Review Article

Projections of the Population of Pakistan by Age and Sex: 1965-1986

A MEASURE OF THE POTENTIAL IMPACT OF A FAMILY PLANNING PROGRAMME

by

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INTRODUCTION

The area comprising Pakistan has had a long history of regular census taking. Registration of births and deaths is also obligatory in a number of political units especially urban areas[1]. In addition, a number of sample surveys have been carried out to determine various characteristics of the population of Pakistan. However, it remains a fact that we do not know enough about such important factors as the birth and death rates of the population. Even the total size of the population, not to speak of its age and sex distribution, is a debated figure.

A number of attempts have been made to arrive at reasonable estimates of this 'true' figure for the total size of the population, its age and sex distribution as well as of the vital rates employing different techniques. Some of most-quoted ones include those by Ahmad [4, p. 44], Khan and Ziauddin [5], Krotki [6, p. 291], and Zelnik and Khan [7]. The Population Growth Estimation survey (PGE) conducted jointly by the Central Statistical Office and the Pakistan Institute of Development Economics is perhaps the only large-scale study conducted mainly

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[1] For details regarding West Pakistan, *see* [1] and for details regarding East Pakistan, *see* [2]. A summary of procedures is also available in [3].

to estimate the vital rates by cross-sectional survey as well as longitudinal registration of vital events based on a national probability sample of areas. The results of all these efforts fall into a wide range and one is left to choose a set of rates depending upon one's own inclinations. Inspite of the efforts of learned scholars the debate is still open.

A recent attempt by James W. Brackett and Donald S. Akers, both of the US Bureau of the Census, projects the population of Pakistan to 1986 and also provides estimates for certain components of the population [8]. It is a noteworthy effort because of its comprehensiveness and theoretical reasoning. These projections aim at demonstrating the consequences of an effective programme of family planning, as well as of no such programme, under the alternate assumptions of constant and declining mortality.

The problem of projecting the population centres around the future behaviour of the vital rates, mainly fertility, since in many countries further declines in mortality seem to be less likely. In the case of Pakistan the basic information on the present vital rates is a problem in itself. The task of projection is, therefore, all the more difficult. Projections are not necessarily inevitable and should not be taken as such [9]. Brackett and Akers do emphasize that the main purpose of their exercise is to indicate the effect of a family planning programme on population growth. Even if the levels of population projection are wrong, the difference between estimates based on various assumptions may not be much in error, but at best such projections are instructive.

Brackett and Akers have made four different estimates of the total size of the population as follows:

Series	Assumptions	Projected 1986 population (million)		
		East Pakistan	West Pakistan	Pakistan
A.	Constant fertility Constant mortality	132.7	104.8	237.5
B.	Declining fertility Constant mortality	115.9	91.3	207.3
C.	Constant fertility Declining mortality	140.6	110.1	250.7
D.	Declining fertility Declining mortality	122.3	95.6	217.8

They have also provided estimates for important components of the population such as:

i) Population of working ages
ii) Population of pre-school age
iii) Population of school age
iv) Older population
v) Urban population

The size of 1986 population indicates the expected levels based on various fertility and mortality assumptions. It is informative to note that changes in fertility alone can cause a difference between 30 to 33 million whereas mortality changes indicate a range of 10 to 13 million only. Under any of the assumptions, the total population of Pakistan is likely to double, or more, over its 1961 level.

Planners and educators should be interested to know that under conditions of declining fertility and constant mortality, primary school population in 1985 would have increased by almost ten million over the 1965 figure. If the fertility does not decline then another seven million children would have been added. This and other information is good to have even though it may not be exact.

THE DATA AND THE ADJUSTMENTS

The principal sources of data are the 1961 Census and PGE results. It is generally agreed that the population of Pakistan was underenumerated in the 1961 Census, although the extent of the underenumeration remains a controversy. Brackett and Akers estimate that the undercount was as much as 8.9 million. The Pakistan Planning Commission estimate of net undercount is 7.5 million [10, p. 4]. Krotki estimated that this figure should be 8.4 million [6, p. 304]. These estimates of undercount have been made basically on one or more of the following considerations:

i) There is a serious underenumeration of infants.

ii) Age group 5-9 is inflated perhaps through misreporting of ages 0-4 and especially 10-14.

iii) There is sex imbalance in certain age groups showing underenumeration particularly of females.

iv) 1951-61 survival rates for some age groups are unrealistic.

To remove these inconsistencies in the data, the age and sex distributions were corrected by Brackett and Akers using the following rather elaborate procedure, separately for East and West Pakistan.

i) Since age-specific death rates obtained through the PGE appeared too erratic, a life table for rural India for 1957/58 was used for ages above 10 years. For ages below 10 values from the UN Model Life Tables, level 25, were used. This composite life table (adjusted for PGE deaths) together with an estimated sex ratio of 106.4 male births per 100 female births, based on Indian hospital records, was used to prepare "adjusted estimates of age and sex distribution" as described in various steps below:

ii) For males 40 to 69, the census counts were smoothed graphically. For males aged 70 and over, the census count was distributed in proportion to the hypothetical population from the Indian life table.

iii) Number of females, except for ages 20 to 29, were estimated on the basis of the number of enumerated males and the sex ratios from the composite life table.

iv) A correction of 0.5 million males was made in the population of East Pakistan 18 to 32 years old to allow for underenumeration and (temporary) emigration.

v) For males under 20, the PGE age distribution rather than that indicated by the census count, was used for rural areas. For urban areas the census count was used. Tribal population was included as discussed later. Due to the serious undercount of population under age 5 both in the census as well as in the PGE, the population under 10 was "manufactured". This involved:

a) Constructing an "index of births" from 1950 to 1960 assuming constant fertility rates applied to the 1951 estimates of the distribution of women of child-bearing ages on the basis of the fertility model described later.

b) Surviving male births using the United Nations life table survival rates, adjusting these to ages 5 to 9 and using this adjustment factor to survivals under 5 years of age at 1961 Census. Female population under 10 was estimated on the basis of the United Nations life table sex ratios.

These adjustments indicated an undercount of 8.9 million—1.2 million higher than that used by the Planning Commission of Pakistan. Since the latter estimate is the officially used figure for planning and other purposes, the new distribution was adjusted to this figure.

There is no doubt that adjustments were needed. Before considering the merit of these adjustments, the following points need to be emphasized:

i) There is a real possibility of *overenumeration* in some age groups not necessarily due to misreporting of ages but rather due to double-counting. In fact the Post-Enumeration Quality Check conducted by the Census Organization does indicate such a possibility [11, pp.1-14]. Even though the validity of this check may be contested, one cannot rule out the possibility of some *overenumeration* of population at least in certain age groups. Krotki [6, p. 292] among earlier writers on this topic did admit such a possibility.

good, but rather because its influence on future growth of population over the next quarter of a century will be negligible any way. Thus for further analysis we are left mainly with population age less than 40 years as of 1961 Census. How far these various adjustments are valid is now our concern below.

i) Use of a life table for *rural* India for adjusting age distribution of the population of Pakistan (including the urban population) is questionable. There are known demographic differences between Hindus and Muslims [17] and Indian population is mainly Hindu whereas a great majority of Pakistan population is Muslim. Moreover, there must be regional differences. Ignoring these differences, the *rural* Indian life table could be applied, at best, only to the rural population of Pakistan.

ii) Use of the United Nations model life tables at level 25 is again doubtful. This level implies a life expectancy at birth of 32.5 years which is not consistent with PGE crude death rate of 19 for East Pakistan and 20 for West Pakistan. Life expectancy in Pakistan is generally considered higher than 32.5, M.K.H. Khan estimated a life expectancy of 33 for males and 35 for females in the Panjab for 1950-52 [18]. Mauldin and Hashmi estimate it as 39.2 for males and 38.1 for females for 1961-66[19]. In fact, Brackett and Akers have themselves used a life expectancy of 51 years for 1961 as basis for future projections. Moreover a recent life table computed directly from the PGE registration data indicates life expectancies at birth of 49 for males and 45 for females [20]. One is not surprised to know that the composite life table prepared by the authors yielded about one-third more deaths than implied by the PGE death rates. How this was reconciled is not stated.

iii) In the case of the tribal population of West Pakistan the authors have assigned the age and sex distribution of the rural population of the Khorasan and Baluchistan-Sistan Province of Iran. One would normally consider that the population of the "settled districts" adjoining the tribal territory would have been better for this purpose.

POPULATION PROJECTIONS

As already stated, four series of projections were constructed on the basis of assumptions regarding mortality and fertility. Series C and D which assume declining mortality expect a gradual rise in life expectancy from 51 in 1961 to 60 by 1990. The basis for choosing these figures is not given and it seems to be a guess. For our purposes, anyway, fertility is perhaps more important in view of the effect it can have on the age structure and growth of a population. Timing of a decline in fertility is also of important consequence. The extraordinary cost of delay in introducing a fertility reduction once mortality has started to decline has been illustrated by a number of scholars [21, Pp. 65-81; 22].

In view of the lack of age-parity-specific birth rates for Pakistan population a hypothetical model had to be constructed. Data from Albania, a country with large Muslim population, and for the American Hutterites were taken and modified for fertility impairment and probabilities of conception. This model assumes, among other things, that all fertile women will marry, that most will be married by age 15 and that virtually all fertile women will have borne their first child by age 20. The programme for population planning is assumed to have immediate effect so that "women who are desirous of family planning would visit the clinic within one year after it was established in an area". This was estimated as one-half of fertile couples in the area. It was also assumed that women with fewer than two children would not accept contraception and that among those with two or more children the incentive to adopt contraception would be greater among high parity women.

The notion that *most* women in Pakistan married (even in 1961) at the young age of 15 is perhaps misleading. Results of a study in Punjab (India) villages show average age at marriage (cohabitation) to be about 16 years [23]. Average age at marriage for women in West Pakistan, including the urban component, should not be expected to be lower than this. In fact, the mean age at marriage for women as reported in 1961 Census (sample tables) has been calculated at 15.74 in East Pakistan [24]. Allowing for a "concealing" of women at younger ages, the average age at marriage should perhaps be *more than this* in view of the general belief that most of the "concealed" women are single rather than married. Some allowance also needs to be made for the difference between the marriage (consummation) and the actual cohabitation. In any case it must be taken as higher than 15.

Furthermore, no allowance has been made for any increase in age at marriage which must follow urbanization, industrialization and modernization and the resultant need for men to marry later, at least in urban areas. Considering that men marry girls with a certain age differential and assuming that this differential will not vary, there must be an expectation of increase in age at marriage, at least among the urban population whose proportion is also expected to increase. The socio-psychological aspects of family planning programme and the gradual loosening of joint-family ties will also have their own contributions to make, in the long run.

A major weakness of the projections lies in the expectations based on the assumed success of the family planning programme. These expectations seem rather high. It is doubtful whether half the married couples would be so motivated as to accept IUCD within one year of the establishment of the family

planning clinics. Even if half the couples are themselves psychologically motivated, there are a number of social factors inhibiting attendance at the clinic[3].

It is also not justified to assume that women with fewer than two children will not be inclined to use contraception. The momentum generated by the programme must also touch these low parity women and cause them to use contraception for purposes of child-spacing. This will have more than proportional effect on fertility than the family limitation practice by high parity women even if the effect is more long range.

Experience gained in some countries does indicate that more high parity women accept contraception than low parity ones [26]. However, too much reliance on this may perhaps be misplaced [27]. These are generally the women who are more likely to be desirous of having larger family size.

The family planning programme is scheduled to make a slower start in East Pakistan but catch up with that in West Pakistan by 1970. This indicates the establishment of clinics. It is not correct to assume that acceptance will also proceed at the same rate. West Pakistan with its higher proportion of industrial and urban population as well as of higher educated (though not so on literacy or primary level education) persons should expect to have a higher acceptance rate. To expect similar results in East Pakistan with a slower programme is too much to expect, to say the least.

The schedule of "losses" of IUCD and reversion to non-contraceptive status is a modification over the official plan. It postulates a gradual decline in proportion of users in each successive years. This is perhaps a drastic schedule. It would have been better to modify the official schedule of IUCD insertion to a reasonable level. If the official level of insertion is really achieved and this means that people are actually motivated to that extent, then we must expect a careful use of all sorts of contraceptive practices even if IUCDs are somehow misplaced or reduced. This is going to be particularly so with higher parity women who are to form the bulk of original acceptors. Furthermore, the momentum generated by the family planning programme must continue for a long time and, in addition, set loose other social forces in increasing motivation to family planning. The long range effect of a family planning programme must be an accelerating acceptance rate, not a deteriorating one. At worst we must assume that the programme will be able to recruit at least as many new acceptors as defaulters.

CONCLUDING REMARKS

Pakistan is engaged in a gigantic effort to raise the standard of living of its people. The tremendous increase in population every year consumes a very large

[3] For a valuable discussion on this topic, *see* Ronald Freedman [25].

proportion of the gain making a difficult task all the more difficult. In order to remedy this situation the Government of Pakistan has officially sponsored a family planning programme. The Brackett and Akers projections are an effort to measure the extent to which this programme may be expected to achieve the desired end.

As pointed out earlier it is not necessary for projections to prove to be prophecies. But they provide instructive information on at least the range of variations under different assumptions. Perhaps a few more fertility assumptions were needed and as pointed out earlier some other assumptions could well have been modified. On the whole, the work is well done and the aim achieved. But the results remain essentially an exercise. This is important for planners and administrators to consider while interpreting these projections. For their benefit it would perhaps have been better to label these projections as "Illustrative Projections of the Population of Pakistan".

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