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Differentials Of Infant Mortality In Rural **West Bengal : A Case Study**

Introduction

DEATH rates in India are considerably higher as compared with those of developed countries, even much higher than some developing ones. In order to reduce the overall death rates, more emphasis is needed on the reduction of infant and child mortality. It is known that the deaths of children before their fifth birth day account for 47 percent of all deaths and almost one third of all deaths are those of infants before their first birth day (Padmanabha 1982). As far as infant mortality is concerned, it is much higher than those of developed countries and even much higher compared with those of some developing countries. In this connection, it may be noted that, whereas crude death rates declined from 27.4during 1941-51 to 14.2 in 1978, infant mortality rate declined from 147 to 126 over the same period. It follows, therefore, that in addition to the influence of such factors as public health engineering, control of certain communicable diseases like Malaria, Cholera etc., there are certain socio-cultural factors which play an important role in determining the level of infant mortality. In India nearly 50 per cent of the infant deaths occur during the post neo-natal period; this is traceable to exogenic factors related to socio-economic condition of the family and its immediate environment (Sandhya 1986).

There were some studies on differential mortality in the past. Mortality studies were initiated in certain rounds of the National Sample Survey (NSS) in which differences in overall death rates were attempted with respect to religion and residence etc. during Feb. 1963 to Jan. 1964. Infant and Child Mortality Survey conducted in 1979 by the office of the Registrar General, India gave much of classifications in terms of living condition of population, socio-economic characteristics of children etc. (RG 1983). Dyson and Moore (1983) in their study, grouped the main states of India into two basic demographic regions, the North and the South including the states in the East and found that in contrast to the North, states in the South and theEast were characterized by lower infant and child mortality. While Nag (1983) compared the southern state of Kerala with the eastern state of West Bengal and found lower mortality in respect of the former state. Sandhya (1986) attempted to find the influence of socio-cultural factors on infant mortality in a case study of Andhra Pradesh and found such factors as type of family, education and occupation of parents, socio-economic status of the family, child birth practices, infant feeding practices and

preference for sons in giving medical attention have significant impact on infant mortality. Present paper attempts to study social group variations in infant mortality on the basis of data from two different villages of West Bengal in which a pilot survey was conducted longitudinally with an emphasis on conceiving the true incidences of live births and deaths in infancy in 1983-84.

Source and Method of Data Collection

A pilot survey was carried out in the villages of Aminpur* and Sandhipur of Hooghly district of West Bengal in the years 1983-84 by the then Demography Research Unit now named, Population Studies Unit of the Indian Statistical Institute, Calcutta. Aminpur is a relatively developed village situated close to the Haripal PHC and railway station. The village is inhabited mostly by educated Hindus . On the other hand Sandhipur is a typical Bengal village connected by road transport only and at a long distance from PHC.

The above survey was carried cut aimed at procuring fertility and infant mortality statistics (other than regarding health) more accurately through logitudinal visits by well experienced interviewers. So far as fertility is concerned complete data were available through repeated visit approach. On the other hand infant mortality data were incomplete in the sense that 12 months data on mortality were not made possible. Because of the stress on fertility study, listing of the two villages were made on the basis of households possessing eligible couples and some more households with the formation of new couples were included in the original list at the time of subsequent visits. Details including children everborn, surviving, age of mother at the time of birth, child health, maternal health, pregnancy and menstrual status of females and other particulars were collected in June 1983 followed by several visits at varying time-intervals. The details of specific intervals between visits and other particulars may be available elsewhere (Sarkar 1984; Mukhopadhyay 1986). For the present paper data on children everborn and surviving by the age of women were only used for the two villages and for different social groups. Listing of the households may be assumed to be complete and show the individual characteristic of the two villages.

Method of Analysis

Estimation Procedure

Infant mortality is defined as the probability of dying of a cohort of live births before reaching age one usually denoted by q_0. In the event of incomplete enumerations of mortality statistics from household surveys which are usually the case in underdeveloped areas, it was difficult to estimate accurately infant mortality or even child mortality directly by using the above stated definition. As such demographers tried to estimate these statistics indirectly from one time retrospective survey data on children everborn and surviving. Brass was the first demographer to propose a set of multipliers for converting statistics on proportion dead among children everborn to women in age intervals of 15-19,20-24,..., into estimates of

Aminpur was a village according to 1961 census. In 1971 census it was included in Haripal non-municipal area, hi the present paper, it was treated as a developed village.

the probability Of dying before attaining certain exact childhood ages (Brass and Coals 1968; Brass 1975). The equation of Brass was as follows :

$$q(x) = k(i)\text{-}D(i) \qquad (I)$$

where *q(x)* is the probability of dying between birth and exact age *x, k(i) is* the multiplying factor for each group of women and D(0 is the proportion dead among children everborn to each age group of woman. Brass found that the relations between the proportion of children dead, *D(i)* and a life table mortality measure, *q(x)* is affected by the age pattern of fertility, since it is this pattern that determines the distribution of the children of a group of women by length of exposure of risk of dying. Hence the multipliers *K(i)* were settled according to the value of *P(l)/P(2)*— a good indicator of fertility condition at younger ages, where /*(/) is the average parity or average number of children everborn reported by women in age group *I.* Coale and Demany suggested a more refined parameter *P(2)/P(3)* since *P(l)* is sensitive both to age reporting errors at the start of child-bearing and to random fluntuations due to the relatively small number of births, at those ages of women (Brass 1975). Brass estimated the *K(i)* multipliers by using a third degree polynomial of fixed shape but variable age location to represent fertility. Later Jeremiah Sullivan, instead of using polynomial by Brass employed actual fertility schedules and the Coale-Demeny life tables and finally obtained multiplies by using least square regression to fit Brass's original equation (Sullivan, 1972). Sullivan's equation for multipliers was

$$K(i) = a(.r) + b(i)\text{-}(P(.2)/P(3)) \qquad (2)$$

where *a(i)* and *b(i)* are coefficients and *P(2)* and F(3) are the average parties of women in age groups 20-24 and 25-29 respectively, Sullivan, though modified Brass's multipliers but unfortunately his actual data were very limited and consequently Trussell (Trussell 1975) estimated a third set of multipliers using data obtained from the model fertility schedules developed by Coale and Trussell (1974). The estimating equation of Trussell was

$$K(i) = 0(0 + b(i)\ (P(l)/P(2) + c(i)\ (\mathrm{P}(2)/\mathrm{P}(3)).\ \text{and}\ q(x) = k(i) \bullet D(i) \qquad (3)$$

The general theory on which these methods are based is same but because of different types of data they used, the multipliers were different. There were some other demographers who contributed to the development of the estimation technique using some other assumptions and models (using own children approach) and obtained mortality statistics the details of which may be available elsewhere (Feeny 1976,1980; Preston and Palloni 1977). Here we propose to apply only Brass's and Trussell's multipliers to obtain finally the infant mortality rate and expectation of life at birth for overall appraisal of mortality condition. The two methods are expected here to make the estimates, to some extent acceptable. It may be mentioned here that for Kerala these two methods gave consistent results and in close agreement with the observed values as obtained from Infant and Child Mortality Survey (Registrar General 1981). Moreover the above report also showed that Feeny's method gave lower estimates of infant mortality rates as compared with those of SRS.

Results

Overall Pattern of Children Everborn and Surviving

The calculation of average number of children everborn and surviving, the total number of females in each age group of 15-19, 20-24,… etc. were necessary both for Brass as well as

Trussell's methods. Since the present data lack these types of information, the number of married women which was actually surveyed in each age group was multiplied by a factor which was obtained from the ratio of the number of all females in each age group to the number of currently married women to estimate the required number of females for the study. The data pertaining to the population of the rural areas of districts around Calcutta (Sarkar 1981) were used and the factors may be reproduced from elsewhere (Mukhopadhyay 1986). Table 1 shows the actual number of married women in each age group with the above stated factors and the average number of children everborn, surviving and the proportion dead *(Di)* of the population irrespective of any characteristic such as village and social groups.

TABLE 1: AVERAGE NUMBER OF CHILDREN EVERBORN, SURVIVING AND PROPORTION DEAD IN EACH AGE GROUP OF FEMALES

(Villages of Aminpur and Sandhipur, 1983-84)

Age group	*Number of mothers*	*Adjustment factor*	*All females*	*Average number of children*		*Proportion dead*
				Everborn	*Surviving*	
(1)	*(2)*	*(3)*	(4)	*(5)*	*(6)*	*(7)*
15-19	32	2.137	68	0.221	0.206	0.068
20-24	66	1.182	78	1.167	1.090	0.066
25-29	53	1.063	56	2.893	2.732	0.056
30-34	46	1.057	49	4.327	3.816	0.118
35-39	36	1.059	38	4.474	3.658	0.182
40-44	34	1.108	38	6.737	5.421	0.195
45-49	20	1.259	25	6.240	4.680	0.250
Total	287		352			

The pattern of average number of children everborn which is shown in the above table is typically complying with the usual pattern obtained in most of the underdeveloping areas where it is found that the figures increase with the age of mother but in the extreme age the figure gets lower because of misreporting of old aged mothers about their children everborn; may be because of recall lapse error. Table 1 shows, moreover, the deficiency in the *Di* figures. These figures seemed to be under estimated mainly because of low precision in the children everborn data which are very common in most of the developing countries. On the other hand, data on children surviving may be considered to be of some better quality since there is less chance of any surviving child not to be reported by the respondent. If children everborn data are to be used only to measure the differentials in fertility, it is not necessary to correct the data for under reporting, it may be presumed that under reporting is equally serious among all sub groups (Bogue 1971). Similarly it may be applicable to differential mortality study particularly on the basis of data on children everborn and surviving under the hypothesis of usual error in everborn and no such error in surviving data. But in our study

some sort of standardization may be applied to the final results of infant mortality and also to the values of expectation of life at birth which are expected to be underestimated from the deficiencies in data on children everbora shown in Table 1. Separate analysis could have been done in respect of the two villages and the different social groups, but since the pattern is supposed to be of the same nature, the detailed analysis is deemed unnecessary for the present paper.

Overall Pattern of Infant Mortality

A resort is made here to estimate the pattern of infant mortality in the villages of Aminpur and Sandhipur. First of all Brass's technique will be applied and then Trussell's one, in calculating the mortality. The results of these two methods win be compared and the appropriate results will be taken into account. It is worthwhile to note here that both these methods are based on the assumptions of constant fertility and mortality in the recent past (there are other assumptions also). Hence it may be expected that the results would be biased if the underline assumptions are not strictly followed. Nevertheless, since the area under study is not much developed in respect of its demographic parameters, the assumptions may, to some extent, be valid and consequently the pattern obtained may be relied upon.

Brass's Method

Table 2 shows the average number of children everborn, surviving and proportions dead among women of age groups, 15-19,20-24,... along with *K(i)* multipliers and x_{qo} values.

TABLE 2: CALCULATION OF 1q0, 2q0, 3q0, 5q0, 10q0, I5q0, 20q0 BASED ON CHILDREN EVERBORN AND SURVIVING DATA

(Villages of Aminpur and Sandhipur, 19S3-S4)

Age of Women	Average number of children		Di = 1 -Si/Pi Multipliers (Ki)		Age	Proportion dead by x(x_{q0})
	Everborn (Pi)	Surviving (Si)				
(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*
15-19	0.221	0.206	0.068	0.993	1	0.0675
20-24	1.167	1.090	0.066	1.019	2	0.0673
25-29	2.893	2.732	0.056	0.999	3	0.0560
30-34	4.327	3.816	0.118	1.006	5	0.1190
35-39	4.474	3.658	0.182	1.015	10	0.1850
40-44	6.737	5.421	0.195	0.992	15	0.1930
45-49	6.240	4.680	0.250	0.990	20	0.2470

In Table 2, Pi and Si columns show the basic data on average number of children everborn and surviving per woman for age intervals 15-19, 20-24, ... The proportions of non

survivors ate shown in column Di. These proportions are converted into estimates of 1_{q0} 2_{q0},..., 20_{q0},. by using multipliers taken from annex table V.I (Manual IV, 1967) according to parameter *P(1)/P(2)* where P(l) and *P(2)* have their usual meaning. The value of *P(1)/P(2)* is calculated to be 0.189 and *K(i)* values were obtained from the table V.I by linear interpolations, wherever required.

The figures in the last column of Table 2 clearly show some sort of irregularity owing mainly to the errors in the reporting of age of women and the number of children everborn and surviving, to some extent Hence it is usual custom to smooth these x_{q0} values. Smoothing is done by the use of logit transformation which requires a life table to be used as standard. In the present case West Model Life table systems of Coale and Dcmeny (1966) was considered as standard. The relationships between the logits of the estimated lx values and those of standards £ is taken as

$$Y(x) = A + Y^s(x)$$

where $$Y(x) = \text{logit of } l_x = \frac{1}{2}\log_e\left(\frac{l_x}{1-l_x}\right) \qquad (4)$$

$$Y^s(x) = \text{logit of } l^s_x = \frac{1}{2}\log_e\left(\frac{l^s_x}{1-l^s_x}\right) = 1 - q(x)$$

and A is estimated as the difference between the average values of logits of actual and the standard lx values excepting the first one upto age 5. Table 3 shows the smoothed *q(x)* values by use of the above relations etc.

TABLE 3 : CALCULATION OF DIFFERENT PARAMETERS FOR SMOOTHING *q(x)* VALUE UPTO AGES

(Villages **of** Aminpur and Sandhipur, 1983-84)

Age of child	*Estimated qx values*	*lx*	Logit lx	*Standard*			*Smoothed*	
				l^s_x	Logit l^s_x	*Logit lx*	lx	*qx*
(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*
1	0.0675	0.9325	1.31287	0.93265	1.31407	1.37181	0.93955	0.0604
2	0.0673	0.9327	1.31447	0.92058	1.22513	1.28283	0.92862	0.0714
3	0.0560	0.9440	1.41239	0.91479	1.18679	1.24449	0.92336	0.0766
5	0.1190	0.8810	1.0097	0.90766	1.14270	1.20040	0.91689	0.0831

The figures in the last column depict a smoothed series of *q(x)* values. For determining the level of infant mortality, instead of taking Iq_0 value, corresponding to age group 15-19

which is usually regarded as weak for estimation purpose, the value corresponding to age group 20-24, i.e., $2q_0$ is considered and corresponding level of infant mortality and expectation of life at birth are obtained from West Model Life Table system of Coale and Demeny (1966). The estimated values of infant mortality rate (IMR) and expectation of life at birth (eS) during 1982-83 are obtained respectively as 61.2 and 62.04 which seemed to be unrealistic as far as the present area of study is concerned. The estimated values could not be made more refined by toying with the South Asian Pattern of Life Table System for Developing Countries (UN, 1982). The lower estimated figures may have originated from the under reporting of children everborn data. This discrepancy could be, to some extent, lessened if the effect of error due to under reporting of children everborn data is minimised. For this a multiplier is determined from the ratio of standard data on children everborn to the actual data obtained from the area. Here the standard value was taken from graduated parity figures corresponding to age group 20-24 in a prospective (follow-up) study in the same region (Mukhopadhyay, 1986). The adjusted figures of IMR and e§ values, thus obtained were found to be 94.21 and 40.30 years which seemed more realistic. The infant mortality rate for rural West Bengal was found to be 93 in 1982 (Registrar General 1985).

Trussell's Method -

The application of TrusselFs method is shown in Table 4.

TABLE 4: CALCULATION OF 1qo 2qo, 3qo, 5qo $15q_0$ and $20q0$ BASED ON CHILDREN EVERBORN AND SURVIVING DATA

(Villages of Aminpur and Sandhipur, 1983-84)

Age of women	*Average number of children*		Di=1-Si/Pi	*Multipliers (Ki)*	*Age*	*Proportion*
	everbron (Pi)	*surviving (Si)*				
(1)	*(2)*	*(3)*	*(4)*	*(S)*	*(6)*	*(7)*
15-19	0.221	0.206	0.068	0,9387	1	0.0629
20-24	1.167	1.090	0.066	1.0483	*2*	0.0692
25-29	2.893	2.732	0.056	1.0287	3	0.0576
30-34	4.327	3.816	0.118	1.0441	5	0.1232
35-39	4.474	3.658	0.182	1.0653	10	0.1939
40-44	6.737	5.421	0.195	1.0544	15	0.2056
45-49	6.240	4.680	0.250	1.0455	20	0.2614

In Table 4, first fora columns have the same meaning as in earlier case of Brass's method. So far as multipliers (ki's) are concerned these have been calculated by using equation(3) and taking tabulated values of the constants *a(i), b(i)* and *c(i)* corresponding to West Model

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pattern of Coale and Demeny life table system (Manual X, 1983) and the values of P(1)/P(2) and P(2)/P(3) from the present data on parity distribution.

The figures in the last column show the similar kind of irregularity as we have obtained in case of Brass's method. Hence these figures are smoothed in a similar fashion as in the last case using logit transfromation and a one parameter life table system of Brass. Table 5 shows the smoothed *q(x)* values upto age 5.

TABLE 5 : CALCULATION OF DIFFERENT PARAMETERS FOR SMOOTHING *q(x)* VALUES UPTO AGE 5

(Villages of Aminpurand Sandhipur, 1983-84)

Age of child	*Estimated qx values*	lx	logit lx	*Standard*			*Smoothed*	
				l^s_x	logit l^s_x	*logit lx*	lx	*qx*
(1)	*(2)*	*(3)*	(4)	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*
1	0.0629	0.9371	1.37977	0.93265	1.31407	1.35541	0.93766	0.06234
2	0.0692	0.9308	1.29953	0.92058	1.22513	1.26648	0.92642	0.07358
3	0.0576	0.9424	139746	0.91497	1.18679	1.22814	0.92102	0.07898
5	0.1232	0.8768	0.98124	0.90766	1.14227	1.18362	0.91429	0.08571

The figures in the last column show a smoothed series of *q(x)* values. The estimated values of infant mortality rate (IMR) and expectation of life at birth (e^0_0) are obtained to be 63.0 and 61.65 respectively. After adjustment by use of a multiplier, the final figures of IMR and e^0_0 came to be 96.98 and 40.05 years. While comparing the figures for IMR and e^0_0 of Trussell's method with those of Brass's one it may be observed that the figures in respect of the former method have slightly higher values of IMR and correspondingly lower value of $e°_0$ than those of the latter method. The values corresponding to the former method seemed more appropriate. From the overall observation of the two methods it may be said that the area under study depicts a gloomy picture of overall health conditions of infants, in particular and the overall population, in general.

Differentials of Infant Mortality

In various studies on the determinants of the level of infant and child mortality, it was more or less established that such factors as social, economic and environmental and cultural aspects of life are responsible for the variations of loss of life in early years of life. As such, an attempt is made here to find out differentials in infant mortality among population of

different social groups especially and between two villages, one is undeveloped (Sandhipur) and the other one is, to some extent, developed (Aminpur) in the state of West Bengal around 1982-83 (Table 6).

TABLE 6: SMOOTHED *q(x)* VALUES SEPARATELY FOR VILLAGES, AMINPUR AND SANDHIPUR

Age of child	*qx [Brass]*		*qx, [Trussell]*	
	Aminpur	*Sandhipur*	*Aminpur*	*Sandhipur*
(1)	*(2)*	*(3)*	*(4)*	*(5)*
1	0.0461	0.0705	0.0457	0.0704
2	0.0534	0,0846	0.0530	0.0844
3	0.0571	0.0912	0.0566	0.0909
5	0.0617	0.0990	0.0612	0.0988

Table 6 shows the *q(x)* values which are more or less consistent among the two methods. So far as the differences in *q(x)* values between the two villages are concerned, it may clearly be seen from the same table that the values in respect of Aminpur are much less than those of Sandhipur. From the $2q_0$ values, the level of infant mortality rate and expectation of life at birth using West Model Life Table of Coale and Demeny (1966), are given in Table after necessary adjustment.

TABLE 7 : PATTERN OF INFANT MORTALITY RATE AND EXPECTATION OF LIFE AT BIRTH SEPARATELY FOR VILLAGES, AMINPUR AND SANDHIPUR, 1983-84

Mortality parameter	*Brass method*		*Trussell method*	
	Aminpur	*Sandhipur*	*Aminpur*	*Sandhipur*
(1)	*(2)*	*(3)*	(4)	*(5)*
Infant mortality rate	72.7	109.9	72.0	107.9
Expectation of life at birth	42.4	38.8	415	38.8

Table 7 shows that the village Aminpur depicted lower infant mortality rate and higher expectation of life at birth man those of Sandhipur. It was already mentioned in the earlier paragraphs that Aminpur is relatively a developed village. In terms of fertility data, too, it was observed that Aminpur has lower marital fertility rate than Sandhipur as observed by Sarkar (1984). Table 8 gives such differentials in fertility.

TABLE S. : AGE-SPECIFIC MARITAL FERTILITY RATES SEPARATELY FOR VILLAGES, AMINPUR AND SANDHIPUR

Age group	*Adjusted rates*		*Combined*
	Aminpur	*Sandhipur*	
(1)	*(2)*	*(3)*	*(4)*
15-19	166.7	214.8	206.1
20-24	256.2	364.1	292.1
25-29	73.7	230.0	179.7
30-34	181.8	205.2	200.0
35-39	93.3	222.2	163.6
40-44	0.0	60.0	43.6
45-49			
15-49	133.9	214.9	187.5

Table 8, although having some fluctuating nature of data, clearly shows better condition in terms of lower age specific and total marital fertility rates in respect of village Aminpur *as* compared with those of Sandhipur.

Social Group **Variation**

The study now attempts to find out differentials in mortality among different social groups -of the combined area of the villages cf Aminpur and Sandhipur. The different social groups include high caste Hindu, Scheduled Caste Hindu, other Hindu and Muslims designated respectively as social groups 1, 2, 3 and 5. Because of females, social group-variation in the combined area has been considered for the analysis. Table 9 shows the *q(x)* values for such a classification of different social groups of Aminpur and Sandhipur.

Table 9 clearly shows some variation between the two methods as far as different *q(x)* values of the four social groups are concerned. It is also clear that the values irrespective of social groups did net vary much and envisaged more or less consistent values among themselves. The plausible reason for the variation may be because of some sort of irregularity found in some social group figures arising from the smaller number of females. Moreover from careful observations, the *q(x)* values for the different social groups according to Trussell's method seemed unrealistic. On the other hand, Brass's method gave more or less

reasonable resalts. The figures in respect of upper caste Hindus (Social group 1) were found to be lower than those of other three social groups. Scheduled caste Hindus showed higher values than Muslims which, again showed higher values than those of other Hindus (Social group 3). From $2\#_0$ values tb&estimated figures of infant mortality rate and expectation of life at birth were calculated and after adjustment, the final figures came to be as given in Table 10,

TABLE 9' SMOOTHED q*(x)* VALUES SEPARATELY FOR DIFFERENT SOCIAL GROUPS

(Villages of Aminpur and Sandhipnr, 1983-84)

Age of child	*qx [Brass mutkad]*					*qx (Trusell Method]*				
	Social group					*Social. group*				
	1	*2*	*3*	*5*	*All*	*1*	2	*3*	5	*All*
(l)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*(10)*	*(11)*
1	0,0564	0,0563	0.0636	0.0695	0.0604	0.0673	0.0704	0.0607	0.0607	0.0623
2	0,0652	0.0897	O.0764	0.0834	0,0714	0.0794	O.O845	0,0760	0,0716	0,0736
3	0.0697	0.0966	0.0823	0.0399	0.0766	0.0852	0,0910	0,0815	0,0769	0,0791
5	0.0752	0.1049	0,0895	0,0976	0,0831	0.0923	0.0988	0.0884	0.0334	0.0857

TABLE 10 : PATTERN OF INFANT MORTALITY RATE, AND EXPECTATION OF LIFE AT BIRTH FOR DIFFERENT SOCIAL GROUPS

Mortality parameter	*Social group*				
	1	2	*3*	5	*All*
(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
Infant mortality rate	86,8	115,9	100.4	108.7	94.2
Expectation of life at birth	41.0	38.3	39,7	39,0	40,3

Table 5,0 shows how the different social group figures vary among themselves. High caste- Hindus possessed the highest expectation of life at birth (41.0 years) and lowest infant mortality rate (86,8) as compared with those of other social groups. The plausible reason behind these figures in respect of social group 1 may be because of better health condition, higher literacy status and overall consciousness about the day to day life. On the other hand Scheduled caste Hindus showed highest infant mortality rate (115,9) and the lowest expectation of life at birth (38.3), may be owing to their inferior health condition, lower educational status and overall lower level of life, As far as Muslims are concerned it may

be obtained from the above table that their infant mortality rate (108.7) is lower than Scheduled caste Hindus as well as they possessed higher expectation of life at birth (39.0). Better results of Muslims may be because of their higher educational status in this particular region. Sarkar (1984) maintained that about 60% of the inhabitants of village Sandhipur were Muslims who are not educationally backward like other Muslims of areas away from Calcutta. The position of other Hindus remained mediocre *(IMR* = 100.49, eg = 39.7) with higher status than Scheduled Caste Hindus and Muslims but lower than Upper caste Hindus. To substantiate the above findings some socio cultural data in respect of four social groups including High caste Hindus, Scheduled caste Hindus, other Hindus and Muslims of rural areas of districts around and away from Calcutta in West Bengal may be useful. So far as education above primary is concerned, Table 11 gives a juxtaposition of figures in respect of rural areas around and away from Calcutta which may have some similarity with the present area under study.

TABLE 11 : ESTIMATED PERCENTAGES OF MALES AND FEMALES (AGED 15+) BY SOCIAL GROUP AND REGION AND EDUCATION ABOVE PRIMARY

Social group	*Region**			
	1		2	
	male	*female*	*male*	*female*
(l)	*(2)*	*(3)*	*(4)*	*(5)*
Upper caste Hindus	72.5	48.7	59.7	36.7
Scheduled caste Hindu	26.2	9.3	26.4	11.1
Other Hindus	44.1	20.4	53.6	22.4
Muslims	34.4	9.3	23.4	6.5
Total	41.4	17.3	35.0	15.3

* Regions 1 and 2 depicted respectively for survey of rural population around Calcutta (1978) and away from Calcutta (1980).

NOTE : This table in condensed form has been reproduced from Sarkar et al., 1984.

From Table 11, it may be observed that the upper caste Hindus possessed the best educational status than other three social groups. As far as Scheduled caste Hindus and Muslims are concrned the figures in the two regions are not tallying. The condition of Muslims is better than Scheduled caste Hindus in region 1, whereas they possessed inferior status in region 2. Similarly, a differential fertility data may be appropriate in substantiating the present study on differential mortality. Table 2 gives such kind of data.

TABLE 12 : ESTIMATED FERTILITY RATES BY SOCIAL GROUP AND REGION

Social group	*Region*	
	1 (1978)	*2 (1980)*
(l)	*(2)*	*(3)*
Upper caste Hindus .	57.0	157.4
Scheduled casts Hindus	148.0	214.2
Other Hindus	125.0	155.1
Muslims	172.0	304.9
Total	139.4	276.4

*Total includes figures for Scheduled tribes which are not shown separately.

NOTE • The above table is also partially reproduced from the reference given in the footnote of Table 11.

Table 12 shows, with a few exceptions, the similar condition of those four social groups signifying the differential nature of fertility conditions. Several other relevant socio-cultural or economic aspects of life of those four social groups of population may be quoted here to show how the variation in mortality among different walks of life occurred. However, we restrict our study upto this stage and it may be inferred that differentials in mortality in no way differ with the differential in socio-cultural and economic aspects of life of the population of villages of Aminpur and Sandhipur in West Bengal.

Discussion

Present paper attempted to find out some differentials in infant mortality rate among different social groups on the basis of the data obtained from a pilot survey in the two villages of Aminpur and Sandhipur in West Bengal. Because of deficiencies observed in mortality statistics especially of infants, a follow-up approach was carried out in that pilot survey to catch the true incidences of live births and deaths in infancy by well experienced inter-viewers. Owing to some unavoidable reasons the data on the latter aspect (mortality) were not complete, while on the former aspect (live birth) were made possible and some interesting results are already available elsewhere (Sarkar 1984, Mukhopadhyay 1986). To fill the gap of direct estimation, some indirect techniques of mortality estimation were tried on the data on children everborn and surviving by age of women which were available in that survey. Because of the questions of several assumptions and applicability of Brass and Trussell's methods, theemphasis of this study was made primarily on the comparative nature of analysis rather than finding the exact level of mortality parameter.

So far as the data on children everborn and surviving by age of women were concerned it did in no way differ from the usual pattern observed in most of the developing countries. The estimations of *q(x)* values both in respect of Brass as well as Trussell's methods were first of all made upto age 20. After careful analysis, it was observed that there were some

fluctuations in the estimates which needed to be corrected, Hence Brass's standard logit system was applied and smoothed *q(x)* values were obtained upto age 5. Using West Model Life Tables of Coale andDemeny (1966), the level of infant mortality from *q(x)* values were obtained. Using Model Life Tables for Developing countries with South Asian Pattern (1982). the estimates could not be made more refined. The estimates of infant mortality rate (IMR) and expectation of life at birth *(eft)* were finally adjusted by use of a multiplier.

The infant mortality rate and expectation of life at birth were, estimated to be 94,21 and 40.30 respectively by Brass's method on the combined data from the villages of Aminpur and Sandhipnr in 3983. TrusselPs method gave those two estimates as 96,98 and 40.05. Although these, two methods gave more or less consistent results, the level is accepted with some reservations. While comparing the figures of Aminpur, a developed village with those of Sandhipur, a less developed one, a clear differential in mortality may be noticed with higher expectations of life at birth and lower infant mortality rats in respect of Aminpur, as compared with those of Sandhipur. Social group figures of IMR and *eft* were based mainly on Brass's technique and gave a clear differential. While upper caste Hindus gave highest expectation of life at birth (41.0) and lowest infant mortality rate (86.8), Scheduled caste Hindus gave lowest expectations of life at birth (38.3) and highest infant mortality rate (115.9) as compared with those of other Hindus (IMR = 100.4. *eft* = 39.7) and Muslims (TMR = 108.7, *eft* = 39.0) of the villages of Aminpur and Saedhipur. It was maintained that the differentials in mortality may have been caused by differentials in socio-culturai and other aspects of life apart from biological factors.

It is true that no firm conclusions could be drawn from this type of study based on the. data on pilot survey from smaller segments of geographical areas. Nevertheless, this small venture gave differentials in mortality even using indirect approach for estimation. Whatever findings obtained from the present study clearly showed that, differentials in mortality were affected by differentials in sociocultural and other aspects of life.

In order to raise the standard of life of people at large in terms of higher expectation of life at birth, lower infant mortality rate etc. different emphasis should be put on the enhancement of socio-cultural factors of life of the people with different socio-cultural, economic or other factors to their own. For this, more and more indepth studies are always welcome to strengthen the knowledge of our scientists for advocating and advising the policy makers who will have rightly to appraise the current situation and make appropriate frame of actions for the betterment of our downtrodden section, in particular and overall population, in general.

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