family Planning, Gandhigram, India.

SATHAR, Zeba Ayesha. 1979. "Rural-Urban Fertility Differentials: 1975", The Pakistan Development Review, Vol.XVIII, No.3, pp.231-251.

SECRETARY, STATISTICS DIVISION. 1981. Overseas Weekly Dawn, 21-27 August. Karachi.

SEMBAJWE, Israel S.L. 1977. "Fertility and Child Mortality Levels and Differentials Among the Yaruba of Western Nigeria", (Unpublished) Ph.D. Thesis, The Australian National University, Canberra.

SPENCER, J., WALTON, W.S., MILLER, F.J.W., COURT, S.Dm. 1954. A Thousand Families in Newcastle Upon Tyne: An Approach to the Study of Health and Illness in Children. Oxford University Press, London.

STANLEY, M. Henemier Jr. 1969. "Estimates of Vital Rates and of Population, Labour Force, and Employment for Long Run Planning in Pakistan", Unpublished Ph.D. Dissertation, Business and Applied Economics, University of Pensylvania.

STATISTICS DIVISION. 1965. Household Income and Expenditure Survey 1963-64. Karachi.

STATISTICS DIVISION. 1970. Household Income and Expenditure Survey 1968-69. Karachi.

STATISTICS DIVISION. 1971. Household Income and Expenditure Survey 1969-70.

STATISTICS DIVISION. 1972. Household Income and Expenditure Survey 1970-71. Karachi.

STATISTICS DIVISION. 1973. Household Income and Expenditure Survey 1971-72. Karachi.

STATISTICS DIVISION. 1973. Population Growth Survey 1968. Karachi.

STATISTICS DIVISION. 1974. Population Growth Survey 1971. Karachi.

STATISTICS DIVISION. 1975. Population Growth Survey 1969. Karachi.

STATISTICS DIVISION. 1979. Pakistan Statistical Yearbook 1978. Karachi.

STATISTICS DIVISION. 1980. Statistical Pocket Book of Pakistan 1980. Karachi.

STOLNITZ, George J. 1956. "A Century of International Mortality Trend", Population Studies, Part 1, pp.17-42.

SULLIVAN, J.M. 1972. "Models for the Estimation of the Probability of Dying Between Birth and Exact Ages of Early Childhood", Population Studies, Vol.26, No.1, pp.78-98.

SULLIVAN, J.M. 1974. "Mortality Estimates Derived from Retrospective Mortality Data During Period of Fluctuating Mortality", Majalah Demografi, Indonesia. 1(2), pp.116-33.

TRAINING, RESEARCH AND EVALUATION CENTRE. n.d. National Impact Survey. Lahore.

TRUSSELL, James T. 1975. "A Re-estimation of the Multiplying Factors for the Brass Technique for Determining the Childhood Survivorship Rates", Population Studies, Vol.29, Part I, pp.97-107.

TRUSSELL, James T. 1978. A Simple Manual on Methods for Estimating Fertility and Mortality Levels and Trends with Incomplete or Inadequate Data (Unpublished). National Academy of Sciences, Washington D.C.

TRUSSELL, James T. and Eleanor BROWN. 1979. "A Close Look at the Demography of Afghanistan", Demography, Vol.1, pp.137-151.

UNITED NATIONS. 1953. The Determinants and Consequences of Population Trends. Population Division, Department of Social Affairs, New York.

UNITED NATIONS. 1954. Foetal, Infant and Early Childhood Mortality: Biological, Social and Economic Factors. Population Division Department of Social Affairs, New York.

UNITED NATIONS. 1955. Age and Sex Patterns of Mortality. Model Life Tables for Under-Developed Countries. Department of Social Affairs, New York.

UNITED NATIONS. 1967. Demographic Yearbook 1967. New York.

UNITED NATIONS. 1971. Report and Selected Papers of the Regional Seminar on Ecological Implications of Rural and Urban Population Growth. Asian Population Studies Series No.10, Economic Commission for Asia and the Far East, Bangkok.

UNITED NATIONS. 1973. The Determinants and Consequences of Population Trends. Vol.1, New York. Population Division, Department of Social Affairs.

UNITED NATIONS. 1975. Population of the Republic of Korea. Country Monograph Series No.2, Economic and Social Commission for Asia and the Pacific, Bangkok.

UNITED NATIONS. 1976. Population of Sri Lanka. Country Monograph Series No.4, Economic and Social Commission for Asia and the Pacific, Bangkok.

VISARIA, P.M. 1969. "Mortality and Fertility in India 1951-61", Milbank Memorial Fund Quarterly, 47(1).

YOUNG, Christabel. 1976. Mortality Patterns and Trends in Australia. National Population Inquiry Research Report No.5, Canberra. Australian Government Publishing Service.

YUSUF, F. 1967. "Abridged Life Tables for Pakistan and Its Provinces, 1962-64", in Contributed Papers, Sydney Conference 21-25 August, 1967, Sydney. IUSSP.

YUSUF, F. 1981. "Fertility and Infant Mortality Levels in Pakistan: A Reassessment of the 1971 Population Growth Survey", Journal of BioSocial Science, Vol.13, No.2, April, pp.189-96.

GOVERNMENT OF PAKISTAN

CENSUS ORGANIZATION

HOUSING, ECONOMIC AND DEMOGRAPHIC SURVEY

Population Census of Pakistan

Date of Enumeration _____

Sample Area Code | | | | | | | | |

Structure Number | | |

Household Number | | |

1. Name of the Head of Household _____
2. Father's/Husband's Name _____
3. Respondent's Name _____
4. Respondent's Relationship to the Head of Household _____

PART—I

HOUSING CHARACTERISTICS AND HOUSEHOLD FACILITIES FOR BOTH URBAN AND RURAL AREAS

1 What are the primary materials of the walls of the housing unit occupied by this household ?

[1] Cement finished (concrete, baked bricks or stones)
[2] Mud finished (with baked bricks or stones)
[3] Sun-dried bricks or mud
[4] G.I./C.I./Asbestos/Plastic
[5] Wood/Bamboo/Thatch
[6] Other material (Specify———)

2 What are the primary materials of the roof of this housing unit.

[1] Cement finished (concrete, baked bricks or stones)
[2] Mud finished (with baked bricks or stones)
[3] Sun-dried bricks or mud
[4] G.I./C.I./Asbestos/Plastic
[5] Thatch/Wood/Bamboo
[6] Other material (Specify———)

3 When was this housing unit constructed ?

[1] Less than 5 years ago
[2] 5 to 10 years ago
[3] More than 10 years ago but after Independence
[4] Before Independence

4 What is the type of tenure of this housig nunit ?

[1] Owner occupied
[2] Rent free
[3] Rent paid

If Rent paid, what is the gross amount of rent paid per month ?

Rs. ————————

5 How many rooms are in this housing unit? (Do not count verandahs, balconies, durhi, kitchen, bath rooms and latrines) ————————rooms.

6 Is there a kitchen in this housing unit ?

1 ☐ Yes 2 ☐ No
3 ☐ Shared

7 Is there a bath room in this housing unit ?

1 ☐ Yes 2 ☐ No
3 ☐ Shared

8 What latrine facilities are available to this housing unit ?

[1] Flush system inside the housing unit (municipal sewerage connected)
[2] Flush system inside the housing unit (Septic tank connected)
[3] No-flush system inside the housing unit
[4] Any facility outside the housing unit
[5] None/open country, etc.

9 What is the primary source of drinking water for this housing unit ?

[1] Running water (piped) inside the housing unit
[2] Running water (piped outside the housing unit
[3] Hand pump inside the housing unit
[4] Hand pump outside the housing unit
[5] Well
[6] Pond, tank, river, spring, etc. (Specify ————————)

10 What fuel is mainly used by this housing unit for cooking ?

[1] Wood
[2] Coal or charcoal
[3] Kerosene oil
[4] Gas (piped or stored)
[5] Electricity
[6] Cowdung
[7] Other (Specify———)

11 What does this housing unit mainly use for lighting purposes ?

[1] Electricity
[2] Kerosene oil
[3] Other (Specify———)

FOR URBAN AREAS ONLY

12 How is the garbage of this housing unit disposed of ?

[1] Regular municipal collection from the housing unit/structure
[2] Dumped at designated location for municipal collection
[3] No arrangements for regular municipal collection (dumped outside the house on the street etc.)

13 What is the type of surface of the street from where there is access to this housing unit ?

[1] Pucca (metalled)
[2] Semi-Pucca (stone or brick)
[3] Kutcha
[4] No regular street at all
[5] Any other type (Specify———)

APPENDIX-1 (Cont'd)

PART - II

PARTICULARS OF THE HOUSEHOLD MEMBERS

Sample Area Code | | | | | | | | Structure Number | | | Household Number | | |

LINE NO.	NAME	RELATIONSHIP TO THE HEAD OF HOUSEHOLD	SEX	AGE	MARITAL STATUS	DISABILITY	INTERNAL MIGRATION			EDUCATIONAL CHARACTERISTICS (For persons 5 years of age and above)				ECONOMIC CHARACTERISTICS (For persons 10 years of age and above)							CHILDREN BORN (For ever-married women only)					
Serial number of household members	Write full name of each member of this household starting with the head of household.	Write the relationship of each person listed to the head of household.	1. Male 2. Female	In completed years	1. Never married 2. Married 3. Widowed 4. Divorced	1. Blind 2. Deaf & dumb 3. Crippled 4. Other handicapped	Birth place (District/Country) Write the name of district in which the person was born. Give name of the country, if born outside Pakistan.	Duration of continuous residence in this locality. Write duration in completed years.	Where were you living (place of usual residence) when India attacked Pakistan in September 1965? Write name of district with urban/rural indication, e.g. Multan (U) Sukkur (R), etc.	Literacy 1. Literate with formal education 2. Literate without formal education 3. Illiterate	School/College attendance 1. Attending general 2. Attending specialised 3. Attending Madrassah 4. Left school 5. Not attended any school	Highest grade/level passed in general or specialised or Madrassah education. Write highest grade/level passed in general, specialised, Madrassah education, viz. Matric, M. Sc., B.Ed., Alim, Fazil, etc.	Area of specialised education. Write area for entries of specialised education in col. 13, e.g. Teaching, Engineering, Agriculture, etc.	Did he/she do any work at all last week for pay or profit (for a minimum of 15 hours, if worked as unpaid family helper) or there was a job but did not work 1. Yes, 2. No.	For those who answered yes in Col. 15: What kind of work did he/she do most of the last week? (Write title of occupation, e.g. Motor Mechanic, Carpenter, Taxi Driver, Cultivator, etc.)	What kind of industry or business or service was he/she working in?	Did he/she work as: 1. Employer, 2. Employee, 3. Self employed or 4. Unpaid family helper?	How many hours did he/she work during the last week?	For those who did not work for pay or profit last week: Was he/she 1. Able to work and looking for work (unemployed) 2. Temporarily suspended for 30 days 3. Job assured but work not started 4. Unable to work 5. Others	(For those who answered yes to number 1 in column 20 only) How long has he/she been looking for work? Months	Age at first marriage. Write the age in completed years.	Give actual number, if none put a cross in the relevant column. How many sons: Were ever born to you?	How many sons: Are still alive?	How many daughters: Were ever born to you?	How many daughters: Are still alive?	Period since last baby born alive. Write (in years and months) the period from the date the last live baby was born to the date of enquiry. Years	Months
1	2	3	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
1																											
2																											
3																											
4																											
5																											
6																											
7																											
8																											
9																											
0																											

APPENDIX 2

Age Distribution of Women Aged 10-49 by Region/Characteristics in Pakistan

Region/ Characteristics	Age Group			Total Number of Females in 10-14 to 45-49 Age Group
	20-24	25-29	30-34	
Pakistan	2010665 (13)	2043978 (13)	1726960 (11)	15812411
Urban	592722 (13)	564454 (12)	464983 (10)	4555428
Rural	1417943 (13)	1479524 (13)	1261977 (11)	11256983
Illiterate	1677451 (13)	1814379 (14)	1575336 (12)	13422042
Below Matric	174893 (9)	143118 (8)	100191 (5)	1844984
Matric and Above	158321 (7)	86481 (4)	51433 (2)	2433396
Punjab	1184123 (12)	1220434 (13)	1041887 (11)	9740595
Sind	518046 (18)	510340 (14)	420433 (11)	3691382
NWFP	217591 (15)	214181 (15)	183359 (13)	1423027
Baluchistan	90905 (12)	99023 (14)	81281 (9)	731965

( ) = Per Cent Distribution of Women.

Source: HED Survey, 1973.

APPENDIX 3

Sex Ratio Among the Children Ever Born, Children Still Living and Children Dead by Various Characteristics of Mothers

Characteristics by Region	20 - 24			25 - 29			30 - 34		
	CEB	CSL	Children Dead	CEB	CSL	Children Dead	CEB	CSL	Children Dead
Pakistan	110	104	136	111	110	118	112	111	115
Urban	107	111	138	111	109	126	111	109	121
Rural	110	106	135	111	110	115	112	112	112
Illiterate	109	106	134	111	110	118	112	112	115
Below Matric	110	105	165	107	106	115	104	104	104
Matric & Above	124	120	161	108	106	122	109	108	117
Punjab	112	108	136	111	110	118	111	111	112
Urban	112	108	138	111	108	128	110	108	117
Rural	112	108	136	111	110	115	111	113	110
Illiterate	112	108	133	112	110	118	112	112	112
Below Matric	109	103	171	108	107	110	102	102	102
Matric & Above	128	122	198	103	101	121	105	105	107
Sind	109	107	129	111	111	114	117	113	119
Urban	110	108	133	111	110	119	112	110	125
Rural	108	106	127	111	112	116	116	116	114
Illiterate	109	106	128	112	111	116	115	114	119
Below Matric	111	108	150	108	107	119	106	105	117
Matric & Above	116	116	112	113	113	119	110	110	127
NWFP	104	99	142	109	106	127	113	111	122
Urban	104	97	147	106	103	128	111	109	122
Rural	105	100	141	110	107	127	113	112	122
Illiterate	103	98	140	110	107	127	112	111	120
Below Matric	117	111	220	93	89	139	129	122	200
Matric & Above	147	142	173	103	100	119	121	116	188
Baluchistan	104	97	152	108	106	122	106	104	119
Urban	112	106	169	113	106	162	108	103	152
Rural	102	96	149	107	106	116	106	104	115
Illiterate	104	98	152	108	105	121	107	104	119
Below Matric	118	117	125	123	121	140	74	74	73
Matric & Above	74	64	181	189	181	500	134	123	317

APPENDIX 4

Proportion of Dead Children by Sex and By Characteristics of Mothers

	15 - 19		20 - 24		25 - 29		30 - 34	
	M	F	M	F	M	F	M	F
Pakistan	.157	.128	.150	.121	.149	.140	.155	.151
Urban	.151	.124	.138	.111	.138	.121	.145	.133
Rural	.159	.129	.155	.126	.153	.147	.160	.159
Illiterate	.156	.132	.154	.126	.154	.145	.180	.156
Below Matric	.182	.091	.120	.080	.104	.097	.108	.102
Matric & Above	.097	.059	.121	.093	.097	.085	.093*	.086*
Punjab	.172	.151	.164	.135	.155	.146	.163	.161
Urban	.163	.157	.154	.125	.145	.125	.150	.142
Rural	.174	.150	.168	.138	.159	.154	.167	.168
Illiterate	.168	.156	.168	.142	.160	.152	.168	.167
Below Matric	.219	.114	.135	.086	.105	.103	.106	.107
Matric & Above	.120	.084	.125	.081	.103	.088	.113	.111
Sind	.143	.110	.115	.097	.125	.123	.134	.129
Urban	.136	.093	.112	.093	.123	.115	.134	.120
Rural	.148	.121	.118	.101	.127	.129	.133	.136
Illiterate	.145	.116	.119	.100	.131	.129	.139	.135
Below Matric	.142	.062	.098	.073	.097	.088	.108	.098
Matric & Above	.070	-	.089	.092	.066	.063	.046	.040
NWFP	.176	.132	.166	.122	.155	.133	.151	.139
Urban	.203	.150	.181	.128	.145	.120	.154	.139
Rural	.169	.128	.163	.121	.157	.136	.150	.140
Illiterate	.176	.133	.167	.123	.155	.134	.152	.142
Below Matric	.105	.119	.119	.063	.139	.093	.135	.087
Matric & Above	.267	.105	.182	.155	.171	.148	.110	.071
Baluchistan	.049	.028	.165	.112	.182	.162	.180	.160
Urban	.085	.094	.136	.090	.186	.130	.157	.111
Rural	.039	.012	.171	.117	.181	.168	.185	.171
Illiterate	.048	.026	.165	.114	.185	.164	.183	.164
Below Matric	.100	-	.097	.091	.085	.074	.071	.172
Matric & Above	-	.200	.225	.093	.071	.027	.130	.055

* Based on only 2 per cent of the respondents.

Source: HED Survey 1973.

APPENDIX 5

(A) STATISTICS RELATED TO TOTAL NUMBER OF RESPONDENTS, CHILDREN EVER BORN AND STILL LIVING BY SEX

Age Group	Total Number of Women	Children Ever Born		Children Still Living	
		Male	Female	Male	Female
15 - 19	2390450	158609	140254	133772	122321
20 - 24	2010665	1089950	992385	926276	872077
25 - 29	2043973	2702497	2439943	2300598	2099454
30 - 34	1726960	3424661	3066080	2893356	2602397
35 - 39	1590017	4002598	3536612	3356718	2966559
40 - 44	1347712	3780256	3253307	3104732	2675337
45 - 49	1148749	3475992	2943185	2818055	2385362

Source: HED Survey 1973.

(B) CHILDHOOD MORTALITY ESTIMATES BY BRASS METHOD

i	Proportion of Children Dead D(i)	Adjustment Factor K(i)	Exact Ages of Children x	Probability of Dying Between Birth & Exact Ages q(x)
1	0.1431	1.2388	1	0.1773
2	0.1364	1.1232	2	0.1532
3	0.1444	1.0523	3	0.1520
5	0.1533	1.0442	5	0.1601

Note: $\frac{P2}{P3} = 0.4116$

Source: HED Survey, 1973

(C) CHILDHOOD MORTALITY ESTIMATES BY SULLIVAN METHOD

x	Di	North		South		East		West	
		K(i)	q(x)	K(i)	q(x)	K(i)	q(x)	K(i)	q(x)
2	0.1364	1.0407	0.1420	1.0789	0.1472	1.0789	0.1472	1.0778	0.1470
3	0.1444	0.9642	0.1392	1.0189	0.1471	1.0042	0.1450	1.0054	0.1452
5	0.1533	0.9671	0.1478	1.0083	0.1546	1.0030	0.1538	0.9942	0.1524

Note: $K(i) = a(i) + b(i) \left(\frac{P2}{P3} \right)$; $\frac{P2}{P3} = .4116$

Source: HED Survey 1973

APPENDIX 6

Table A 4. Original and Revised Coefficients for the Estimation of t*

I. Original regression coefficients to be used in estimating t* for the case of declining mortality, where t* is the length of time in years before the survey date to which the corresponding mortality estimate refers

Regression equation: $t^*(n) = A(n) + B(n) \quad (P(j)/P(n))$

AGE GROUP	n	P(j)/P(n)	A(i)	B(i)
20 - 24	2	P(1)/P(2)	1.8185	5.9263
25 - 29	3	P(2)/P(3)	1.5387	6.5743
		P(1)/P(3)	3.6729	14.1214
30 - 34	4	P(3)/P(4)	-0.1434	10.3404
		P(2)/P(4)	4.0772	9.0332
35 - 39	5	P(4)/P(5)	-2.5147	14.8231
		P(3)/P(5)	3.8032	10.2856

II. Revised Regression Coefficients (Trussell, 1978b)

Regression Equation: $t_n^* = a_n + b_n(P1/_{P2}) + c_n(P2/_{P3}) + e_n$

AGE GROUP	a_n	b_n	c_n	Mean	Largest Error	R^2
15 - 19	1.1026	5.5934	-2.0133	0.9161	.059	.947
20 - 24	1.3187	5.6158	0.2645	2.1707	.013	.999
25 - 29	1.5413	2.6451	4.8783	4.1040	.007	1.000
30 - 34	1.9978	-2.4053	10.5208	6.4679	.204	.956
35 - 39	2.8052	-8.5119	16.2550	9.0863	.576	.813

Note: All coefficients significant at the 0.01 level

APPENDIX 7

Estimates of Mortality Levels from Pakistan Fertility Data

1975 (Published Tabulations) by Trussel's Method

Age Group	Total Number of Women	Children Ever Born CEB	Children Still Living CSL	Proportion of Dead Children $D(i)^{(a)}$	Adjusting Factors $K(i)^{(b)}$	Probability of Dying from Birth to Exact Age x $q(x)^{(c)}$	Mortality Level (d)
15 - 19	1475	358	314	.1229	1.0008	.1230	13.44
20 - 24	1116	1601	1265	.2099	1.0403	.2184	10.09
25 - 29	1031	3131	2460	.2143	0.9955	.2133	11.21
30 - 34	903	4149	3284	.2085	0.9985	.2082	12.28
35 - 39	629	3605	2990	.1706	1.0110	.1725	14.50
40 - 44	656	4293	3115	.2744	0.9962	.2734	11.01
45 - 49	516	3451	2450	.2901	0.9887	.2868	11.25

(a): $D(i) = 1 - \frac{CSL(i)}{CEB(i)}$

(b): $K(i) = a(i)\ (\frac{P1}{P2}) + b(i)\ (\frac{P2}{P3}) + C(i)\ \log_e\ (\frac{P1}{P2}) - d(i)\ \log_e\ (\frac{P2}{P3}) + e(i)$

where i = 1,2,3,4,5,6 and 7

and a(i), b(i), c(i), d(i) and e(i) are regression coefficients for ith age group.

(c): $q(x) = k(i) \times D(i)$; where x = 1,2,3,5,10,15 and 20.

(d): Mortality levels are based on West model life tables and are for both sexes assuming a sex ratio of 105.

Source: Population Planning Council, 1976.

APPENDIX 8

Mortality Levels*** by Sex of Children and Educational Level of Mothers

Region	Derived Mortality Levels Based on q(x) Values						Median Levels	
	Male			Female				
	q(2)	q(3)	q(5)	q(12)	q(13)	q(15)	Male	Female
				ILLITERATE				
Pakistan	13.39	14.43	14.77	13.93	13.96	14.09	14.43	13.96
Punjab	12.49	14.01	14.37	12.87	13.58	13.57	14.01	13.57
Sind	15.76	15.84	15.90	15.83	14.95	15.27	15.84	15.27
NWFP	12.74	14.29	15.05	14.11	14.59	14.85	14.29	14.59
Baluchistan	12.73	12.87	13.64	14.75	12.96	13.70	12.87	13.70
				BELOW MATRIC				
Pakistan	14.95	17.12	17.50	16.31	16.49	16.15	17.12	16.31
Punjab	13.91	16.04	17.48	16.20	16.11	16.40	16.04	16.20
Sind	16.43	17.40	17.43	17.34	17.15	17.19	17.40	17.19
NWFP	14.88	15.05	16.20	18.01	16.50	18.29	15.05	18.01
Baluchistan	16.06	18.42	19.36	16.61	18.16	18.29	18.42	18.29
				MATRIC AND ABOVE				
Pakistan	14.77	17.50	18.33	15.65	17.08	17.39	17.50	17.08
Punjab	14.29	17.08	17.32	16.51	16.20	15.94	17.08	16.20
Sind	17.79	19.05	19.37	15.79	18.20	18.29	19.05	18.20
NWFP	11.18	13.50	17.37	11.69	13.16	20+	13.50	13.16*
Baluchistan	9.35	18.20	15.31	16.86	20+	20+	15.31	**

* Based on two values only.

** Two values are above 20, therefore the median value was not calculated.

*** All levels are based on west family of model life tables (Coale and Demeny, 1966).

Source: HED Survey, 1973.

APPENDIX 9

DESCRIPTION OF STRUCTURE TYPE

(A structure was classified as pucca, pucca-kutcha, kutcha and others, depending upon the nature of its walls and roofs as given below)

Structure Type	Principal Material Used in	
	Walls	Roofs
1	2	3
PUCCA	(a) Cement, concrete, baked bricks, stone	Cement, concrete, baked bricks, stone
	(b) - do -	G.I., C.I., asbestos, plastic
	(c) G.I., C.I., asbestos, plastic	- do -
	(d) - do -	Cement, concrete, baked bricks, stone
PUCCA-KUTCHA	(a) Cement, concrete, baked bricks, stone	Mud, stone, baked bricks
	(b) - do -	Mud, kutcha bricks
	(c) - do -	Thatch, wood, bamboo
	(d) - do -	Other material
	(e) G.I., C.I., asbestos, plastic	- do -
	(f) Mud, stone, baked bricks	Other material
	(g) - do -	Cement, concrete baked bricks, stone
	(h) - do -	Mud, stone, baked bricks
	(i) - do -	Mud, kutcha bricks
	(j) - do -	G.I., C.I., asbestos, plastic
	(k) - do -	Thatch, wood, bamboo
	(l) G.I., C.I., asbestos, plastic	- do -
	(m) - do -	Mud, stone, baked bricks
	(n) - do -	Mud, kutcha bricks
	(o) Mud, kutcha bricks	Cement, concrete, baked bricks, stone
	(p) - do -	Mud, stone, baked bricks
	(q) - do -	G.I., C.I., asbestos, plastic
	(r) Thatch, wood, bamboo	Cement, concrete, baked bricks, stone
	(s) - do -	Mud, stone, baked bricks
	(t) - do -	G.I., C.I., asbestos, plastic
	(u) Other material	Cement, concrete, baked bricks, stone
	(v) - do -	Mud, stone, baked bricks
	(w) - do -	G.I., C.I., asbestos, plastic

APPENDIX 9 (Cont'd)

1	2	3
KUTCHA	(a) Mud, kutcha bricks	Mud, kutcha bricks
	(b) - do -	Thatch, wood, bamboo
	(c) Thatch, wood, bamboo	Mud, kutcha bricks
	(d) - do -	Thatch, wood, bamboo
OTHERS	(a) Mud, kutcha bricks	Other material
	(b) Thatch, wood bamboo	- do -
	(c) Other material	Other material
	(d) - do -	Mud, kutcha bricks
	(e) - do -	Thatch, wood, bamboo