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Infant Mortality Trends and Differentials in Iran

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Abstract

This paper is about trends and differentials in infant mortality in Iran. There is very little known about the topic of infant mortality in Iran. The dearth of knowledge about infant mortality in Iran is mainly due to lack of data. There is no reliable vital registration data as a large number of infant deaths in rural areas and small towns go without registration. Under such situation the best source for studying infant mortality is retrospective data from demographic surveys. In this paper I analyze data from Iran Fertility Survey of 1976-77, to examine the levels, trends, and differentials in infant mortality since 1947. A declining trend in infant mortality is observed since 1950s and a remarkable decline is reported by 1992. However, there are consistent regional and rural-urban, socioeconomic, and demographic differences in the rate of infant mortality. The paper presents and discusses results from logistical regression analysis of the determinants of infant mortality and their implications for future infant mortality decline in Iran.

Introduction

This paper examines the trends and variation in infant mortality in Iran. There is very little known about mortality in general, and infant mortality in particular in Iran due to lack of reliable data. The vital statistics is not reliable and does not record a large number of infant deaths particularly those happening in rural and isolated areas.

In 1976 the Statistical Center of Iran launched a project to collect nationally representative data about fertility and family planning within the framework of World Fertility Survey (WFS) program. The Iran Fertility Survey (hereafter referred to as IFS) is the first nationally representative survey which provides detail information about birth histories and living status of children ever born by each women in the sample.

The Survey was implemented in the period 1976-77 and consisted of two separate surveys, **a household survey** and a **survey of individual ever-married women.** The household survey focused on baseline household data and identified eligible respondents, defined as ever-married women ages 15-50. The individual survey consisted of interviews with ever-married women at ages 15-50, as identified in the household survey.

The sampling frame of the IFS was the 1976 Population Census. Based on a multistage random sampling procedure 6056 households were visited and all ever-married women who were 15-50 years old were interviewed. This procedure resulted in interviews with a total of 4,932 women in 23 provinces of Iran.

There was 42 non-responses for an effective sample size of 4,890. For a detailed description of the survey and evaluation of the data see Aghajanian, et al. 1993).

The basic question used to obtain the date of a live birth was, 'In what month and year did your (first, second....) birth occur?' if the respondent did not know the answer she was asked how many years ago the birth occurred. If a child had died, the respondent was asked, 'For how long did the child live?' The age in completed year and months was obtained for each child who died.

For the purpose of this study the analysis is limited to all births between 1947 and 1975. The number of births covered in the survey for the years before 1947 is small. Year 1975 is used as the upper ceiling for full exposure. Births born in 1976 were not fully exposed to the mortality period. A total of 20378 births were born during the 1947-1975 period.

Infant Mortality Rate in Iran and Other Middle East Countries

Before considering the trends and variation in infant mortality rate, it would be important to see how infant mortality data from Iran Fertility Survey compares with other data sources and rates from other countries in the Middle East which participated in the WFS program. There have been two national population surveys in Iran which collected data amenable to measurement of infant mortality. A survey of Vital Rates during

1973-74 reports a rate of 105 per 1,000 for this period (Iran Statistical Center, 1980). According to this survey the rate of infant mortality in urban and rural areas were 61.6 and 119.8 respectively. The Population Growth Survey of Iran which was conducted in 1973-76 collected information about the vital events for each six month during the period of the study. This survey is the most reliable source of vital statistics for Iran during the early 1970s. The data from this survey showed an infant mortality rate of 112.4 per 1,000 live births during 1973-76. The rates for urban and rural areas were 76 and 130 respectively (Iran Statistical Center, 1980). The rate calculated from Iran Fertility Survey for the births during 1971-75 compares with the rate from the Population Growth Survey. There is a difference of about 8 per 1,000 infant death between the two surveys (Table 1).

Table 1 shows the infant mortality rate for Iran and other countries. The rates are calculated for the births during 5 years prior to the survey and they refer to the first half of 1970s. The results suggest marked differences between infant mortality rate in Iran and in other Middle Eastern countries. The rate of 121 infant death per 1,000 birth during 1971-1975 for Iran is similar to a rate of 133 per 1,000 for Turkey. However, relatively poorer countries such Jordan or Sudan show infant mortality rates much lower than the rates for Iran.

(Table 1 about here)

Trends in Infant Mortality

The birth histories in Iran Fertility Survey cover four major socioeconomic era in Iran. The first period (1947-53) is the post World War II era during which the Anglo-Soviet invasion of Iran resulted in disruption of the central political control, renewal of tribal and local government, and economic disorder. The second period is the period of renewal of military monarchy and centralization of political power (1954-1963). During this period Iran received humanitarian foreign aid and loan and some attempt was made to improve the living standard of the population. The third period (1964-1970) is a era of social and economic reforms and significant economic growth in various sectors of the economy. The last period (1971-1975) is the period of oil boom. During this period, increases in oil prices resulted in huge oil revenues for Iran.

Figure 1 shows the rate of infant mortality for these four different periods. Infant mortality declined from a level of 192 per 1,000 to 155 per 1,000 in the more stable political and economic situation. Then it declined to 125 per 1,000 during the period of economic growth and social and economic reforms. However, with huge increase in the oil revenue during 1971-1975, it remained almost at the level of the previous period. The pattern of decline was similar for male and female infants. However, in the most recent period, the female infant mortality remained at a higher level than male infant mortality.

(Figure 1 about here)

The comparison of the rates by rural and urban region suggest that infant mortality has been very high in rural areas even during the time when the rate was falling in urban areas. Figure 2 and 3 show the trend in infant mortality by rural-urban residence of mother and by rural-urban background of mother. Both figures show a disadvantage in the trend for infant mortality decline in rural areas. By 1975 infant mortality rate had declined to 88 per 1,000 live births in urban areas. Yet, the rate for rural areas remained at the level of 142 per 1,000 live births. This is almost two times the rate for urban areas. The trend by rural background of mother also shows a slow decline in infant mortality for mothers who had rural background--those born and raised up to age 12 in villages.

The rural areas disadvantage in infant mortality decline particularly in the 1970s is due to the centralized urban oriented growth which excluded the rural population from the benefits of the oil resources. The rural areas remained totally isolated from the economic growth which was happening through the oil revenue in Iran during late 1960s and early 1970s. As a result rural and urban areas turned to be two different worlds in terms of access to basic amenities such as electricity, water, and sanitation. In addition, rural areas had limited access to health facilities, supplies, and personnel. While expensive sophisticated hospitals were established and maintained in large cities, such as provincial capitals and the national capital,

rural areas had very limited access to any type of health services. Poor transportation and heavy cost for the rural family prevented access to health facilities in urban areas. These structural difference were behind the rural-urban differences in infant mortality.

(Figure 2 and 3 about here)

Recent Trend :1976-1992

The most recent data about infant mortality rate suggest a significant decline in infant mortality by 1992 (Population Reference Bureau, 1992). In 1992 Iranian government report are rate of 43 infant deaths per 1,000 births. This is almost one-third of the rates estimated from Iran fertility Survey and the Population Growth Survey. As such during the 1975-92 period infant mortality rate declined about 64 percent.

Infant mortality rate has declined in other countries in the Middle East and North Africa. However, the amount of change has been remarkable and a significant accomplishment in the Islamic Government of Iran. Such an incredible decline in infant mortality could have been possible by efforts toward declining infant mortality in rural areas. No detail data by rural and urban regions are available for 1992. In the 1970s infant mortality in rural areas was almost two times the rate of infant mortality in the urban areas. As such any decline in rural

infant mortality could have resulted in a notable decline in the national level rate of infant mortality. It is now well established that improvement in sanitation and clean drinking water in developing countries can reduce infant mortality rate by about 37 percent (Galway, et al, 1987). During the post revolutionary era, especially during the first two years before Iran was attached by the Iraqi Army, The Ministry of Reconstruction was formed and implemented a large number of village development projects such as drinking water and electricity. According to the 1986 census about 51 percent of the households in rural areas had access to piped water in 1986 compared to 21.5 percent of the rural households in 1976 (Iran Statistical Center, 1981, 1989). Similarly, the percent of rural households which had access to electricity in their house increased from 14 percent in 1976 to 65 percent. These local development efforts could have been an important force for improvement of the environment for child survival.

Regional Differences in Infant Mortality

Iran is a diverse country with geographical, cultural, and ethnic boundaries and regions. The Albouz mountain separate the provinces located on the Caspian Sea from the ones located in the central plateau. Two deserts separates the eastern provinces from the central provinces. On the western side, the Zagrous mountains draw the line between northwestern and western

provinces and the central provinces. The rich oil province of Khuzistan is located on the southwest. The two historically port provinces of Bouserh and Hormozgan are located on the Persian Gulf. Such geographic diversity and difference in climate has produced different pattern of life style and subsistence. Rice agricultural and tea have the dominant activities in the Gilan and Mazanderan provinces located on the Caspian Sea. The western states with a lot of rain and water have been the producers of wheat. The central provinces have been fruit producers. The Eastern provinces of Sistan dominated by a desert climate has had dates as the only product.

Ethnically, Turks have lived in the Northeastern provinces of West and East Azarbayjan. Kurds have lived in the western provinces of Kurdestan, Kermanshahan, Ilam. The majority of the Iranians living in Khuzistan, Bousher, and Hormozgan have Arab background. Baluchis live in the Southeastern provinces of Sistan and Baluchestan. The central provinces of Isfahan, Yazd, and the southern province of Fars is dominated by Persians.

The 1976 census of Iran divides the country to 23 provinces. These 23 provinces can be grouped to 11 regions based on cultural similarity and geographic proximity as following:

Markazi Region includes the large capital city of Tehran.

Gilan region includes Gialn and Mazanderan, the two provinces located on the Caspian sea with rice and tea as the dominant product.

Azarbayjan region includes the East and West Azarbayjan

provinces in the northwest with Turkish sub-culture.

Kermanshah region includes Ilam, Kermanshah, and Kurdistan provinces populated by Kurds.

Hamedan region includes the Khoramabad, Lorestan and Hamedan with most of population of the Lori tribal ethnic groups.

Khuzistan region includes the large oil producing province of Khuzistan with Arab endogenous population but a big influx of Persians from the central provinces in the twentieth century.

Bousher region includes the two port provinces of Bousher and Hormozgan with Arabs as the endogenous population but a big influx of Persians during the twentieth century.

Fars region includes Fars and Boyrahmad provinces on the southern margin of the Iranian Central Plateau.

Isfahan region includes Isfahan and Yazd provinces which holds the majority of the population in the Central Plateau.

Khorasan region includes Semnan and Khorasan in the northeast.

Kerman region includes Kerman and Sistan-Baluchistan provinces. These are desert provinces with low population density.

See Map 1 for location of these provinces and regions.

Figure 4 shows the level of infant mortality across these regions in Iran during 1971-75. There is strong variation in the level of infant mortality across regions. Regions such as Markazi and Isfahan have a level of infant mortality much lowerer

than other regions. On the other hand some of the regions populated by ethnic minorities have levels of infant mortality much higher the average infant mortality rate of the country. For some regions the level of infant mortality is similar to the level of 1950s.

(Figure 4 about here)

Differentials in Infant Mortality

The comparative study of infant mortality from WFS data has shown that a number of demographic and socioeconomic factors have substantial impact on the chances of survival of infants (Rutstein, 1983). However, variation exist on the impact of different variables in different countries. This section examines some of these differentials based on the availability of data in Iran Fertility Survey.

Sex of Child. It is commonly accepted that males have higher mortality than females at all ages, except where maternal mortality is important. With normal pattern of higher male mortality at every age, higher rate of infant mortality for female infant than for male infants, is perceived as excess female infant mortality. The WFS data shows excess male infant mortality in 27 of the 29 countries studied (Rutstein, 1983). Two countries, Syria and Jordan have substantial excess female infant mortality. The excess female infant mortality for Syria is 6 per 1,000 births. For Jordan, the excess female infant

mortality rate is 11 per 1,000 births. Excess female infant mortality is also observed in India, Bangladesh and Egypt (Das Gupta, 1990; Chen, 1980; 1981; Coale, 1991).

Available data from Iran indicate excess female infant mortality. In fact, age-specific mortality rate, calculated from the most reliable demographic survey in Iran shows an infant mortality rate of 110 per 1,000 compared to a figure of 101 for male infants during the 1974-75 period (Iran Statistical Center, 1977). From the same data source, female infant mortality rate in rural areas is 129 and male infant mortality is 118 per 1,000 live birth.

According to IFS data the infant mortality rate for female in Iran during 1971-1975 period is 121 compared to the rate of 117 for male infant (Table 2). The difference is 4 extra death per 1,000 for the female births. The sex differential in infant mortality widens when the data is disaggregated by rural and urban residence. In rural areas infant mortality rate was 147 death per 1,000 female live births. For male infants the rate was 137 per 1,000 live births. This reflects a 10 per 1,0000 excess female infant deaths in rural areas. Analysis of data about births during the 10 years prior to the survey, reveals the similar pattern of relationship.

(Table 2 about here)

Discrimination for access to food and deprivation of care and especially medical care have been proposed as the mechanism

behind excess female infant mortality (Basu, 1989; Chen, 1980; Schultz, 1982; Das Gupta, 1987). There is no data about any of these mechanisms operating behind excess infant mortality in Iran. However, attitudinal data collected in a large urban area in 1987, suggest that mothers favor male children in food distribution (Aghajanian, 1994).

Birth Order. There are reasons that the mortality of infants should be associated with their order of birth. On the one hand, first-born child is more likely to be born to a mother who is biologically, mentally, socially and economically unprepared to bear and bring up a child. On the other hand, children of high birth orders are more likely to be born to mothers who are physically more worn out and older. The high birth older births are more likely to be cared for by someone other than mother, especially an older sister, and are more likely to considered superfluous. Hence, it is expected that infant mortality has a U-shape relationship with birth order. Such pattern holds true for 29 countries with WFS data (Rutstein, 1983). Table 2 shows the rate of infant mortality by birth order from Iran Fertility Survey. The rate for the first birth is significantly higher than the rate for the second and third birth. However, it increases for births of order 4 and more. The U-Shape relationship holds true for Iranian data.

Mother's Age. Statistics of developed countries show a U-shape relationship between age of mother and infant mortality. Results from a comparative study of 29 countries which

participated in the WFS project also support this U-shape relationship. Due to early age of marriage a large number of births happens to very young women below age of 20. Analysis of data about births during 5 years prior to the survey, infant mortality rate for infants born by mothers age 19 and below is 162 per 1,000 live births. This high rate declines as age of mother increases. For mother's in age group 25-29, the rate is 101 per 1,000 live births. The least infant mortality rate is for infants born to mothers in age group 30-39, 114 death per 1,000 live births. After age 39, infant mortality increases significantly. The data from Iran clearly supports the U-Shape relationship found in other countries (Table 2).

Table 3 shows the rate of infant mortality by socioeconomic variables commonly examined in the analysis of infant mortality. These variables include mother's background which refers to the size of the place where the mother lived up to age 12. In addition information is available about size of the place of residence at the time of survey. It should be noted that due to rural to urban migration, some of the births which are classified as urban actually happened in rural areas before migration. Other socioeconomic variables are mother's education, her working status, and father's education. A multivariate analysis done with World Fertility Survey data from 28 countries suggest that there are important variations in the effect of maternal education and work status on infant mortality (Hobcraft, 1984). Like in other WFS surveys mother's working status refers to the

working status at the time of the survey and it is not necessarily a preceding factor to the birth and infant mortality. Working status might have changed between the time of marriage and the time of survey. Considering these limitations Table 3 reports the bivariate relationship between socioeconomic variables and infant mortality.

(Table 3 about here)

Mother's Background. Significant difference in infant mortality rate is revealed by mother's background. Children born to mothers with rural background have a rate of infant mortality which is 38 percent higher than the children born to women with urban background. This difference holds true across cohorts of births.

Mother's Residence. Mother's residence at the time of the survey is a strong differentiating factor in infant mortality. Children born to women interviewed in urban areas, have experienced a much lower infant mortality rate than those born to the women interviewed in rural areas. Infant mortality rate for children born to rural women is almost 6 percent higher than the rate for children born to urban women. This difference continues to exist across cohorts of births.

Mother's Education. A strong consistent relationship exist between infant mortality and level of education of mother. Children born to women with high school diploma or more education have a rate of infant mortality 10 times lower than the rate of

infant mortality for children of illiterate mothers. Infant mortality declines almost 50 percent with completion of elementary school for mothers. The systematic linear relationship between mother's education and infant mortality exist for all cohorts of births. The higher the mother's education, the lower the chance of infant death (Table 3)

A number of authors have tried to explain the effect of maternal education on infant mortality. The most obvious mechanism through which the mother's education affect child survival directly is in her knowledge of appropriate care for both health and sick children. However, the effect of maternal education is seen beyond the mere contribution of knowledge. It is related to the greater role of an educated mother in family decision-making about allocation of resources, distribution of food among its members and recourse to modern medicine (Caldwell, et al, 1983). This mechanism could be very important in the context of Iranian socio-cultural system where the authority of women is very limited.

Mother's Working Status. Mother's working status refers to the time of the survey rather than to the time of the birth. As such the results for work status variable may be subject to error. However, the bivariate analysis shown in Table 3, suggest a lower infant mortality for children of working women. The difference between the two groups, seems to sharpen for the recent cohort of births.

Father's Education. Father's education has a strong

negative effect on infant mortality. The rate of infant mortality for children with illiterate father is 136 per 1,000 live births compared to the rate of 26 per 1,000 for children of highly educated fathers. The rate for children with fathers who have a high school diploma or more is 5 times lower than the illiterate fathers.

(Table 3 about here)

Multivariate Analysis of Infant Mortality

The bivariate analysis in the previous section suggests that all of the demographic and socioeconomic variables examined, are related to the infant mortality in the expected direction. In this section we examine the net effect of each demographic and socioeconomic variables in multivariate framework. The effect of demographic and socioeconomic variables can be examined in the context of the analytical framework presented by Mosley and Chen (1984). Within this framework, proximate and intervening variables are distinguished and the effects of structural factors, as exogenous variables, are viewed through the intervening variables. In this analysis rural/urban origin and rural/urban background are the exogenous variables. They influence infant mortality through parental socioeconomic characteristics. The proximate variables are maternal age, birth order, and sex of the child.

The dependent variable is the probability of death before

age 1. Logistic regression models are estimated on the independent variables defined in the previous section. The logistic regression models are run for both children born during 5 years prior to the survey and those born during 10 years prior to the survey. Table 4 presents logistic estimates of the effect of background variables, socioeconomic characteristics, and demographic variables on probability of death before age 1 among the children born during 5 years prior to the survey (1971-75). Model 1 shows that mother's urban background increases decreases the odds death before age 1. Once urban residence is introduced in model 2, the effect of urban background disappears and urban residence shows strong negative effect on probability of infant death, as expected. Model 3 shows that part of the effect of urban residence is transmitted through educational attainment of parents as the size of the coefficients of urban residence decreases in this model. Model 3 also shows strong effect of maternal education on infant mortality as expected. It was expected that part of the effect of mother's education be transmitted through work status of mother. Model 4 which include the work status of mother does not suggest any effect from this variable.

(Table 4 about here)

Maternal age is entered as a categorical variables in model 5. Inclusion of this variable in the model does not change the coefficient of the background and socioeconomic variables. The results indicate strong negative effect on infant mortality when

maternal age is between 20 to 35. A higher level of infant mortality when mother is 36 years and older.

Based on model 5 and 6, there is no net effect from birth order and sex of the child on infant mortality. The direction of the effects for both birth order and sex are consistent, but they are not statistically significant. The best model predicting infant mortality is model 5 which includes urban residence, socioeconomic variables, and maternal age.

The fact that most of the urban/ural differences remains when other variables are controlled can be interpreted in relation to the unequal quality and distribution of medical care between the two population subgroups. Hence to the extent that such inequalities decline in future, there will be significant reduction in infant mortality.

The results for the births during the 10 years period to the survey, reported in Table 5 are the same.

Conclusions

This paper has investigated the trends and differentials in infant mortality in Iran. Specifically, the effects of maternal demographic characteristics and socioeconomic factors on infant mortality in Iran were examined. The study furnishes a picture of infant mortality levels and trends in Iran for the period 1947 to 1992. In addition, this study replicates some of the findings from previous research on determinants of infant mortality.

Infant mortality declined in Iran during late 1960s and 1970s. But the dramatic decline was reported by 1992. A decline of almost 60 percent compared to 1975. In spite of the spectacular decline, substantial regional, demographic, and socioeconomic variation in infant mortality exist in Iran. Excess female infant mortality was observed in the bivariate analysis in this study and also from other studies (Iran Statistical Center, 1977). However, the multivarite analysis showed that excess female differential disappear after controlling for urban residence and socioeconomic variables. Hence, excess female mortality is not common across all groups and classes. It seems that it exist among rural poor households.

Old age of mother is a very important factor in relation to infant mortality net of all other factors. Mother's old age at birth has a positive effect on infant mortality. Since, a large number of high parity births happen to older women, the finding regarding maternal age has significant implication.

As found in other studies (Caldwell, 1979; Hobcraft, McDonald, and Rutstein, 1984; Das Gupta, 1990) maternal education is a very important factor in reducing infant mortality net of other factors. A complex set of mechanisms are involved in the negative relation between maternal education and infant mortality (Ware, 1984). Among other things, maternal education raises the skills and self-confidence of the mother; it increases exposure to information and improves her power status in household decision making. There is not direct measurement of any of these

mechanism in the IFS data. However, the rate of infant mortality for infants of women who have finished high school is much lower than the rate for infants of illiterate women. Even infants of literate women have a significantly lower mortality than children of illiterate women. Considering this finding, one has to note that literacy rate is low among Iranian women only a small percentage of them complete high school. According to the Iran Fertility Survey only 4 percent of women had high school diploma and above and in total about 22 percent have some elementary education or more. It is clear that the spread of literacy and higher level education will have dramatic effects in terms of reducing infant mortality in future in Iran.

A strong effect net of individual socioeconomic factors was found for place of residence. Infants whose mothers were living in cities of 25,000 and larger at the time of survey, had experienced a much lower infant mortality rate. The expectation was that the rural-urban differential is due to the socioeconomic and demographic composition of the two areas. Hence once these factors were controlled, the effect of urban/rural residence should disappear. Contrary to this expectation, the effect of urban residence remains solid in the multivariate analysis. Such net effect of urban residence on infant mortality should be related to the contextual characteristics of the urban community. These characteristics includes physical access to medical facilities, availability of clean water, access to information about prevention and cure and the social milieu surrounding

health care for infants. If these contextual differences between rural and urban areas count for the differences in infant mortality, the recent (1985-92) decline in infant mortality can be explained in terms of changing environment in the rural areas in recent years. Specifically, increase in the number of the development projects such as sanitary water, electricity, health houses, improvement of roads which facilities access to urban health services, could signify the reduction in infant mortality in the recent years. The continuation of these rural programs should result in further decrease of infant mortality.

Another important factor in future infant mortality decline is the new population policy and family planning program in the Islamic Republic of Iran. There is strong support in this program for limiting the number of children to three. The number of women using family planning services has increased significantly in recent years and the expectation is that this trend will continue. As this trend proceeds and the rate of high parity birth declines, there will be significant reduction in infant mortality. This is basically expected because of the high risk of infant death associated with high parity birth and older maternal age.

While the available statistics indicate to the decline of infant mortality in Iran, data are not available by region and other characteristics. A very important question is the pattern of decline for different regions particularly the ones dominated by minorities in the peripheral areas. Similarly, the level of

infant mortality by sex and parity is important to be explored in the context of the tight family resources during the 1980s.

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Table 1. Levels of Infant Mortality in Iran and Other Middle Eastern Countries

Country	Survey Date	Infant Mortality WFS	Infant Mortality 1992
Iran	1976–77	121.3	43.0
Jordan	1976	65.6	39.0
Sudan	1978–79	79.4	87.0
Syria	1978	65.1	48.0
Turkey	1978	132.6	59.0

Source: Rutstein, 1983; Population Reference Bureau, 1992
Note: Rates from WFS surveys refer to a birth During 5 years before the survey.

Table 2. Demographic Differentials in Infant Mortality in Iran

Variables	Infant Mortality Rate per 1,000	
	Births During 5-year Prior the Survey	Births During 10-Year Prior the Survey
Gender		
Male	117.1	120.7
Urban Male	91.0	101.1
Rural Male	137.0	136.7
Female	121.1	122.9
Urban Female	84.2	91.8
Rural Female	147.5	146.8
Birth Order		
First	137.1	135.1
Second	125.6	126.8
Third	111.7	117.1
Fourth	114.6	106.2
Fifth or more	117.9	123.1
Mother's Age at Birth		
less than 20	162.6	153.8
20-29	101.1	112.2
30-39	113.7	113.7
40 or more	174.8	158.2

Table 3. Socioeconomic Differentials in Infant Mortality in Iran

Variables	Infant Mortality Rate Per 1,000 Births During 5–Years Prior to the Survey	Infant Mortality Rate Per 1,000 Births During 10–Years Prior to the Survey
Mother's Background		
Urban	85.8	88.1
Rural	134.2	136.3
Mother's Residence		
Urban	91.1	98.8
Rural	143.4	141.9
Mother's Education		
None	133.1	134.1
Some Primary	73.1	72.6
Complete Primary	72.8	76.1
Some Secondary	38.8	30.5
High School or more	14.8	22.4
Morther's Work Status		
Homemaker	140.9	139.6
Working	114.2	117.2
Father's Education		
None	136.1	135.4
Some Primary	123.2	120.1
Complete Primary	89.5	99.8
Some Secondary	86.8	86.1
High School or more	26.1	37.7

Table 4. Logistic Regression Coefficients for Regression of Infant Death on Sociodemographic Variables

Independent Variables	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)
Mother Has Urban Background	−0.515***	−0.212	0.0712	0.082	0.093	0.106
Residence Urban		−0.465***	−0.371**	−0.349**	−0.368*	−0.376**
Mother's Education			−0.295***	−0.292***	−0.307**	−0.328**
Father's Education			−0.109*	−0.111*	−0.121*	−0.129*
Mother Works				0.111	0.122	0.121
Maternal Age:						
Less than 20 years					0.327	0.039
20–29					−0.263*	−0.426**
30–35					−0.370*	−0.403**
36 Years or more					rfc	rfc
Birth Order						
First						0.363
Second						0.314
Third						0.215
Fourth						0.020
Fifth or more						rfc
Male Infant						−0.029
Constant	−2.139***	−2.549***	−1.925***	−1.889***	−1.853***	1.778***
−2 Log Likelihood	4282.92	4266.14	4234.96	4233.36	4191.46	4185.13
Chi-Square	28.35	16.77	31.18	1.59	41.9	6.13

* Significant at .05
** Significant at .01
*** Significant at .0001
Note: Urban residence is defined by a population size of 25,000 and more.

Table 5. Logistic Regression Coefficients for Regression of Infant Death on Sociodemographic Variables

Independent Variables	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)
Mother Has Urban Background	−0.521***	−0.326**	−0.079	0.082	0.059	−0.056
Residence Urban		−0.299***	−0.223**	−0.349**	−0.225*	−0.224**
Mother's Education			−0.325***	−0.292***	−0.343**	−0.352***
Father's Education			−0.063	−0.111*	−0.047*	−0.078*
Mother Works				0.113	0.109	0.107
Maternal Age:						
Less than 20 years					0.277**	0.203
20–29					−0.147*	−0.152
30–35					−0.308*	−0.302**
36 Years or more					rfc	rfc
Birth Order						
First						0.104
Second						0.072
Third						−0.003
Fourth						−0.105
Fifth or more						rfc
Male Infant						−0.007
Constant	−2.109***	−2.116***	−1.929***	−1.895***	−1.8761***	1.875***
−2 Log Likelihood	8250.16	8235.97	8184.21	8181.31	4191.46	8129.512
Chi-Square	57.25	14.19	51.76	2.89	41.9	3.63

* Significant at .05
** Significant at .01
*** Significant at .0001
Note: Urban residence is defined by a population size of 25,000 and more.

Infant Mortality Rate in Iran by Period and Gender

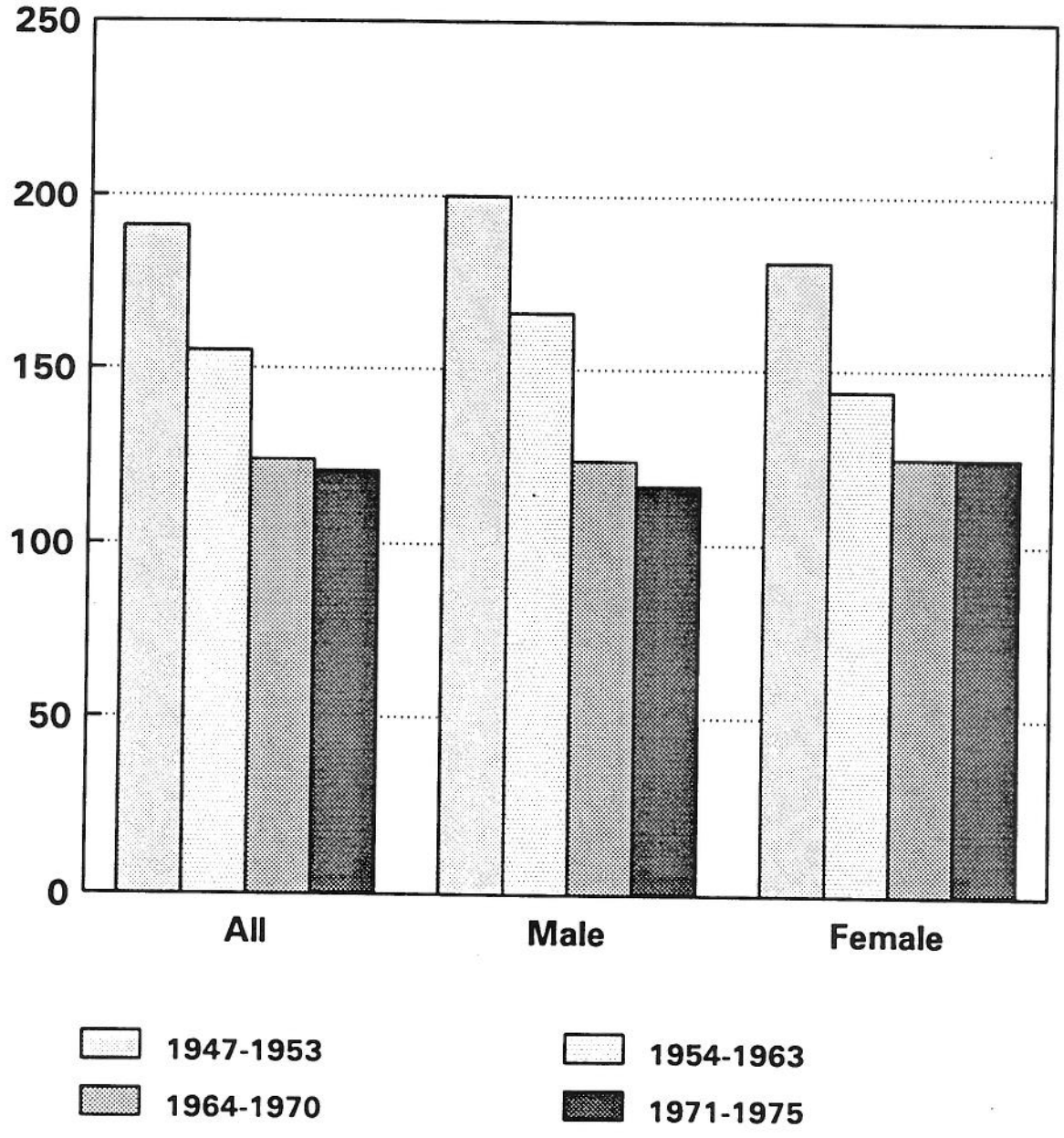

Figure 1

Infant Mortality Rate in Iran 1947-75

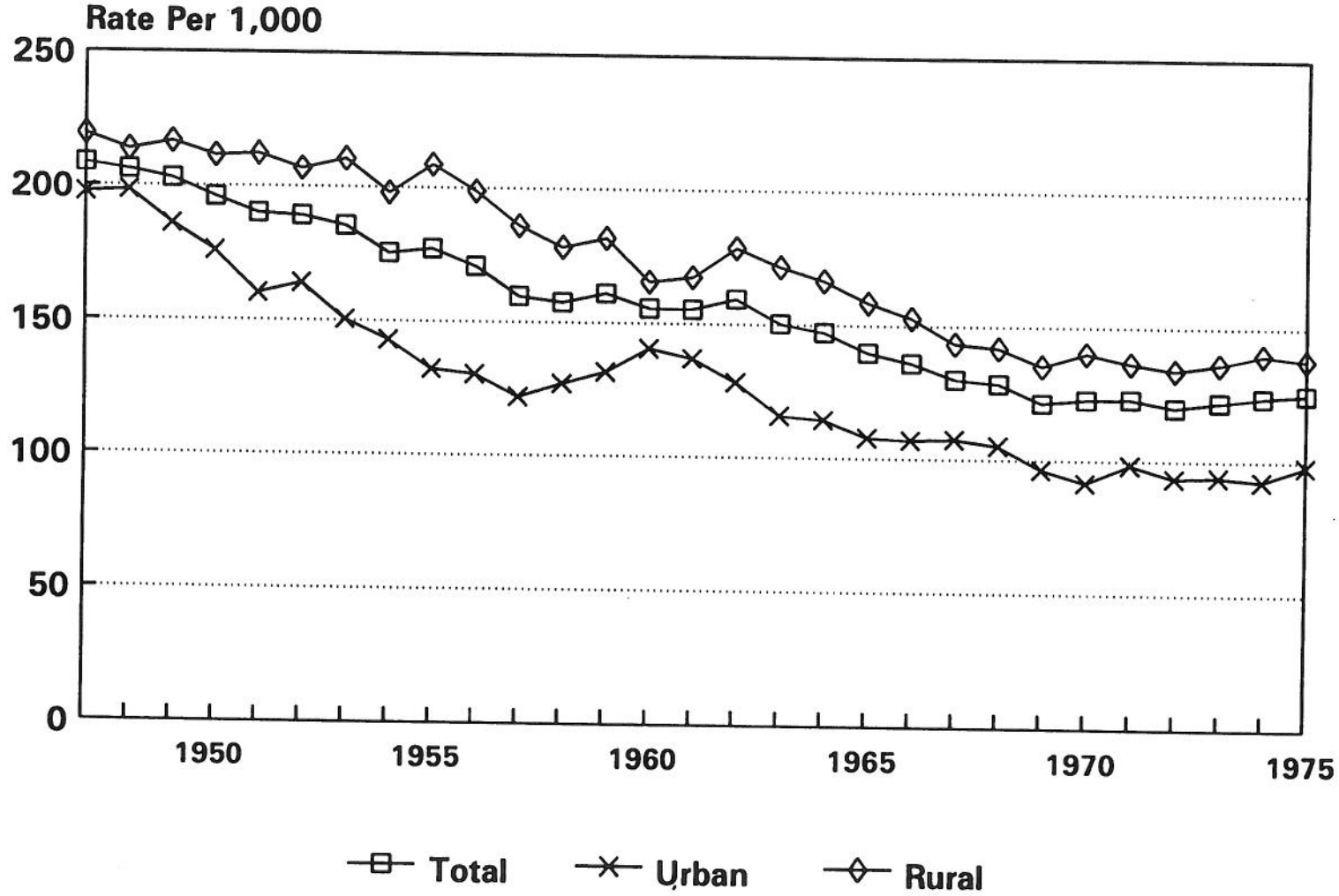

Figure 2

Infant Mortality Rate in Iran 1947-75

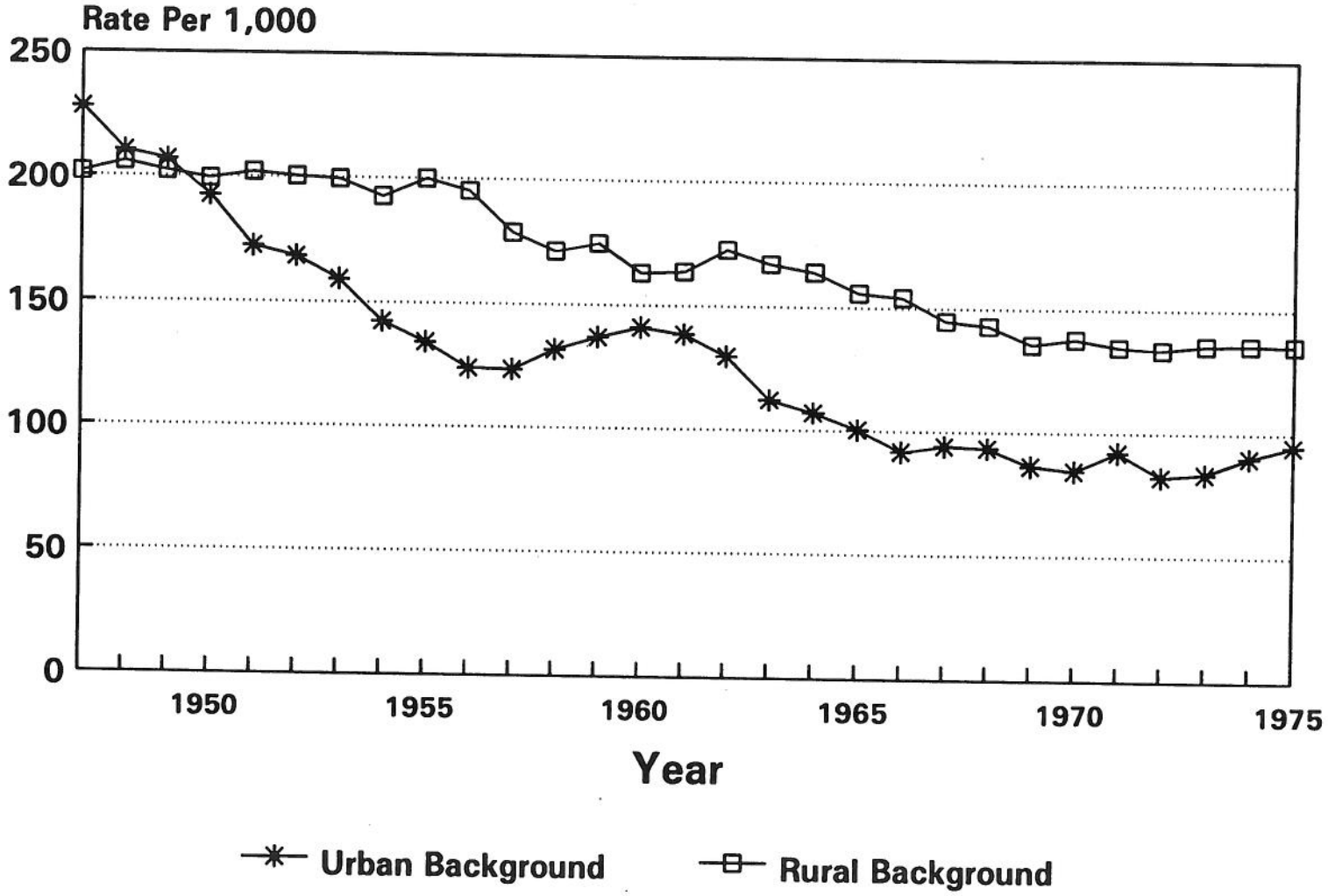

Figure 3

Infant Mortality in Iran by Region 1971-75

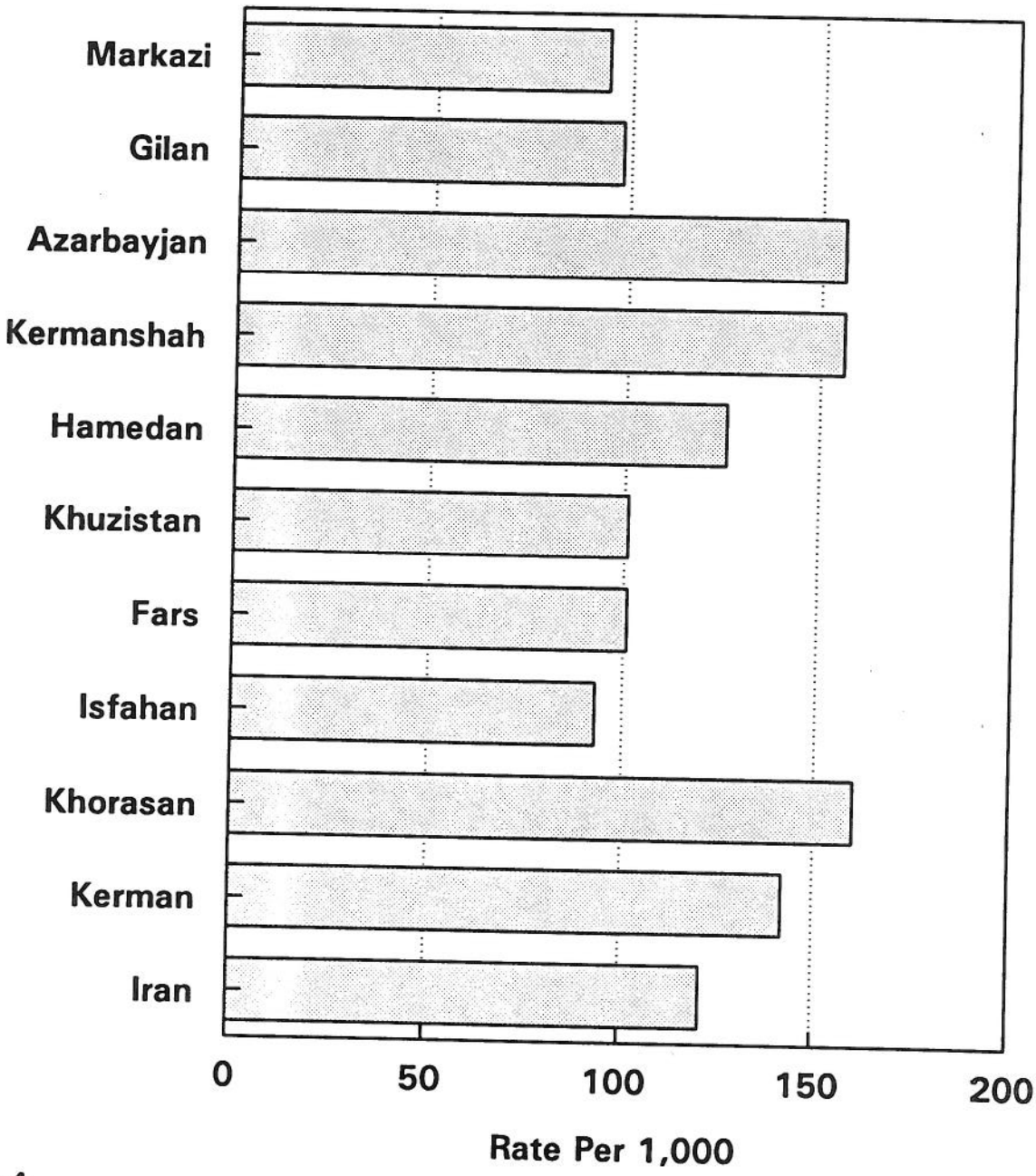

Figure 4

Ethnic–Georgraphic Regions Of Iran