DEMOGRAPHIC SURVEILLANCE SYSTEM - MATLAB

Volume Three

VITAL EVENTS AND MIGRATION-1974

Lado T. Ruzicka
A. K. M. Alauddin Chowdhury

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Vital Events and Migration

1974

Lado T. Ruzicka, Senior Fellow, Demography Department,
Australian National University, Canberra
A.K.M. Alauddin Chowdhury, Head, Statistical Branch,
Cholera Research Laboratory

CHOLERA RESEARCH LABORATORY
G.P.O. Box 128, Dacca - 2
Bangladesh

PREFACE

The Cholera Research Laboratory (CRL) operates under a bilateral project agreement between the governments of Bangladesh and the United States of America. Research activities of CRL center on the interrelationships between diarrheal disease, nutrition, fertility and their environmental determinants. CRL issues two types of papers: scientific reports and working papers which demonstrate the type of research activity currently in progress at CRL. The views expressed in these papers are those of authors and do not necessarily represent views of Cholera Research Laboratory. They should not be quoted without the permission of the authors.

Abstract

The results of the Demographic Surveillance System (DSS) in Matlab for the calendar year 1974 are presented in three sections: (A) A summary overview of the vital events and migration recorded in 1974 with a descriptive analysis of the results. (B) A detailed study of mortality differentials between males and females, and an analysis of the prevailing patterns of marital fertility. (C) Selected cross-tabulations of the recorded events.

The present volume is a part of a series describing and analysing the annual results of the DSS - Matlab.

Introduction

The data presented in this volume were obtained from the continuing registration of births, deaths and migrations in the calendar year 1974. A description of the Demographic Surveillance System (DSS), its operation and definition, is presented in Volume One of this series. The DSS consists of two parts: longitudinal registration of demographic events, and cross sectional censuses. The latest census was taken between 22 April and 4 July 1974; the results of it are presented in Volume Two of this series.

The present volume on the vital events and migration in 1974 is divided into three sections: (A) A summary overview and analysis of the main results of the Demographic Surveillance for 1974; (B) Further analysis and discussion of a selected topic; and (C) The basic tabulations of the results of the DSS under three parts; C-1 Deaths; C-2 Births and Pregnancy Termination; C-3 Migration. The number of tabulations in each section of part C does not utilize all of the wealth of information generated by the DSS. Its main objective was to present only selected cross-tabulations which may be utilized by health and population researchers. The detailed information on the DSS in Volumes One and Two provides leads for further specific tabulations of the data as they may be required for specialized inquiries and research projects.

The quality of the results of any continuing surveillance system depends on the field workers and their supervisors. There are more than 300 of them in the DSS Matlab. We wish to acknowledge their untiring effort and dedicated work, both in the villages and in the Matlab H.Q. of the field operations. The staff of the Statistical Branch of the Cholera Research Laboratory in Dacca verified, coded, punched and processed the data and this contribution to the results of the DSS is gratefully recognized and appreciated.

A. Analysis of the results of the Demographic Surveillance System in the Matlab area, 1974

The DSS was maintained in 228 villages with a population of 263,507 as enumerated during the 1974 census. The census, however, was taken in different villages at different dates between April 22 and July 4, 1974 (see TABLE 1). For the calculation of the relative measures of demographic change the base-line population is required, that is a population size at the mid-point of the calendar year. To estimate the population size as of 1 July 1974 birth, death and migration records of each month from April to July were used and the census population was adjusted for changes which took place between the actual enumeration and 1 July 1974. As the time span was very short, the adjustment was numerically a small one: only about 300 persons (153 males and 147 females) have to be added to the census population to obtain an estimate of the mid-year population size.

TABLE 1

Census 1974. Enumerated population by the month in which census was taken and estimate of the mid-year population

Census Month	Enumerated population	Adjustment for change between census month & 1 July			Estimated Population 1 July 1974
		Births	Deaths	Migrations	
22 - 30 April	6,368	+ 42	- 16	- 7	6,387
1 - 31 May	112,509	+480	-201	-56	112,732
1 - 30 June	125,074	+174	- 83	-31	125,134
1 - 4 July	19,556	- 8	+ 3	+ 3	19,554
Total	263,507	+688	-297	-91	263,807

A general review of the number of events registered in the DSS during the calendar year of 1974 is summarized in TABLE 2. The population of the area increased during that year by 4,587 persons, representing a growth rate of 1.7 percent. The natural increase resulting from the excess of births over deaths was, however, considerably larger, reaching 6,954 persons and implying a rate of population growth of 2.6 percent a year on the average. The migration into and out of the DSS area ended up with a net loss of 2,367 persons thus considerably reducing the growth effect of the reproduction.

The reproduction continued to display typical features of a high fertility, moderate mortality population. Birth rate stood high in 1974 at 42.9 live births per 1,000 population and the crude death rate - 16.5 per 1,000 population - may at best be described as moderate. Among the causes why mortality level is not lower is the persistence of high infant and child mortality. Out of 1,000 live born children 137.8 died during the first year of life, a majority of those deaths occurring during the first month after birth (neonatal mortality of 78.0 in contrast to post-neonatal mortality of 59.8 during the age 1 - 11 months after birth).

In the subsequent sections the pattern and characteristics of the demographic change in the DSS during 1974 will be discussed in more detail.

TABLE 2

Vital events and migration registered in DSS Matlab in 1974

Events	Number	Rate per 1000 Population
Mid-year population	263,807	-
Live births	11,316	42.9
Deaths	4,362	16.5
Infant deaths	1,559	137.8 [(a)]
Migration - in	2,875	10.9
Migration - out	5,242	19.9
Natural increase	6,954	26.4
Loss due to migration	2,367	9.0
Total population increase 1974	4,587	17.4

[(a)] per 1,000 live births.

Mortality

There were 4,362 deaths recorded in the DSS in 1974, more than half of them (2,451 or 56.2 percent) among infants and young children under the age of five years. Infant and child mortality is still very high in Bangladesh in general and the DSS area is no exception. Out of 1,000 live births of that year 137.9 were lost during the first year of life, the majority of them during the first month of life (TABLE 3). Mortality of boys exceeded that of girls by 7 percent during infancy, but a closer inspection of the data by child's age at death reveals that it was only during the neonatal period (the first month after birth) when the girls enjoyed a considerably higher chances of survival than boys. The risk of death during the first month after birth was 30 percent higher for male than for female babies (87.9 in contrast to 67.8 deaths per 1,000 live births for male and female babies respectively). From then on throughout the post-neonatal period

girls were disadvantaged compared to boys and their disadvantage increased with the child's age and extended beyond the first year of life throughout the early childhood. Between the ages 1 and 4 years mortality of girls exceeded that of boys by, on the average, 80 percent.

TABLE 3

Infant and Child Mortality, 1974

Age at Death	Number of Deaths			Mortality rates per 1,000 live births			100 F/M Ratio
	Total	Males	Females	Total	Male	Female	
Under 1 month	883	506	377	78.1	87.9	67.8	77
1-5 months	424	207	217	37.5	36.0	39.0	108
5-11 "	252	107	145	22.3	18.6	26.1	140
Under 1 year	1559	820	739	137.9	142.5	132.9	93
1 year	296	109	187	31.6*	22.9*	40.6*	177
2 "	305	116	189	34.8	25.7	44.4	173
3 "	195	71	124	22.5	16.0	29.2	183
4 "	96	33	63	11.6	7.7	15.8	205
1-4 yrs.	892	329	563	25.4	18.3	32.9	180

* for ages 1-4 years,
deaths per 1,000 mid-year population.

The higher female than male mortality applied in the general population of the DSS throughout the greatest part of the life span. From the Life Tables based on the 1974 mortality data it appears that only at the ages 35 to 60 years women had slightly lower or almost equal mortality with men. As a result, the life expectation of females at birth was, in 1974, more than four years shorter than that of males (49.3 years in contrast to 53.4 years for females and males, respectively). The difference in the life expectation between the sexes gradually diminished and became almost zero between the ages 30 and 50 years but started increasing again at the older ages. (TABLE 4).

TABLE 4

Abridged Life Table based on age-specific death rates for 1974 in DSS Matlab

Age	Probability of dying $1{,}000\,{}_nq_x$	Survivors l_x	Life expectation e^o_x	Probability of dying $1{,}000\,{}_nq_x$	Survivors l_x	Life expectation e^o_x
	MALES			FEMALES		
0	117.28	100,000	53.4	110.44	100,000	49.3
1	22.64	88,272	59.5	44.87	88,956	54.4
2	25.38	86,274	59.8	43.43	84,965	55.9
3	15.89	84,084	60.4	28.80	81,275	57.4
4	7.69	82,748	60.3	15.63	78,934	58.1
5	23.47	82,111	59.8	31.54	77,700	58.0
10	5.24	80,184	56.2	8.86	75,249	54.8
15	5.68	79,764	51.5	17.35	74,583	50.3
20	5.98	79,311	46.7	15.13	73,289	46.2
25	11.48	78,836	42.0	14.05	72,180	41.8
30	14.99	77,931	37.5	21.52	71,166	37.4
35	27.66	76,763	33.0	20.93	69,634	33.2
40	32.08	74,640	28.9	34.06	68,177	28.8
45	52.11	72,245	24.7	33.63	65,855	24.7
50	75.67	68,481	21.0	53.58	63,640	20.5
55	103.55	63,299	17.5	94.38	60,230	16.5
60	152.47	56,744	14.2	154.04	54,546	13.0
65	222.22	48,092	11.3	226.05	46,143	9.9
70	285.40	37,405	8.8	393.93	35,712	7.1
75	425.63	26,730	-	603.74	21,644	-

Mortality in Bangladesh has a strongly pronounced seasonal variation, partly determined by the changes in the climatic conditions during the year with a consequent variation in the incidence and fatality of various diseases. In 1974, the monthly number of deaths of persons aged five years and over exceeded the 'expected' one (assuming an even incidence of deaths throughout the year) by between 24 and 62 percent during September till December, but was only about half of the expected number during April and May and well below the expected number during March as well.

Even higher was the excess of the observed over expected deaths among the children aged 1-4 years. The seasonal peak reached its highest point in September-October when the recorded deaths exceeded the expected frequency by about 90 percent. (TABLE 5). In both instances the food shortage may have contributed to the high mortality in the last four month of 1974.

TABLE 5

Seasonality* of deaths, 1974

Month:	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Deaths at ages 5+ years	87	89	68	52	52	79	94	99	124	162	132	160
Deaths at ages 1-4 years	46	63	44	59	67	108	74	103	189	195	131	120

* Ratio $100 \frac{\text{observed deaths}}{\text{expected deaths}}$ in each calendar month

The variation in monthly frequencies of neonatal, post-neonatal and infant deaths reflects not only the seasonal variation of the respective risks, whichever they may be, but the seasonality of births as well. In TABLE 6 the two former categories of deaths were related to the number of births from which they may have originated rather than to the births that were registered in the same calendar month. The technique is explained in the Annex of this report. In the two last columns of Table 6 the death rate of each month was related to the annual average to obtain an index of the seasonal variation.

Neonatal deaths show a marked increase during June-July and again during September-October. Post-neonatal mortality had, in 1974, a rather irregular pattern with two peaks, one in June and the other in December.

TABLE 6

Neonatal and post-neonatal mortality rates by calendar months, 1974

Month	Deaths per 1,000 related births		Seasonal index of mortality@	
	Neonatal	Post-neonatal	Neonatal	Post-neonatal
Jan	75.4	44.6	97	80
Feb	64.5	42.1	83	76
Mar	62.9	44.6	81	80
Apr	49.2	56.8	63	102
May	65.6	52.7	85	95
Jun	95.3	68.0	123	122
Jul	90.0	43.3	116	78
Aug	81.4	56.2	105	101
Sep	102.3	53.3	132	96
Oct	85.5	57.8	110	104
Nov	78.3	64.0	101	115
Dec	81.9	90.3	106	162
Year	77.53	55.57	100	100

@/ 100 $\frac{\text{mortality rate of the month}}{\text{annual (average) mortality rate.}}$

Causes of death are difficult to ascertain with any reliability even under more favourable conditions than are those found in the rural areas in Bangladesh. DSS attempted to record the cause of death and the circumstances and symptoms as they were reported by the family members. In 1974, the coding list of the cause of death was changed and the number of 'causes' expanded from nine to twenty-seven (the shorter list was in use during January-April, the expanded list from May, 1974).

During the first four months of the year there were 1,062 deaths reported but most of them (73 percent) cannot be meaningfully attributed to any clearly identifiable cause. Among the remaining ones, 'fever' and 'respiratory diseases' (which included common cold, cough, TB) were the most frequently reported.

The more detailed list used during the subsequent eight months shows amongst the most frequent causes dysentery (272 males and 386 females); tetanus (171 males and 131 females); respiratory diseases and TB (145 males and 131 females). Symptoms such as fever, diarrhea, old age appeared with high frequencies as well. As about one-quarter of all deaths was attributed to 'other' unspecified circumstances, any attempt to ascertain likely causation of death from this data is seriously hampered.

Despite the limitations of the reporting of the cause of death it is worth pointing out that at least 25 percent of infant deaths was attributed to tetanus. The incidence of drowning was also very high among children aged 1-4 years (9 and 4 percent of all deaths at that age among boys and girls respectively) - but that is not surprising considering that rivers and canals replace the roads to a large extent in this part of the country.

Fertility

In the DSS the terminations of pregnancies are reported under three headings: miscarriages, stillbirths, and livebirths. Miscarriage is recorded if, according to the woman's or her family's assessment, pregnancy lasted for less than seven months. If after seven or more months of pregnancy duration a child is born dead, stillbirth is recorded. The DSS is not capable of recording all foetal losses and in particular it fails to record the early ones. Thus miscarriages in the DSS represent obviously only a fraction of the total pregnancy wastage and stillbirths may be under-represented as well.

In 1974, there were 12,068 pregnancy terminations recorded for the 45,877 married women aged under 50 years, yielding a general (marital) pregnancy ratio of 263 pregnancies per 1,000 married women. Out of these pregnancies 4 percent resulted in a miscarriage and the rest were carried to term. The latter resulted in 377 stillbirths, 128 multiple births (126 twins and 2 triplets) and 11,085 single live births. The twin-births produced 225 live births and 27 stillbirths (all triplets were live born). Out of the live born children 5,756 were males and 5,559 females (in one case sex was not recorded) yielding a sex ratio at birth of 103.5 males per 100 females. This sex ratio does not deviate significantly from 105 to 106 male per 100 female births sometimes considered to be the normal ratio.

The age-specific marital fertility rates (per 1,000 married women) are presented in TABLE 7 along with the age-specific rates irrespective of the marital status (per 1,000 women). The peak of marital fertility was reached

TABLE 7

Age Specific Fertility Rates and Marital Fertility Rates in 1974

Age of mother	Age-specific fertility rate per 1,000 women	Age-specific fertility rate per 1,000 married women	Proportion of women currently married
10-14	5.6	158.6	0.035
15-19	161.3	281.2	0.574
20-24	311.8	335.8	0.929
25-29	323.3	336.7	0.960
30-34	253.8	269.8	0.941
35-39	163.4	183.8	0.889
40-44	55.8	68.0	0.821
45-49	16.3	22.9	0.712
Total fertility rate TFR* (women aged 10-49 years)	6.46	8.28	0.607
General fertility rate GFR** (women aged 15-49 years)	202.6	244.4	0.816

* Total fertility rate (TFR) is the sum of age specific fertility rates; the measure indicates the number of children that would be born, on the average, to each woman in the course of her reproductive life time, if she were to follow the fertility pattern of 1974. Both the GFR and TFR may also be computed by confining the births to the married women only.

** General fertility rate (GFR) is a ratio between the total number of live births in the given years and total female population in the reproductive age (assumed to be 15-49 years).

at the ages 20-29 years. At that age almost all women were married: 92.9 percent of those aged 20-24 years and 96.0 percent of those aged 25-29 years. During those 10 years of her reproductive life a married woman gave birth, on the average, to 3.4 children. The levels and patterns of fertility as they were recorded in 1974 would yield a total fertility rate (TFR) of 6.45 children per woman. Assuming a sex ratio at birth as recorded in 1974, this would result in a gross reproduction rate of 3.17 female children per woman. In combination with the Life Table for 1974, the continuation of such level of fertility and mortality as experienced in the DSS during 1974 would generate a net reproduction rate of 2.26 indicating that the next generation, about 27 years from now, would be 2.26 times larger than the present generation of mothers. Such a reproductive pattern, if continued, would eventually generate a stable population with a growth rate of 3.0 percent annually. (TABLE 8.)

TABLE 8

Measures of Reproduction, 1974

Measure:	
Gross Reproduction Rate	3.17
Net Reproduction Rate	2.26
Intrinsic Rate of Growth (percent a year)	3.0
Mean Length of Generation (years)	27.2

The persistence of high levels of fertility is indicated by the distribution of the women who reported a termination of pregnancy by live birth in 1974. Two sets of data are given in Table 9: the distribution by the number of previous pregnancies (present birth excluded) and by the number of living children. The mothers who gave birth in 1974, have had on the average 3.55 previous pregnancies and 2.52 living children. Those who were 40 years of age and older, however, have had 8.12 earlier pregnancies and 5.66 living children on the average. With an early age at marriage, typically around 15-17 years for women, those who were in their early thirties and thus married for 15-20 years, have had on the average 5.8 pregnancies prior to the present one and 4.1 surviving children.

The seasonal trend of the termination of pregnancies carried to term (stillbirths and live births) is depicted in FIGURE 1. Almost 30 percent of the pregnancies were terminated during the last three months of the

TABLE 9 A

Percentage distribution of the mothers reporting a termination of pregnancy by live birth in 1974, by age and the number of previous pregnancies

Age of mother	Number	Number of previous pregnancies*									Average No. of pregnancies
		0	1	2	3	4	5	6	7	8+	
Under 20	2281	63.2	28.7	7.1	0.7	0.1	-	-	-	-	0.46
20-24	2760	12.9	28.6	30.3	17.6	7.4	2.4	0.5	0.2	0.1	1.89
25-29	2513	1.7	4.8	12.0	23.0	26.1	17.7	8.7	3.4	2.5	3.88
30-34	2215	0.4	1.3	2.9	7.6	13.8	19.6	19.5	16.8	18.1	5.78
35-39	1045	-	0.2	0.7	3.3	5.2	9.9	16.3	16.8	47.7	7.36
40+	399	0.3	0.5	1.0	1.5	4.0	5.5	10.3	14.0	62.9	8.12
All mothers	11213	16.5	14.3	12.3	11.5	11.0	9.6	7.8	6.2	10.9	3.55

* present pregnancy termination excluded.

TABLE 9 B

Percentage distribution of the mothers reporting a termination of pregnancy by live birth in 1974, by age and the number of living children

Age of mother	Number	Number of living children (present birth excluded)									Average No. of living children
		0	1	2	3	4	5	6	7	8+	
Under 20	2281	75.3	22.6	2.0	0.0	-	0.1	-	-	-	0.27
20-24	2760	20.6	38.1	29.8	9.7	1.4	0.3	0.1	0.0	-	1.35
25-29	2513	3.3	11.1	24.9	32.9	19.6	6.4	1.4	0.3	0.1	2.81
30-34	2215	0.9	3.5	9.6	20.4	25.4	22.0	12.8	4.5	1.0	4.12
35-39	1045	0.2	1.6	4.2	9.9	17.2	26.2	20.1	11.7	8.8	5.17
40+	399	0.3	0.5	4.8	6.3	12.6	19.7	20.7	16.9	18.2	5.66
Total	11213	21.3	17.3	15.8	14.9	11.8	9.0	5.5	2.6	1.7	2.52

TABLE 9 A

Percentage distribution of the mothers reporting a termination of pregnancy by live birth in 1974, by age and the number of previous pregnancies

Age of mother	Number	Number of previous pregnancies*									Average No. of pregnancies
		0	1	2	3	4	5	6	7	8+	
Under 20	2281	63.2	28.7	7.1	0.7	0.1	-	-	-	-	0.46
20-24	2760	12.9	28.6	30.3	17.6	7.4	2.4	0.5	0.2	0.1	1.89
25-29	2513	1.7	4.8	12.0	23.0	26.1	17.7	8.7	3.4	2.5	3.88
30-34	2215	0.4	1.3	2.9	7.6	13.8	19.6	19.5	16.8	18.1	5.78
35-39	1045	-	0.2	0.7	3.3	5.2	9.9	16.3	16.8	47.7	7.36
40+	399	0.3	0.5	1.0	1.5	4.0	5.5	10.3	14.0	62.9	8.12
All mothers	11213	16.5	14.3	12.3	11.5	11.0	9.6	7.8	6.2	10.9	3.55

* present pregnancy termination excluded.

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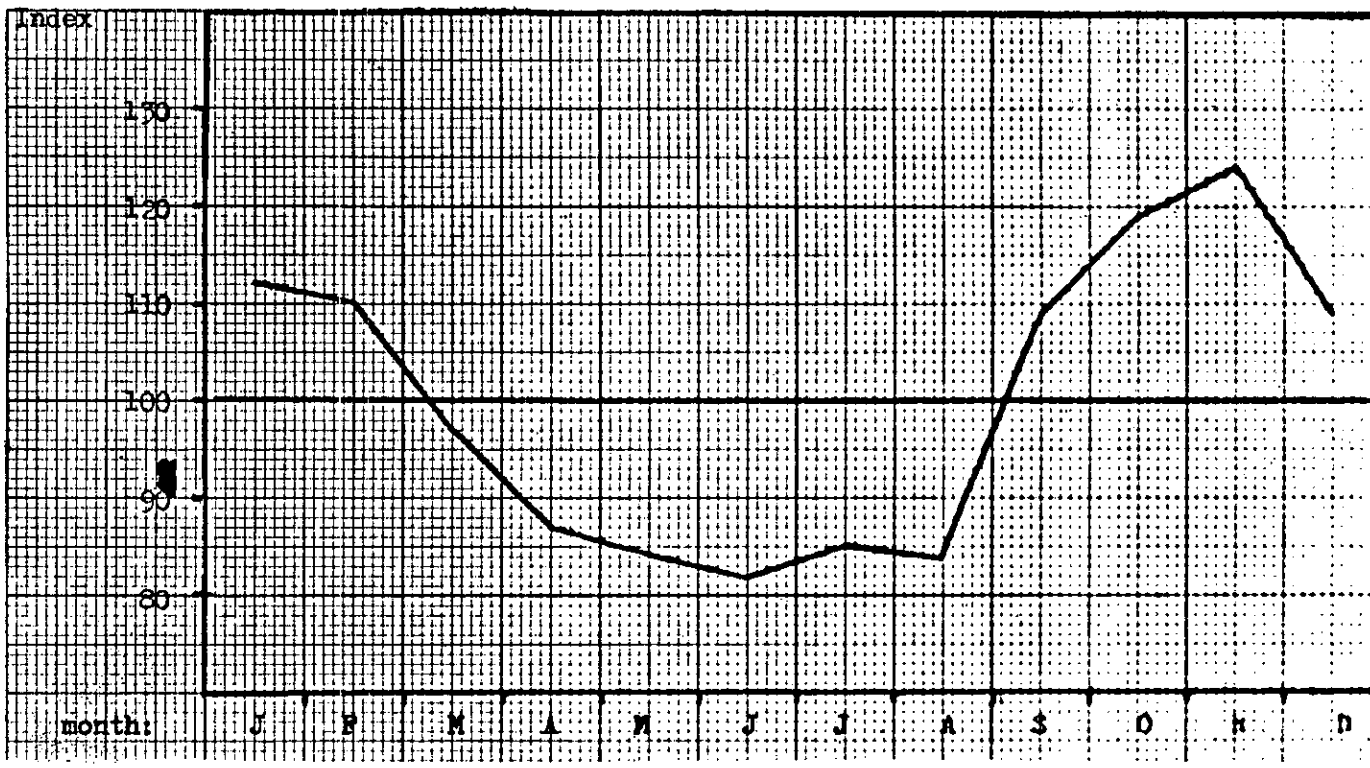
Percentage distribution of the mothers reporting a termination of pregnancy by live birth in 1974, by age and the number of living children

Age of mother	Number	Number of living children (present birth excluded)									Average No. of living children
		0	1	2	3	4	5	6	7	8+	
Under 20	2281	75.3	22.6	2.0	0.0	-	0.1	-	-	-	0.27
20-24	2760	20.6	38.1	29.8	9.7	1.4	0.3	0.1	0.0	-	1.35
25-29	2513	3.3	11.1	24.9	32.9	19.6	6.4	1.4	0.3	0.1	2.81
30-34	2215	0.9	3.5	9.6	20.4	25.4	22.0	12.8	4.5	1.0	4.12
35-39	1045	0.2	1.6	4.2	9.9	17.2	26.2	20.1	11.7	8.8	5.17
40+	399	0.3	0.5	4.8	6.3	12.6	19.7	20.7	16.9	18.2	5.66
Total	11213	21.3	17.3	15.8	14.9	11.8	9.0	5.5	2.6	1.7	2.52

FIGURE 1. Seasonal variations in the number of pregnancies terminated by live or stillbirth in 1974.



year (29.6 percent, October through December) and another 17.9 percent took place in January and February. The seasonality of the terminations of pregnancies reflects seasonal variations of marriages as well as of conceptions. The peak months of conceptions were the cool season from November to March which also coincides with the period when new harvest of rice is brought home and the nutrition of people is improved.

Migration

During 1974, 2,875 persons (1,182 males and 1,693 females) moved into the DSS area, which represented an annual average in-migration of 8.8 per 1,000 males and 13.1 per 1,000 females of the mid-year population. During the same period, however, 5,242 persons (2,320 males and 2,922 females) left the DSS area, that is on the average 17.3 per 1,000 males and 22.6 per 1,000 females. The number of out-migrants exceeded thus the immigrants by 2,367 persons. This movement across the border of the DSS area does not, however, represent the full extent of the migration of the rural population; movement between villages within the DSS, though recorded, is not processed and tabulated.

The age and sex patterns of migration in 1974 are depicted in FIGURE 2. The highest incidence of in-migration as well as of out-migration of males occurred at the ages 25-29 years and the rates were about equal: 28.3 in-migrants and 28.6 out-migrants per 1,000 males of that age. At all other ages out-migration was higher than in-migration, the net loss being larger at the ages below 30 years than at the older ages.

Migration of women reached its highest point at ages 15-19 years with 31.3 women per 1,000 moving in and 41.1 migrating out of the DSS area. Out-migration appeared to have another minor peak at ages 25-29 years (22.0 per 1,000 women). Between the ages 20-24 years the in-migrants slightly exceeded the number of out-migrants at the rate of 3.1 per 1,000 women.

Sex and age pattern of migration is closely associated with the causes why people change their place of residence. (TABLES 10 and 11). More than one quarter of males moving into DSS area and two out of five leaving the area were dependents: young children and, less frequently, aged parents and close relatives. Among female in-migrants, more than one third were dependents and among the out-migrants almost one half: female children, wives, aged parents. The second largest group of male migrants, both into and out of DSS, were those who moved because of job opportunity or to improve their living conditions: 33.6 percent of in-migrants and 31.3 percent of out-migrants. The in-migrants who gave this reason for their move were most frequently found in the age group 25-29 years; the out-migrants were more widely distributed between the ages 20 and 34 years. Among young males 106 left the DSS for study and 89 moved in for the same reason.

Among women the second most frequent reason for migrations was marriage: 32 percent of in-migrants and 23.2 percent of out-migrants. The brides who moved into DSS were heavily concentrated at the ages 15-24 years, but the out-migrant brides were about five years younger, most often aged 10-19 years. Another frequent cause of female migration was dissolution of marriage: 11.6 percent of female in-migrants and 6.2 percent of out-migrants changed their residence because of divorce or separation from husband.

In 1974, as in the previous years, migration had a well pronounced seasonal pattern, which is portrayed in FIGURE 3. The seasonal pattern was about the same for males and females. Out-migration was relatively low during the first six months of the year, above average in July, and particularly marked during the last quarter of 1974. This latter peak might have been associated with the extensive floods in the area and subsequent failure of the winter crops. In-migration of males had three periods of high levels: February, August and November-December. Very low in-migration was in April and May, and this applied for both males and females. Female in-migration concentrated heavily in September and November-December.

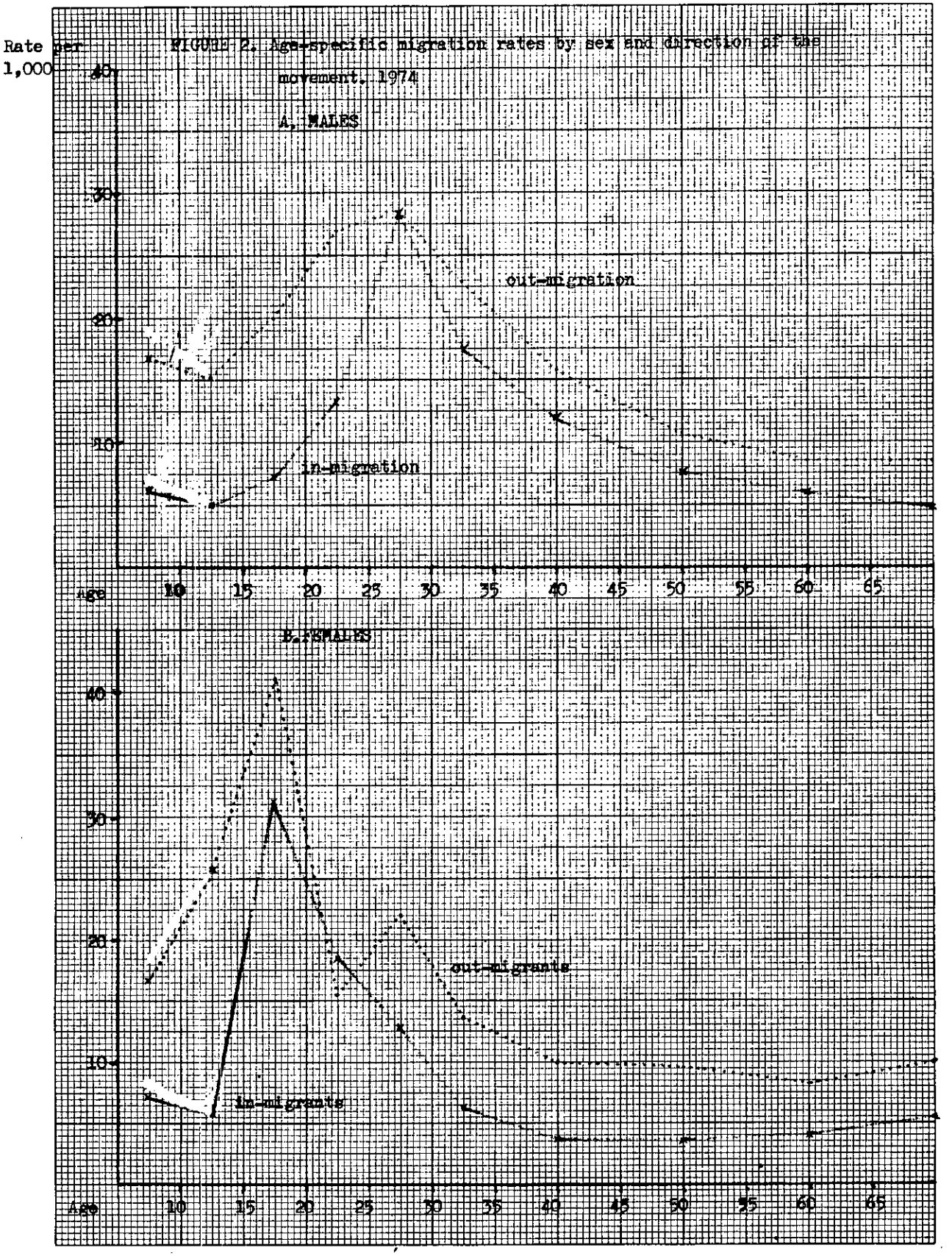


FIGURE 2. Age-specific migration rates by sex and direction of the movement, 1974

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TABLE 10

Migration in 1974. MALES, In-Migration

Age	Total Migrants	Dependents	Better living Business, Work Service	Study	Returning home	Total Number
	rate per 1,000 population of given sex and age					
Under 10	6.25	5.95	0.32	0.24	0.05	265
10-14	4.95	2.71	0.86	0.90	0.24	104
15-19	7.25	0.94	2.68	1.48	0.40	108
20-24	13.20	0.55	5.34	1.53	1.31	121
25-29	28.27	0.33	14.71	0.83	2.31	171
30-34	17.53	-	8.33	0.14	2.44	122
35-44	11.97	0.08	5.76	0.15	1.29	158
45-54	7.58	-	3.53	-	1.14	73
55-64	5.99	0.17	2.33	-	0.33	36
65+	4.69	0.20	1.37	-	0.59	24
Total	8.79	2.28	2.95	0.54	0.66	1,182
Percent		26.0	33.6	6.1	7.5	100.0
	MALES, Out-migration					
Under 10	16.78	15.69	0.11	0.26	-	711
10-14	15.27	9.71	2.95	1.28	0.14	321
15-19	19.92	2.28	9.06	2.35	0.40	297
20-24	26.83	0.98	15.38	2.51	0.55	246
25-29	28.60	1.82	16.70	1.65	0.66	173
30-34	22.99	0.86	12.35	0.14	0.57	160
35-44	15.76	0.23	8.18	-	0.38	208
45-54	11.22	0.21	6.23	-	0.10	108
55-64	8.66	-	3.33	-	-	52
65+	8.61	0.20	1.96	-	-	44
Total	17.26	7.01	5.41	0.79	0.21	2,320
Percent		40.6	31.3	4.6	1.2	100.0

TABLE 11

Migration in 1975. FEMALES, In-Migration

Age	Total Migrants	Dependents	Marriage	Separation Divorce	Joining Husband	Total Number
	rate per 1,000 population of given sex and age					
Under 10	7.25	7.12	0.03	-	-	292
10-14	5.77	2.81	0.59	0.34	-	117
15-19	31.33	5.36	26.87	7.15	0.45	635
20-24	18.55	9.38	16.49	7.91	0.80	376
25-29	12.86	5.53	2.06	1.93	0.13	100
30-34	6.30	3.21	0.92	0.46	0.12	55
35-44	3.74	2.36	-	0.33	-	46
45-54	3.64	2.19	-	-	-	30
55-64	3.93	1.50	-	-	-	21
65+	5.42	2.84	-	-	-	21
Total	13.12	4.70	4.21	1.52	0.12	1,693
Percent		35.8	32.1	11.6	0.9	100.0
			FEMALES, Out-Migration			
Under 10	16.74	15.43	0.03	-	0.03	674
10-14	25.85	9.47	10.95	0.64	0.89	524
15-19	41.05	11.61	29.26	7.52	5.73	832
20-24	15.49	14.46	5.42	3.95	3.62	314
25-29	22.00	12.09	1.42	1.54	2.44	171
30-34	13.74	8.25	0.23	1.03	1.37	120
35-44	10.16	6.18	-	0.57	0.57	125
45-54	9.60	5.47	0.12	0.24	-	79
55-64	8.24	5.06	-	0.19	-	44
65+	10.06	4.64	-	-	-	39
Total	22.64	11.13	5.25	1.39	1.29	2,922
Percent		49.2	23.2	6.2	5.7	100.0

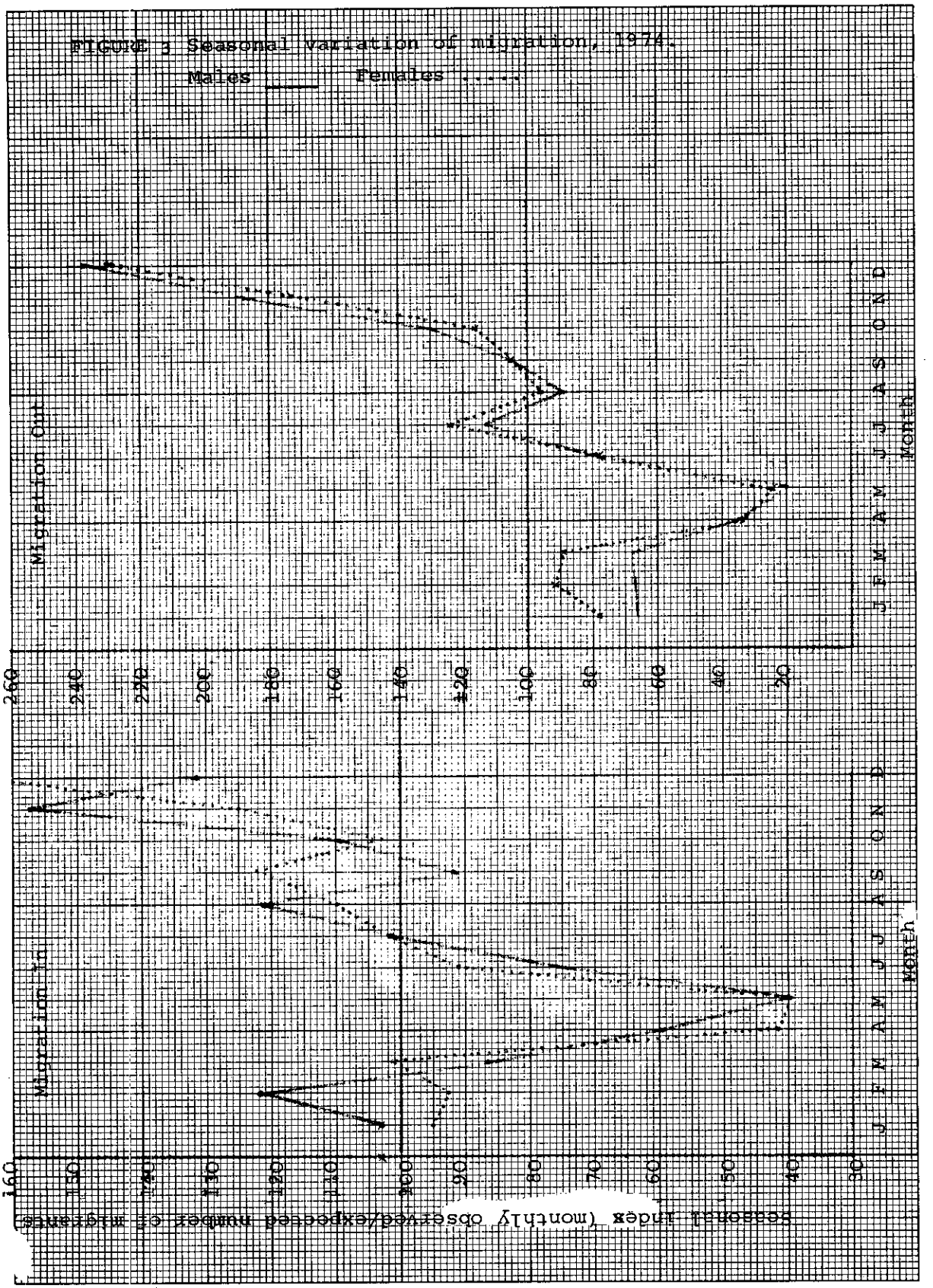

FIGURE 3 Seasonal variation of migration, 1974.
Males ——— Females .....

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B. Levels and Patterns of Mortality and Fertility

According to the Life Table presented in Table 4 the mortality of females was higher and, consequently, life expectation was shorter than of males. The difference, in terms of the life expectation, was 4.1 years at birth and increased to a maximum of 5.1 years at the age of one year. Thereafter, the gap between male and female longevity narrowed until, between the ages 35 and 50 years, the males and females had about an equal number of years of expected duration of life. Women might have even enjoyed a marginal advantage over males at that age. (TABLE 12.) After about the age of 50 years female life expectation became, once again, less than that of males.

TABLE 12

Difference in the life expectation of males and females, 1966-9 and 1974

Period	AGE										
	0	1	5	10	20	30	35	40	45	50	60
	Difference $^{o}e_{x}(M) - {}^{o}e_{x}(F)$ in years										
1974	4.1	5.1	1.8	1.4	0.5	0.1	-0.2	-0.1	0.0	0.5	1.2
1966/9	1.5	3.4	1.2	1.2	1.0	0.6	0.1	0.5	0.6	0.6	0.8

This is not a new phenomenon in rural Bangladesh in general and in the DSS in particular. A Life Table by Chowdhury et al. (1970) based on the mortality of the three-year period of 1966-69 as recorded in the Old Trial Area (comprising about half of the population of the present DSS) displayed a similar pattern of excess female mortality, though at most ages the differences in longevity between males and females were smaller in 1966-9 than in 1974. It should be, however, pointed out that the comparison shown here is merely between two points in time. It is not sufficient information to indicate a sustained trend. Higher female than male mortality starts in rural Bangladesh almost from the beginning of life. Only during the first month after birth is a female baby at a lower risk of death than a boy: during the neonatal period, out of 1,000 live born male children 88 died in 1974 in contrast to only 68 out of 1,000 female live born children. After that, however, throughout the post-neonatal period and early childhood female children were at a considerably higher risk of dying than their male peers. (See Tables 3 and 13). Moreover, this disadvantage increased as the children were getting older: female mortality exceeded that of males by 19 percent during the post-neonatal period but by as much as 80 percent during early childhood.

TABLE 13

Comparison of female and male mortality in infancy and early childhood 1966-69 and 1974

Age at death	Deaths per 1,000 live births				Ratio of mortality rates, F/M	
	1966-1969		1974			
	Males	Females	Males	Females	1966-69	1974
Neonatal, under 28 days	77.4	62.8	87.9	67.8	.81	.77
Post-neonatal 1 - 11 months	47.4	52.2	54.6	65.1	1.10	1.19
Infant under 1 year	124.8	115.0	142.5	132.9	.92	.93
Early childhood 1-4 years @/	22.3	29.6	18.3	32.9	1.33	1.80

@/ Deaths per 1,000 population of given sex and age.

Similar pattern prevailed in 1966-69, and if any change occurred between the late 1960s and 1974 at all, it appears that it was not to any advantage of the female children. The data in Table 13 suggest that death rates might have declined for male children but not for girls; their mortality might have even increased. Infant mortality of both sexes apparently deteriorated in 1974. The increase in the death rates was about the same for boys and girls during the neonatal period (14-15 percent) but much steeper for girls than for boys during the post-neonatal period (25 and 8 percent respectively). It is not unlikely that this increase was due to the food shortage that affected the area of the DSS towards the end of 1974 after the flooding destroyed much of the winter crops. Price of rice, the staple food in the villages, was rising throughout 1974 reaching a peak in January 1975 when it was four times higher than at the beginning of 1974 (see Figure 2 in Chowdhury et al., 1977).

The differences in mortality between the sexes may have cultural roots in Bangladesh; differential mortality is only one, undoubtedly the most disturbing one, of the many manifestations of the disadvantages women have to cope with in most venues of life. Conditions of life disadvantaging

women, impairing their health and leading, eventually, to an excessive mortality are not unique to Bangladesh. The manifestation of the similar situation existing in parts of India, Pakistan and, most probably, in other countries of high mortality as well may be found in sex differentials of mortality. Not always, however, are hard data available to prove it beyond reasonable doubt.

Whether mortality declined in the DSS between 1966-69 and 1974 cannot be answered without mentioning the limitations of such a comparison. Two circumstances make firm conclusions on this issue difficult: first, in the late 1960s the available data covered only about half of the population of the DSS, namely the so called Old Trial Area (OTA) comprising 132 villages 1/. The margin of random fluctuations of the rates in the former period is thus considerably larger than in the year 1974. Second, age-specific mortality rates, particularly because of the recurrent epidemics of infective diseases, may vary considerably from one year to another. Comparison between two relatively short periods looses thus some of its convincing strength.

TABLE 14

Changes in life expectation at selected ages, 1966-69 and 1974

Sex	Period	Life expectation (years) at a given age						
		0	1	5	15	30	45	60
Male	1966/9	51.0	57.3	57.7	49.3	36.0	23.3	12.1
	1974	53.4	59.5	59.8	51.5	37.5	24.7	14.2
	increase	2.4	2.2	2.1	2.2	1.5	1.4	2.1
Female	1966/9	49.5	54.9	56.5	48.1	35.4	22.7	11.3
	1974	49.3	54.4	58.0	50.3	37.4	24.7	13.0
	change	-0.2	-0.5	1.5	2.2	2.0	2.0	1.7

Keeping those limitations in mind it appears that mortality of males declined, increasing the life expectation of infants and children by about two years and of adults by about 1½ years. By comparison, the decline of female mortality prolonged their longevity to a similar extent (and, possibly,

1/ The population enumerated in the OTA in 1966 was 111,748 whereas that of the DSS reached 263,507 at 1974 census.

even slightly more) only between the ages 15 and 45 years. In infancy and early childhood female life expectations remained stagnant, or even may have deteriorated; as we noted earlier, the widening gap between mortality of boys and girls disadvantaging the latter accounts for this.

Looking at the change in the age-specific mortality rates by sex (TABLE 15) between those two points in time provides some indications about how the changes in longevity occurred. It has to be admitted, however, that the pattern of mortality change is somewhat blurred, lacking regularity. It appears that male mortality rates declined at ages 5 to 34 years, but generally increased at the older ages. The distorted pattern of change is, undoubtedly, partly a result of the small numbers involved, in particular where only data for a single year are involved. Female death rates may have increased among children 5-14 years old, but most probably declined between the ages 15 and 64 years or remained relatively stable.

TABLE 15

Changes in age-specific death rates between 1966-69 and 1974

		Age at death						
Sex	Period	5-14	15-24	25-34	35-44	45-54	55-64	65+
Males	1966-69	3.05	2.44	3.46	5.38	12.86	21.58	68.07
	1974	2.78	1.16	2.69	6.06	13.09	26.96	77.84
	percent change	- 9	-52	-22	+ 13	+ 2	+ 25	+ 14
Females	1966-69	3.57	3.93	4.22	5.55	11.94	26.86	80.49
	1974	3.92	3.32	3.64	5.53	8.87	27.91	103.12
	percent change	+ 10	- 16	- 14	0	- 26	+ 4	+ 28

Some deterioration of mortality was likely to have occurred among the women aged 65 years and older. To summarize, there is some evidence that mortality may have somewhat improved, though not equally at all ages and probably not without a discriminating effect on women. One is, however, left with the uneasy impression that what improvements were achieved so far they still rest on rather shaky grounds. It is still a long way from a radical change in health conditions and nutritional status, from control of infective diseases

and prevention of outbreaks of epidemics - which all appear to be the necessary (though perhaps not the only ones) pre-conditions of achieving a steady downturn of mortality.

Fertility in Bangladesh probably remained high throughout the 1960s and the early 1970s in the rural areas 2/. In the DSS the crude birth rate recorded in 1974, namely 42.9 live births per 1,000 population, was, true enough, about 10 percent below the level found in 1966-69 in the OTA and about 5 percent below the 1971-2 level 3/. However, the total fertility rate (TFR) declined only marginally from the 1966-69 level and not at all if compared with the 1971-2 period. (TABLE 16). Chowdhury et al. (1977)

TABLE 16

Crude birth rate (CBR) and total fertility rates (TFR) in the DSS area

Area	1966-67	1967-68	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	1974
Crude birth rate									
OTA	46.8	45.2	46.4	45.2	43.6	44.5	41.8	47.8)	
								)	42.9
NTA	-	-	44.9	44.0	44.8	43.8	41.8	46.6)	
Total fertility rate									
OTA	6.66	6.43	6.68	6.56	6.40	6.54	6.06	7.25)	
								)	6.46
NTA	-	-	6.72	6.47	6.58	6.40	6.08	7.19)	

OTA - old trial area; NTA - new trial area; 1974 - DSS

have shown that between 1966 and 1974 age specific fertility rates declined demonstrably only at the ages 10-19 years in the OTA and NTA. In a high-fertility society such an isolated change, confined to the youngest age-group, may be due to either of two causes: reduced fecundity resulting from deteriorating health conditions and malnutrition that may have, for instance, increased the age of menarche; or from deferment of marriage and marriage

2/ Rabbani et al. (1976) indicated that between 1961 and 1974 fertility might have declined in urban areas. This followed from comparison of the child/woman ratios derived from the two censuses.

3/ The levels of fertility in the period from May 1972 through April 1974 were distorted by the civil war in 1971 and, after that, by some - probably compensatory - increase.

consumation to a somewhat older age. The latter may be the sequel of the former. There is no hard data to prove directly that the former chain of events operated, although Chen and Chaudhury (1975) gave some evidence suggesting a deterioration in per capita intake of calories as well as protein between 1960-65 and 1965-70.

As to the second proposition, reliable data are, once again, difficult to come by. Because of the lack of marriage registration and unreliability of the age-at-marriage information collected retrospectively by census and surveys it is impossible to determine with full confidence what change in the age at first marriage took place, and if it occurred, how large it was. The singulate mean age at marriage, calculated from the 1961 and 1974 censuses, from the CRL censuses of 1968 (NTA), 1970 (OTA) and 1974 (DSS), as well from the retrospective surveys of fertility and mortality (RSFM-1973/4) seem, however, to point with singular uniformity that an increase in the age of brides did occur over time. From the DSS data it appears that the singulate mean age at first marriage was, for the brides, 15.7 years in 1968 (NTA), 16.2 years in 1970 (OTA) and 17 years in 1974 (DSS). This was considerably higher than the 15.9 years derived from the 1974 census of Bangladesh but close to the age at marriage reported by the Bangladesh Retrospective Survey of Fertility and Mortality - namely 16.5 years. The singulate mean age at first marriage obtained from the then East Pakistan census of 1961 was 13.9 years. Such trend in the age of first marriage could by itself cause the fertility decline at the ages 10-19 years noted earlier, or, at least, contribute significantly to it.

Despite the reduced fertility at the youngest ages the TFR remained unaffected at about 6.5 children per woman for most of the period reviewed in Table 16.

It may be worth comparing the fertility patterns as observed in DSS with those obtained for approximately the same time in the Bangladesh Fertility Survey of 1975 (BFS-1975) and RSFM (1973-4), and by the Impact Survey of 1966-8 (IS 1966-8).

The IS (1966-8) probably underestimated the true level of fertility; as Cain et al. (1976) concluded, 'the underestimation was probably a consequence of systematic error associated in this society with the collection of maternity histories' leading to a shifting back in time of the more recent births. The two more recent surveys displayed fertility patterns very similar to the one observed in OTA in 1966-9 with a peak of fertility in the 20-24 age group and high fertility levels continuing in the 25-29 age group. (TABLE 17). In 1974, it appears, the peak shifted into the latter age group, the former remaining, however, close to the peak. Fertility also increased by more than 20 percent at ages 35-44 years and by about 13 percent at ages 30-34 years.

TABLE 17

Age specific fertility rates in DSS (1974) as compared to other survey data

Survey	AGE						
	15-19	20-24	25-29	30-34	35-39	40-44	45-49
	Live births per 1,000 women						
DSS 1974	161.3	311.8	323.3	253.8	163.4	55.8	16.3
OTA 1966-9	224.4	332.0	307.9	225.5	128.6	45.1	16.3
BFS (1975)	203	332	301	236	152	69	22
RSFM (1973-4)	198	337	311	262	197	95	14
IS (1966-8)	252	301	250	198	126	37	3

The comparisons, however, should not be taken too far and the differences given undue importance. There are, at least, two sources of errors that distort a fertility schedule: first, erroneous age reporting which often is a function of reproductive history - namely women who are with no issue or have only few children may be attributed younger age, in contrast to women with larger families that may be given higher age by the interviewer. Second, time-shift errors that effect recent reproductive histories (in particular, the number of births during the past twelve months). It should be noted that the DSS is free of the latter defects, as it records births at the time they occurred. As to the age reporting, it certainly is not any better than elsewhere in Bangladesh. However, the defects were confined to the census populations of 1966 and 1970 and affect the age estimation of in-migrants. Once age is recorded, all demographic events as they occur are associated with the updated age of the individual and thus the age distortion of the age-specific rates is minimized.

The persistence of high fertility and the relative stability of the childbearing patterns in the DSS is revealed by comparison of the parity distributions of mothers who were delivered of a child in a given year. Two types of parities are presented in Table 18. Number of previous pregnancies, that is those resulting in stillbirth or live birth (miscarriages are not counted in the determination of pregnancy order), and number of children still alive at the time of the latest birth.

Leaving out the youngest mothers and the oldest ones whose numbers are very small, it appears that since the late 1960s there has been some, although only marginal, decline of the pregnancy order of women aged 15-35 years. This trend was somewhat steeper among the younger mothers (a decline

TABLE 18

Average number* of previous pregnancies and of living children of women whose last pregnancy was terminated by live birth in 1966/7, 1967/8 and 1974

Year	Area	All mothers	Age of the mother at delivery in a given year							
			under 15	15-19	20-24	25-29	30-34	35-39	40-44	45+
			a. average number of previous pregnancies							
1966/7	OTA	3.50	.16	.62	2.19	4.17	5.91	6.96	7.97	8.73
1967/6	OTA	3.39	.09	.58	2.20	4.32	5.96	6.93	7.56	8.45
1974	DSS	3.55	.09	.48	1.89	3.88	5.78	7.36	8.12	8.16
			b. average number of living children							
1966/7	OTA	2.32	.07	.35	1.48	2.84	3.88	4.57	5.04	5.23
1967/8	OTA	2.24	.02	.33	1.48	2.92	3.92	4.60	4.97	5.74
1974	DSS	2.52	.02	.29	1.35	2.81	4.12	5.17	5.78	5.66

* present birth excluded.

of 23 and 14 percent between 1966/7 and 1974 for mothers aged 15-19 and 20-24 years respectively) than among the older ones. It should be remembered, however, that the 1966/8 observations are based on a considerably smaller population 4/ of the OTA than is the DSS. This by itself increases the possibility of a random variance being responsible for the observed fluctuations of the age-specific parities. It will certainly require further monitoring before the decline of pregnancy parities may be confirmed and accepted as an indication of an incipient change in family formation patterns. In addition, an explanation of such change, if confirmed, will be called for. It is unlikely that at the younger ages a deferment of births and pregnancies would be the cause.

In section (b) of the Table 18 the average number of living children is presented. Ignoring, as previously, the youngest and the oldest mothers, only marginal decline in the age group 15-24 years may be noticed, stability

4/ The number of mothers in 1966-8 was about 5,600 annually in contrast to 11,200 mothers in the DSS in 1974.

among mothers aged 25-29 years of age, and a marked increase of parities among the older age groups. Mortality decline may have contributed to this increase. As mentioned earlier, the life expectation increased between 1966-9 and 1974 for males at birth by 2.4 years and at the age of five years by 2.1 years. For females, the increase was less impressive, amounting to 1.5 years at the age of five years but practically none at birth. The change at the younger ages is not large enough to signal, for instance, a tendency to wider spacing of births. At the older ages, the impact of improved mortality may not be excluded as a plausible explanation.

To conclude, in 1974 as in the previous years mortality remained, at the best, moderate but still fluctuating under the impact of changing incidence of infective and parasitic diseases. It also maintained significant differentials between males and females, the latter being considerably disadvantaged at almost all ages. Fertility remained high and, if there was a recognizable change, it was likely to be occasioned by a changing marriage pattern rather than by changes of fertility in marriage.

ACKNOWLEDGEMENT

We wish to acknowledge the contribution of the staff members of the Cholera Research Laboratory, both in Dacca and Matlab, without whose untiring efforts and co-operation it would not be possible to maintain a large scale operation such as the DSS and preserve continuously its high quality. The registration system was originally initiated by Dr. Wiley H. Mosley in 1966. In the subsequent years the contributions of Mr. K.M.A. Aziz, Mr. Makhlisur Rahman, Dr. George Curlin, Dr. Douglas Huber, Dr. Lincoln Chen to the improvements and expansion of the DSS made it a unique registration system in existence on such a large scale in Bangladesh. The organizational skills and devotion of Mr. A.M. Sarder helped to keep the registration continuing even under such difficult conditions as were those occasioned by the war and economic crisis.

The full list of the field staff associated with the DSS during 1974-76 period is presented in Volume One of this series. Their assistance and efforts are here gratefully acknowledged. Indispensable to the smooth functioning of the DSS has been the logistic support provided by the maintenance staff in Dacca and Matlab, speed-boat and vehicle drivers and others.

The Statistics Branch of the CRL in Dacca, and in particular Mr. M. Mohsin, took care of all the sorting and tabulations with excellence and precision. Mr. Cyril Gomes expertly typed the manuscript and prepared it for publication.

Apart from those mentioned here by name, a great number of annonymous workers in the CRL contributed indirectly and made this study possible.

C. Tables

TABLE C.1 Deaths by age and month, 1974

Month	All deaths	Under 1 month	1 - 11 months	1 - 4 years	5 years and more	Percent of total deaths were under 1 year
January	307	85	45	35	142	42.4
February	281	65	43	43	130	38.4
March	248	59	46	33	110	42.3
April	226	43	59	43	81	45.1
May	244	53	55	51	85	44.3
June	348	74	71	79	124	41.7
July	325	71	45	56	153	35.7
August	363	67	58	78	160	34.4
September	482	94	54	139	195	30.7
October	559	92	56	148	263	26.5
November	454	90	60	96	208	33.0
December	525	90	84	91	260	33.1
Total	4,362	883	676	892	1,911	35.7

TABLE C.2 Deaths by sex and age, 1974

Age	Males	Females	Age	Males	Females	Age	Males	Females
months								
0	506	377	0-4	1,149	1,302	45-49	54	29
1-5	207	217	5-9	88	112	50-54	72	44
6-11	107	145	10-14	22	36	55-59	71	57
years								
0	820	739	15-19	17	47	60-64	91	92
1	109	187	20-24	11	27	65-69	107	95
2	116	189	25-29	14	22	70-74	97	104
3	71	124	30-34	21	38	75-79	89	87
4	33	63	35-39	37	27	80-84	50	50
			40-44	43	41	85+	55	64
						Total	2,088	2,274

TABLE C.3 Deaths by cause, 1974 (January - April) by sex and age

Cause of death	Total deaths	Age at deaths (years) under 1	1-4	5-14	15-24	25-34	35-44	45-54	55-64	65-74	75+
					MALES						
Fever (all forms)	59	15	13	3	1	2	2	3	8	4	8
Acute diarrhoea	7	3	-	-	-	-	-	-	-	1	3
Respiratory(incl. cold, cough, fever, TB)	56	14	8	-	1	1	6	4	8	5	9
Smallpox, measles	6	3	3	-	-	-	-	-	-	-	-
Accident	9	-	2	1	-	-	-	2	1	2	1
Others	384	194	25	5	4	5	17	22	34	42	36
Total	521	229	51	9	6	8	25	31	51	54	57
					FEMALES						
Fever (all forms)	66	20	16	7	4	-	4	2	4	6	3
Acute diarrhoea	8	3	-	1	-	-	-	2	1	1	-
Respiratory(incl. cold, cough, fever, TB)	41	19	4	2	1	1	3	1	5	2	3
Smallpox, measles	14	3	10	-	-	-	1	-	-	-	-
Accident	14	2	8	1	1	1	1	-	-	-	-
Child birth	7	-	-	-	1	3	3	-	-	-	-
Others	391	169	65	18	6	6	4	11	30	37	45
Total	541	216	103	29	13	11	16	16	40	46	51

TABLE C.4 Deaths by cause, sex and age. 1974 (May til December).

Cause of death	Total deaths	Age at death (years)									
		under 1	1-4	5-14	15-24	25-34	35-44	45-54	55-64	65-74	75+
			MALES								
Smallpox	2	-	1	-	-	-	1	-	-	-	-
Measles	5	3	1	1	-	-	-	-	-	-	-
Tetanus	171	152	15	4	-	-	-	-	-	-	-
Cholera (proved)	1	-	-	1	-	-	-	-	-	-	-
Diarrhoea (acute)	21	9	3	7	-	-	1	-	-	-	1
(chronic)	16	3	8	-	-	-	1	1	-	1	2
Dysentery (acute)	101	11	61	9	-	-	3	4	6	3	4
(chronic)	171	8	37	14	1	1	9	21	20	36	24
Jaundice	8	-	2	-	-	1	1	1	-	2	1
Venereal	1	-	-	-	-	-	-	-	1	-	-
Gastro-intest. (other than cholera)	29	-	-	1	1	2	4	2	12	6	1
Respiratory (incl. cold, fever, cough, TB)	145	52	20	4	2	3	7	18	13	19	7
Heart diseases	11	1	-	1	-	-	1	-	2	3	3
Liver dis.	10	-	2	1	4	-	2	1	-	-	-
Skin dis.	18	9	4	4	-	-	-	-	-	-	1
E.N.T.	1	1	-	-	-	-	-	-	-	-	-
Dropsy	47	2	10	1	1	-	2	4	10	12	5
Rheumatism	21	1	2	-	-	-	1	4	3	4	6
Accident	18	1	4	3	3	1	1	1	2	1	1
Drowning	47	5	25	11	2	1	-	2	-	-	1
Murder	7	4	-	-	-	-	1	-	2	-	-
Suicide	3	1	-	-	1	1	-	-	-	-	-
Old age	101	-	-	-	-	-	-	2	15	33	51
Fever	164	28	51	17	6	10	6	13	7	12	14
Other	444	299	32	22	1	7	12	20	18	18	15
Unknown	4	1	-	-	-	-	2	1	-	-	-
Total	1,567	591	278	101	22	27	55	95	111	150	137

TABLE C.4 Deaths by cause, sex and age. 1974 (May til December).

Cause of death	Total deaths	Age at death (years)									
		under 1	1-4	5-14	15-24	25-34	35-44	45-54	55-64	65-74	75+
		FEMALES									
Smallpox	-	-	-	-	-	-	-	-	-	-	-
Measles	13	5	6	2	-	-	-	-	-	-	-
Tetanus	135	123	9	2	1	-	-	-	-	-	-
Cholera (proven)	1	1	-	-	-	-	-	-	-	-	-
Diarrhoea (acute)	29	9	6	3	3	2	3	-	-	2	1
(chronic)	26	-	13	3	3	-	-	-	-	5	2
Dysentery (acute)	167	18	117	13	-	-	1	3	8	4	4
(chronic)	219	5	87	10	6	7	10	12	19	36	27
Child birth	8	-	-	-	2	5	1	-	-	-	-
Jaundice	9	-	2	3	1	-	2	1	-	-	-
Venereal dis.	6	-	-	-	-	1	3	-	2	-	-
Gastro-intest. (other than cholera)	17	2	-	3	1	4	2	1	1	2	1
Respiratory (incl. cold, fever, cough, TB)	131	56	28	7	4	1	5	9	6	8	7
Heart dis.	10	-	-	1	2	-	-	1	1	2	3
Liver dis.	4	-	1	-	-	2	1	-	-	-	-
Skin dis.	35	18	12	3	1	-	-	-	1	-	-
E.N.T.	4	-	-	-	1	1	1	1	-	-	-
Dropsy	107	2	29	9	3	3	6	7	13	15	20
Rheumatism	36	8	3	3	1	3	1	2	4	7	4
Accident	8	2	1	3	-	1	-	1	-	-	-
Drowning	28	8	18	1	1	-	-	-	-	-	-
Murder	2	-	1	1	-	-	-	-	-	-	-
Suicide	10	-	-	1	6	1	1	-	1	-	-
Old age	140	-	-	-	-	-	-	2	25	50	63
Fever	198	37	73	25	8	5	5	10	14	11	10
Other	386	228	53	26	16	12	11	7	14	11	8
Unknown	4	1	1	1	1	-	-	-	-	-	-
Total	1,733	523	460	119	61	48	53	57	109	153	150

TABLE C.5 Terminations of pregnancies by month, 1974

Month	Miscarriage	Stillbirth	Live birth*	Number of live born children		
				Total	Males	Females
January	34	33	1,067	1,073	542	531
February	44	34	940	944	472	472
March	31	20	931	933	479	454
April	38	18	811	815[a/]	418	396
May	42	35	791	801	399	402
June	54	34	743	752	378	374
July	46	29	811	825	431	394
August	48	22	805	821	431	390
September	50	34	1,004	1,016	534	482
October	31	44	1,128	1,137	574	563
November	31	33	1,155	1,163	584	579
December	29	41	1,027	1,036	514	522
Total	478	377	11,213	11,316	5,756	5,559

* Number of confinements resulting in at least one live birth.

a/ One birth - sex not recorded.

TABLE C.6 Multiple confinements, 1974

Sex	No.	Result					
		First child		Second child		Third child	
		Live birth	Stillbirth	Live birth	Stillbirth	Live birth	Stillbirth
M, M	46	39	7	38	8	-	-
M, F	20	19	1	18	2	-	-
F, M	16	16	-	13	3	-	-
F, F	44	42	2	40	4	-	-
F, M, F	2	2	-	2	-	2	-

TABLE C.7 Number of live born children by mother's age and number of surviving children (present birth excluded). 1974

Mother's age	Number of living children										Total mothers
	0	1	2	3	4	5	6	7	8	9+	
under 14	30										30
14	82	2									84
15	210	18									228
16	375	34	1								410
17	347	63	1								411
18	376	176	13								565
19	298	223	31	1							553
20	213	324	91	6	2						636
21	162	236	137	16	3	1	1				556
22	88	202	185	40	3	1	1				520
23	63	150	178	64	6	3					464
24	44	139	231	141	26	2	1				584
25	38	92	146	134	40	8					458
26	17	88	194	236	96	12	2	1			646
27	10	37	101	146	73	27	5			1	400
28	14	34	98	175	153	50	15	1			540
29	4	28	86	136	131	65	13	5	1		469
30	9	19	59	145	152	100	42		10		536
31	5	22	82	124	143	140	70	18	5		609
32	1	12	26	66	91	70	52	19	2		339
33	2	14	28	57	88	79	44	28	5	1	346
34		9	19	60	90	98	75	24	6	4	385
35	1	4	13	26	45	67	40	27	9	3	235
36	1	8	17	39	68	96	71	34	16	10	360
37		4	3	12	19	29	25	15	11	3	121
38		1	9	16	27	45	35	20	15	10	178
39			2	10	21	37	39	26	10	6	151
40 - 44	1	1	18	21	38	67	70	53	35	26	330
45+		1	1	4	12	13	12	16	6	4	69
Total	2391	1941	1770	1675	1327	1010	613	297	121	68	11213

TABLE C.8 Terminations of pregnancies by the number of previous pregnancies and mother's age, 1974. A. Confinements resulting in live birth

Mother's age	Number of previous pregnancies @										All mothers
	0	1	2	3	4	5	6	7	8	9-	
under 15	106	6	2								114
15-19	1,336	649	160	17	3	1	1				2,167
20-24	355	789	837	486	203	67	15	5	3		2,760
25-29	43	121	302	578	657	445	219	85	44	19	2,513
30-34	8	29	64	169	306	434	431	372	222	180	2,215
35-39	-	2	7	35	54	103	170	176	199	299	1,045
40-44	-	1	4	4	14	18	37	46	65	141	330
45-	1	1	-	2	2	4	4	10	13	32	69
Total	1,849	1,598	1,376	1,291	1,239	1,072	877	694	546	671	11,213
					B. Confinements resulting in stillbirth						
under 15	8	1									9
15-19	51	16	6								73
20-24	10	14	22	17	6	3	1				73
25-29	1	2	5	16	9	12	8	8	3	2	66
30-34	1	1	2	6	8	19	15	9	10	15	86
35-39		1		1	2	5	5	4	10	21	49
40-44						2		5		10	17
45-							2		1	1	4
Total	71	35	35	40	25	41	31	26	24	49	377
					C. Miscarriages						
under 15	8	1									9
15-19	56	29	4	1	1	1					92
20-24	19	27	27	14	8	2			1		98
25-29		7	14	19	21	14	10	2	1	4	92
30-34		1	5	4	10	22	19	13	10	15	99
35-39			2	3	5	3	13	8	4	20	58
40-44		1					1	5	7	9	23
45-				1					1	5	7
Total	83	66	52	42	45	42	43	28	24	53	478

@ Present birth excluded.

TABLE C.9 Migration by sex, direction and month, 1974

	Males		Females			Males		Females	
Month	In	Out	In	Out	Month	In	Out	In	Out
January	104	129	137	187	July	102	223	146	297
February	111	120	120	198	August	122	176	158	229
March	87	133	146	214	September	89	200	170	243
April	58	67	58	80	October	110	256	149	280
May	40	39	58	58	November	153	358	175	403
June	74	152	127	181	December	132	467	249	552
					Total	1182	2320	1693	2922

TABLE C.10 Migration by sex, age, and direction, 1974

	Males		Females			Males		Females	
Age	In	Out	In	Out	Age	In	Out	In	Out
under 5	163	443	186	420	40-44	52	92	23	57
5-9	102	268	106	254	45-49	45	60	12	32
10-14	104	321	117	524	50-54	28	48	18	47
15-19	108	297	635	832	55-59	23	31	10	21
20-24	121	246	376	314	60-64	13	21	11	23
25-29	171	173	100	171	65+	24	44	21	39
30-34	122	160	55	120					
35-39	106	116	23	68	Total	1182	2320	1693	2922

TABLE C.11 Migration by sex, age, direction and cause, 1974

A. MALES - In-migration

Cause	< 10	10-14	15-19	20-24	25-29	30-34	35-44	45-54	55+	Total
Marriage				1	3	1				5
Service			3	8	14	14	13	4	2	58
Divorce			1					1		2
Dependent	226	57	14	5	2		1		2	307
Study	9	19	22	14	5	1	2			72
Better living	11	8	13	14	33	28	35	15	7	164
Return home-after study			2	1	1	1				5
-after service			3	11	11	14	13	7	5	64
-after work			1	3	10		6	2	3	25
For livelihood			2	4	5	1	10		4	26
Adoption	11	3								14
Business			9	8	9	4	8	3	4	45
Work	1	10	15	19	33	12	20	12	8	130
Change in residence	1	1		4	2	1	3	3	1	16
To join spouse/husband										-
parents	1		1	2	1		2			7
relatives	1	1	1				1	1	2	7
Unknown	1			2	2			1		6
Separation										-
For treatment							1			1
Widow										-
Return home	2	5	6	12	14	17	17	11	5	89
Regular member			1	2	7	10	2	5	1	28
Other	1		14	11	19	18	24	8	16	111
Total	265	104	108	121	171	122	158	73	60	1182

TABLE C.11 Migration by sex, age, direction and cause, 1974

B. MALES - Out-migration

Cause	<10	10-14	15-19	20-24	25-29	30-34	35-44	45-54	55+	Total
Marriage	1		3	1	1		1			7
Service	1	5	46	76	54	43	36	16	8	285
Divorce					2		1			3
Dependent	672	204	34	9	11	6	3	2	1	942
Study	10	27	35	23	10	1				106
Better living	1	3	24	23	16	13	33	20	15	148
Return home-after study		3	6	3	3					15
after service					1	2	1	1	1	6
after work		1							2	3
For livelihood	3	8	30	10	18	25	33	17	17	161
Adoption	8									8
Business		6	9	10	12	7	13	4	2	63
Work	2	48	56	32	19	23	26	20	5	231
Change in residence	2	4	25	28	13	20	42	21	32	187
Joining parents	7	6	4	3	3	1	3			27
relatives		1		3		5	1	1	2	13
Unknown	3		11	10	4	5	3	2	5	43
Separation						1	1			2
For treatment									1	1
Return home		3	6	5	4	4	5	1		28
Other	1	2	8	10	2	4	6	3	5	41
Total	711	321	297	246	173	160	208	108	96	2320

TABLE C.12 Migration by sex, age, direction and cause, 1974.

A. FEMALES - In-migration

Cause	-10	10-14	15-19	20-24	25-29	30-34	35-44	45-54	55+	Total
Marriage	1	12	361	146	16	8				544
Service		1	2							3
Divorce		6	59	46	9	1	2			123
Dependent	257	57	72	83	43	28	29	18	19	606
Study	5	11	6	1						23
Better living	4	9	18	31	10	6	6	5	11	100
Return home - after study			1							1
after work		2								2
For livelihood	1	2	3	2	2		1	1	6	18
Adoption	15		1	1						17
Work	1	6	5	2	1		1	2		18
Change in residence			2	2	1					5
Joining husband			6	7	1	1				15
- parents	3	1	9	7	2	4	2			28
- relatives	2	2	3	1	1			1		11
Unknown	1	1	30	7	2	1				42
Separation		1	37	24	6	3	2			73
Widow				2						2
Returning home		6	6	7	2	3	3	2	3	32
Regular member				1						1
Other	2		14	6	4			1	2	29
Total	292	117	635	376	100	55	46	30	42	1,693

B. FEMALES - Out-migration

Marriage	1	222	393	48	11	2		1		678
Service				2	4					6
Divorce		10	65	24	7	6	4	2		118
Dependent	629	192	156	128	94	72	76	45	45	1,437
Study	4	14	5							23
Better living	4	4	18	16	14	5	10	8	8	87
Return home after study		1	1							2
- work	1			1				1		3
For livelihood	4	10	17	16	7	8	15	6	12	95
Adoption	10	1								11
Work	2	19	7	2	2	1	4	1		38
Change in residence	1	3	5	3	1	4	3	4	6	30
Joining husband	1	18	77	32	19	12	7			166
- parents	9	5	5	6		1				26
- relatives	2	3	1	1	1			6	7	21
Unknown	3	13	35	15	2	1	2	1	1	73
Separation		3	36	11	5	3	3		1	62
For treatment			1		2					3
Widow			3	1		1	1			6
Returning home	3	5	4	5	1	1				19
Other		1	3	3	1	3		4	3	18
Total	674	524	832	314	171	120	125	79	83	2,922

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A N N E X

Estimation of neonatal and post-neonatal mortality rates by calendar month of occurrence

To link infant deaths classified by age into neonatal (under one month of age) and post-neonatal (1-11 completed months of age) with the appropriate birth cohorts from which they originated may be done in two ways: by matching directly birth and death records, or, alternatively, by using a set of weights derived from Lexis Grid. The latter procedure was followed in the calculation of monthly rates of neonatal and post-neonatal mortality in this paper.

Taking as example deaths that occurred in January 1974, that is D(JAN), neonatal deaths shall be denoted D' and post-neonatal deaths D".

The number of neonatal deaths D'(JAN) originated from the births of December 1973, B(DEC) and from the births of January 1974, B(JAN)'. Assuming that neonatal deaths were evenly distributed over age and time, the estimated probability of neonatal death in January 1974 was

$$Q(JAN) = \frac{D'(JAN)}{\frac{1}{2} B(DEC) - \frac{1}{2} B(JAN)'}$$

A similar procedure was followed for other months of 1974.

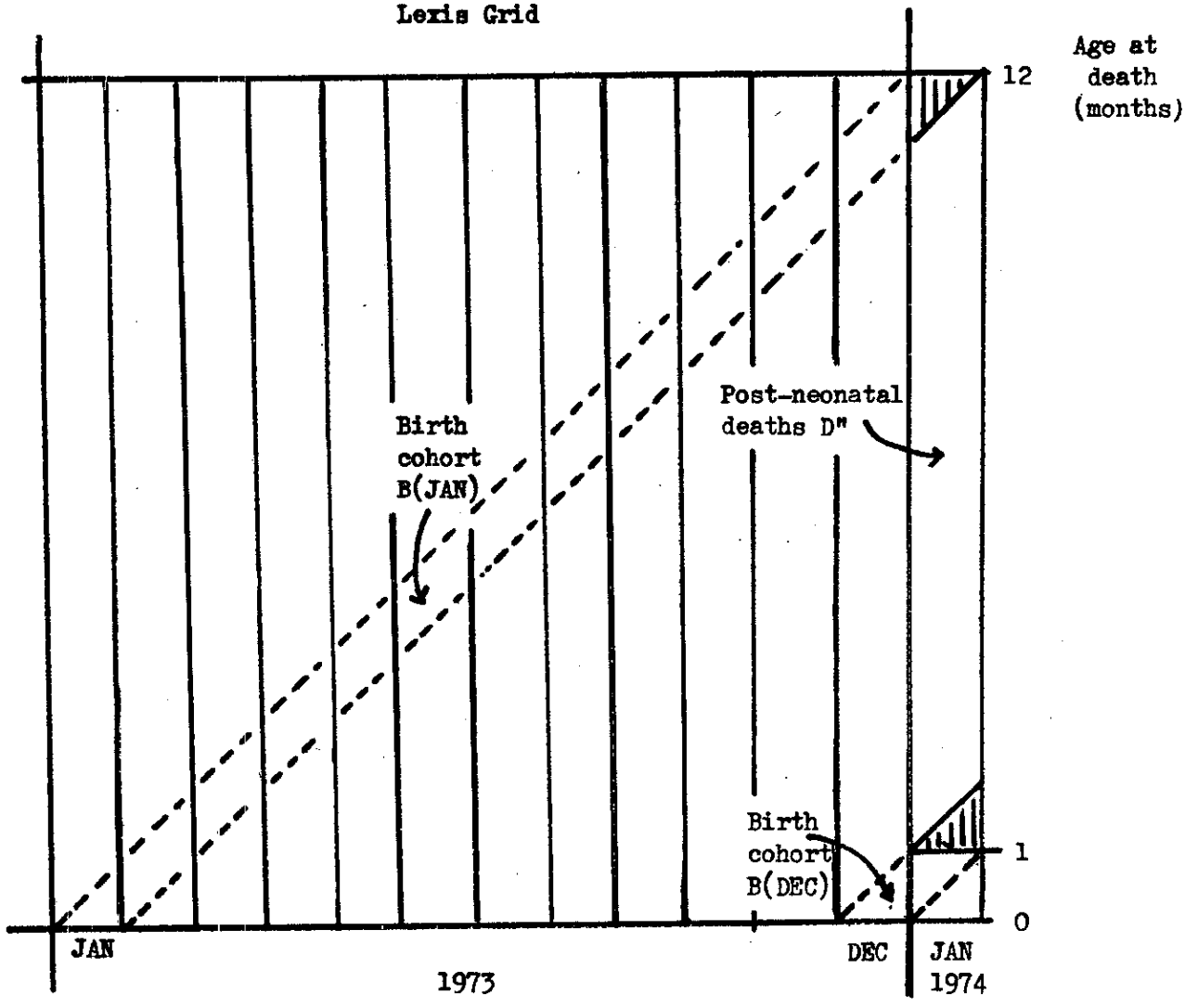
Post-neonatal deaths in January 1974, D"(JAN) originated from the births that took place between 1 January 1973 and 31 December 1973. However, the monthly birth cohorts were not evenly contributing to post-neonatal mortality. From Lexis Grid follows that only $\frac{1}{22}$ of D"(JAN) may be linked with the births recorded in January 1973 and the same proportion of D"(JAN) may be linked with the births recorded in December 1973. The remaining deaths, that is $\frac{20}{22}$ D"(JAN) is linked with the number of births from 1 February to 30 November 1973. Thus

$$Q(JAN)' = \frac{1}{22} \left(\frac{D"(JAN)}{B(DEC)} - \frac{20\ D"(JAN)}{B(FEB \ldots NOV)} - \frac{D"(JAN)}{B(JAN)} \right)$$

The graph on the following page illustrates the example.

Similar procedure was used for allocating post-neonatal deaths in other months of 1974 to the appropriate birth cohorts.

Lexis Grid


Age at death (months)
12
1
0
Birth cohort B(JAN)
Post-neonatal deaths D"
Birth cohort B(DEC)
JAN
1973
DEC
JAN
1974

CRL publications can be obtained from Publications Unit, Cholera Research Laboratory, G.P.O. Box 128, Dacca - 2, Bangladesh.

List of current publications available:

A. CRL Annual Report 1976

CRL Annual Report 1977

B. Working Paper:

No. 1. The influence of drinking tubewell water on diarrhea rates in Matlab Thana, Bangladesh by George T. Curlin, K.M.A. Aziz and M.R. Khan.

No. 2. Water and the transmission of El Tor cholera in rural Bangladesh by James M. Hughes, John M. Boyce, Richard J. Levine, Moslemuddin Khan and George T. Curlin.

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D. Special Reprint:

Management of cholera and other acute diarrhoeas in adults and children - World Health Organization.