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# Some Differentials in Infant and Child Mortality Risks in Pakistan 1962 – 1986

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## INTRODUCTION

In Pakistan the history of alternative sampling approaches to collect demographic data for direct and indirect estimation of population parameters extends back for three decades. The sources which provided directly usable statistical data for estimating fertility and mortality rates, are the 1962–65 Population Growth Estimation (PGE), the 1968–71 and 1976–79 Population Grwoth Surveys (PGS), and the 1984–86 Pakistan Demographic Surveys (PDS). Since these surveys yielded series of data which could be directly used for working out estimates which are in accordance with the conventional concepts, their results are being given a prior consideration in this paper. The second series of demographic surveys in Pakistan consists of the one-time retrospective surveys, which provided data to which indirect techniques could be applied for working out the estimates of fertility and mortality. The three most prominent of such surveys are: the 1975 Pakistan Fertility Surveys (PFS), the 1979-80 Population, Labour Force and Migration Survey (PLM) and the 1984-85 Pakistan Contraceptive Prevalence Survey (PCPS). The objective of this paper is to provide some direct and indirect estimates of infant and child mortality risks from these sources with a view to examining differentials and trends in these estimates.

The area of infant-child mortality in Pakistan has been the focus of some recent demographic studies [Alam and Cleland (1984); Sathar (1985, 1987); Irfan (1986)]. The results of the present study are based on the analysis of relevant data from two types of sources which collected data by following more or less the same approach and to which the same methodology was applied in order to get results which were conceptually more consistent.

## DIRECT ESTIMATES

The direct estimates of infant and child mortality risks were obtained from the

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data on age-specific deaths by sex provided by the PGE 1962–65, PGS 1968–71 and 1976–79, and the PDS 1984–86 surveys. For this purpose a revised series of abridged life tables were prepared and the estimates of infant mortality rate ($_0q_1$) and child mortality risks ($_0q_5$) taken from these tables are provided in Table 1.

The table shows that during 1962–65 the average infant mortality rate was substantially high, with the female rate higher than that for the male. During the subsequent decade not only did the risks of deaths to infants decline significantly but the patterns of sex differentials in such risk were also reversed i.e. female infant mortality became much less than that for the male. While the 1962–65 PGE did not yield separate estimates for urban and rural segments of the population, the PGS and the PDS series did provide separate data for construction of urban and rural life tables. Table 1 shows that the urban infant mortality rates have been much lower than the corresponding rates for the rural areas. Also the male-female differentials, were higher for urban areas (1.19) than for rural areas (1.12). The 1976–79 PGS average rates indicated a further decline in the risks of death to infants in both urban and rural areas, with their male to female ratio as 1.24 and 1.17 respectively. In other words, the decline in infant mortality risks between 1968–71 and 1976–79 provided to the female babies a further edge in survival, over male babies.

The PDS series initiated in 1984, however, show a sudden increase in the infant mortality risks in Pakistan, which perhaps are due more to the adjustments done by the data generation agency, than the reflection of the actual phenomena. This is because child mortality risks ($_4q_1$) given by the same survey do not show a similar variation either in urban or in rural estimates. The adjustment in the PDS estimates resulted in an inflation of about 33 percent in the infant mortality rates as compared to the average PGS rate for 1976–79. The unreasonableness of the 1984 PDS rates, is further indicated by the reversal of the sex differentials by showing a 56 percent increase in the rural female rate as compared to their 1976–79 average levels. Moreover, the 1985 estimates of infant mortality clearly show a decline in their levels by about 13 percent and the realignment of the male-female differentials again to the male-higher and female-lower pattern shown earlier by the two PGS series. Incidentally, the male rural rates are indicated to be higher in 1985 than in the 1984 PDS. The 1986 rates come down to a more reasonable level, though still exceeding the 1976-77 PGS. The 1984, 1985, 1986 PDS infant-child mortality estimates do not confirm that this (PDS) series are an "improvement" over the previous series.

A relatively unbiased view of the secular decline in the mortality risks to children in Pakistan, during the preceding three decades, is, however, indicated by the estimates of probability of death from age 1 to age 5 ($_4q_1$) i.e. the component of child mortality excluding infant mortality. The direct estimates from PGE, PGS and PDS series, show that such risks in both urban and rural areas continue to decline



Table 1
*Infant and Child Mortality Risks from Life Tables*

| Source | Area | Probability of Death from Birth to Age One ($_1q_0$) | | | Probability of Death from Age One to Age Five ($_4q_1$) | | | Probability of Death from Birth to Age Five ($_5q_0$) | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Both Sexes | Male | Female | Both Sexes | Male | Female | Both Sexes | Male | Female |
| PGE (LR) 1962–65 | Pakistan | .142 | .139 | .146 | .214 | .192 | .237 | .090 | .073 | .106 |
| PGS – I 1968–71 | Pakistan | .110 | .116 | .103 | .169 | .169 | .169 | .068 | .061 | .074 |
| | Urban | .092 | .100 | .084 | .136 | .139 | .133 | .048 | .044 | .053 |
| | Rural | .114 | .121 | .108 | .178 | .178 | .179 | .073 | .066 | .080 |
| PGS – II 1976–79 | Pakistan | .094 | .102 | .086 | .132 | .136 | .128 | .042 | .039 | .046 |
| | Urban | .074 | .082 | .066 | .102 | .108 | .095 | .030 | .029 | .032 |
| | Rural | .101 | .109 | .093 | .143 | .146 | .140 | .047 | .042 | .052 |
| PDS 1984 | Pakistan | .125 | .124 | .126 | .151 | .153 | .149 | .031 | .033 | .028 |
| | Urban | .108 | .119 | .097 | .140 | .136 | .144 | .020 | .020 | .019 |
| | Rural | .136 | .128 | .145 | .170 | .166 | .175 | .040 | .044 | .035 |
| PDS 1985 | Pakistan | .109 | .120 | .099 | .134 | .144 | .131 | .028 | .025 | .035 |
| | Urban | .088 | .098 | .079 | .104 | .112 | .097 | .018 | .016 | .020 |
| | Rural | .127 | .137 | .116 | .159 | .165 | .157 | .036 | .033 | .047 |
| PDS 1986 | Pakistan | .102 | .108 | .096 | .127 | .131 | .122 | .028 | .027 | .029 |
| | Urban | .083 | .084 | .081 | .102 | .101 | .102 | .021 | .020 | .023 |
| | Rural | .117 | .127 | .107 | .146 | .156 | .137 | .033 | .034 | .033 |

from 1962–65 through 1986 with an overall percentage decline of about 69 percent. A similar trend is indicated for males and females with the exception of the upward kink for rural female babies in 1985, but even this has not affected the overall relatively lower level for both sexes.

## INDIRECT ESTIMATES

In this paper indirect estimates of child mortality risks have also been worked out from three national retrospective sample surveys namely 1975 PFS, 1979 PLM and 1984 PCPS, by using data on children ever born and children surviving to the mothers who were in different age groups at the time of the respective survey. The basic methodology used for indirect estimation of childhood mortality from this information, was developed by Brass (1973). Later [Sullivan (1972); Trussel (1975); and Feeney (1980)] applied some modifications to the Brass approach for working out similar estimates. Since the estimates arrived at in this study, by applying each of these methods were very close to each other, their results were averaged for the purpose of this paper.

Table 2 provides the estimates of child mortality risks in terms of the probability of death from birth till age 5, from the above three surveys. As was observed in the case of direct estimates the indirect estimates also indicate declining trends, in male and female child mortality risks for both urban and rural areas, although the level of these estimates is relatively higher than the direct estimates given in Table 1. It may be mentioned here that the series of retrospective surveys from which the indirect estimates have been derived, were conducted with the primary aim of studying the interrelationships between demographic, socioeconomic, attitudinal and behavioral factors. The indirect estimates worked out from the data provided by these surveys on the past experience of mothers of different age cohorts, involves many assumptions, including the use of model life tables, and, thus, are not conceptually comparable to the direct estimates, which correspond to a specific year for which the relevant data were collected. Thus, in the presence of a series of direct estimates the indirect estimates is for looking at the trends and differentials in the demographic parameter under study. In any case, levels are of a secondary importance for the purpose of this study since the focus here is more on the differentials in child mortality risks. The indirect estimates do have a supportive value even with regard to the estimates of the levels arrived at in this study.

Table 2 shows that in terms of differentials, each of the urban mortality estimate is lower than the corresponding rural estimate. There is also some indication that the decline in female child mortality risks has been relatively higher with the results that the sex differentials have narrowed over the years. The estimates from 1984-85 PCPS show that risks of child mortality are much lower in major urban centres in the country than the smaller towns.



Table 2

*Indirect Estimates of Child Mortality Risks in Pakistan*

| Source | Area | Year to which Estimate Refer | Probability of Death from Birth to Age 5 ($_5q_0$) | | |
|---|---|---|---|---|---|
| | | | Both Sexes | Male | Female |
| PFS 1975 | Pakistan | 1968-69 | .193 | .194 | .192 |
| | Urban | | .160 | .153 | .168 |
| | Rural | | .216 | .223 | .209 |
| PLM 1979 | Pakistan | 1972-73 | .165 | .174 | .161 |
| | Urban | | .145 | .152 | .138 |
| | Rural | | .174 | .180 | .170 |
| PCPS 1984-85 | Pakistan | 1977-78 | .157 | | |
| | Major Urban | | .102 | | |
| | Other Urban | | .138 | | |
| | Rural | | .172 | | |

## DIFFERENTIALS BY LITERACY STATUS

Realizing the utility of indirect estimates of child mortality risks for describing the pattern of differentials, this study is extended to provide the differentials in the child mortality risks for mothers who had no schooling and those who had some schooling. A similar set of estimates has been worked out for women who were reported as employed and those other than the employed. This analysis is limited to the 1979 PLM survey, the sample for which was more than double that of the other surveys.

Table 3 shows that the child mortality risks were much higher for mothers who never attended a school as compared to those who had a chance to attend a school. This is true for both male and female children. Similar differentials are also indicated for both urban and rural segments of the country's population but such differentials are higher for urban areas than for rural areas, thus reflecting on their respective living conditions. The present study, therefore, confirms the importance of the mother's education for bringing down the risk of child mortality.

Table 3

*Differentials in Child Mortality Risks by Literacy Status and Employment Status of Mothers: PLM 1979*

| Area | Year to which Estimate Refer | Probability of Death from Birth to Age ($_5q_0$) | | |
|---|---|---|---|---|
| | | Both Sexes | Male | Female |
| Mothers who Ever Attended School | | | | |
| Pakistan | 1972-73 | .123 | .128 | .119 |
| Urban | | .087 | .112 | .062 |
| Rural | | .135 | .122 | .148 |
| Mother who Never Attended School | | | | |
| Pakistan | | .173 | .178 | .168 |
| Urban | | .161 | .160 | .161 |
| Rural | | .176 | .179 | .173 |
| Employed Mothers | | | | |
| Pakistan | | .157 | .171 | .149 |
| Urban | | .107 | .139 | .085 |
| Rural | | .170 | .177 | .165 |
| Other than Employed Mothers | | | | |
| Pakistan | | .168 | .175 | .163 |
| Urban | | .149 | .157 | .146 |
| Rural | | .174 | .181 | .171 |

## DIFFERENTIALS BY EMPLOYMENT STATUS

Table 3 also provides the indirect estimates of child mortality risk for mothers who were reported as "employed" and as "other than employed". The table shows that $_5q_0$ estimates are lower for employed mothers than for other mothers. Such differentials are more conspicuous in the case of urban mothers than that for rural mothers. The male-female differentials in child mortality risks are observed to be higher for employed urban mothers than for other mothers, with the advantage to female babies being much higher than to male babies.

What could be the reasons for such conspicuous differentials for urban mothers than for rural mothers? One explanation in this connection is, that the employed/not employed dichotomy in some respect can be considered to go along with the urban/rural dichotomy, the urban being relatively ahead of the rural areas on the axis of development with many more chances of availing income-generating opportunities and also of civic and health amenities. Life in urban areas, therefore, helps to keep the infant and child mortality risks on a relatively lower side in comparison with the rural areas. Since the employment of mothers gives access to better resources, the risk of mortality to their children is lower. The same is true for educated mothers, whose share in the proportion of women employed may be much more, particularly in the urban areas, and hence their child mortality estimates are indicated to be relatively much lower. As such an advantage does not exist for employed mothers in rural areas hence the differentials in child mortality risks by employment status, for rural mothers are also less.

The other view is that for some of the employed mothers it is their poverty which forces them to work outside the home in order to supplement their meager family income or, they may be the sole earners for the family. Since their work is at the cost of looking after their children, their children are exposed to a higher risk of mortality.



## SUMMARY AND CONCLUSION

The series which have provided directly usable statistics on fertility and mortality rates viz, 1962–65 PGE, 1968–71 PGS, 1976–79 PGS and 1984–86 PDS have been the source of working out the estimates which are in accordance with the conventional concepts. Thus their results, in spite of some variations in the estimation procedures of vital events, have been given prior consideration for the purposes of this paper.

The direct and indirect estimates of infant and child mortality risks presented here show that infant and child mortality have been on the decline, but more so in the urban areas than in the rural areas. The study also shows that male-female differentials in child mortality risks have been substantially narrowed, but the advantage to urban female babies has been much more as compared to those in the rural areas. The study confirms the role of mothers education in lowering child mortality risks, but at the same time points towards the desirability for much more attention towards the improvement in the living conditions of the rural areas, so that a further reduction of infant and child mortality risks could be achieved in this predominant segment of our population.

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## Comments on "Some Differentials in Infant and Child Mortality Risks in Pakistan 1962 – 1986"

This is an interesting and well-written paper.

I have, however, a few observations about the findings.

1. With regard to the higher female life expectancy, females as compared to males seem to be data errors which the authors have themselves pointed out by virtue of the levels of living, attitudinal changes especially as the levels of literacy and health infrastructure in small urban centres and rural areas did not change much. Even the family planning series did not improve, so there shoud have been some evidence on causal explanation in this area to strengthen the argument.

2. The authors have discussed two social and economic variables to determine the infant and child mortality which seems to be unjustified because health conditions vary substantially by 'major urban', 'other urban' and 'rural' areas. The basis of comparison among the surveys should have been the 'major urban' 'other urban' and 'rural' areas. This is so because the health infrastructure has been heavily based in the major urban areas and this could affect the reporting of children.

3. Comming to the life table model the authors have used the South regional model life table. However I feel it would have been more appropriate if the U.N. model life tables had been used to determine life expectancy at birth.

4. Neonatal as well as post-neonatal mortality should have been discussed which could have shed some light on various sources of data because in conditions of improving mortality post-neonatal mortality usually declines first. But the study did not provide any evidence on this.

5. The high risk in the first month is due to biological and birth-related factors and generally declines less in response to environment and other improvements than mortality after the first month. It would have been more appropriate to study mortality by socio-economic differences and endogenous and exogenous factors could have been analysed for infant and child mortality. The differentials by breast-feeding, birth spacing and sex preferences and maternal mortality should have also been covered because these are critical factors related to infant and child mortality.

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