

Chakaria Health and Demographic Surveillance System Focusing on the Poor and Vulnerable

**Demographic Events and Safe Motherhood
Practices – 2012**

Scientific Report No. 125



icddr,b

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GLOBAL LIFESAVING SOLUTIONS

Chakaria Health and Demographic Surveillance System

Focusing on the Poor and Vulnerable

Demographic Events and Safe Motherhood Practices – 2012

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All staff members of the Chakaria HDSS, Dhaka and Chakaria, have contributed to the preparation of this report.

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CHAPTER I

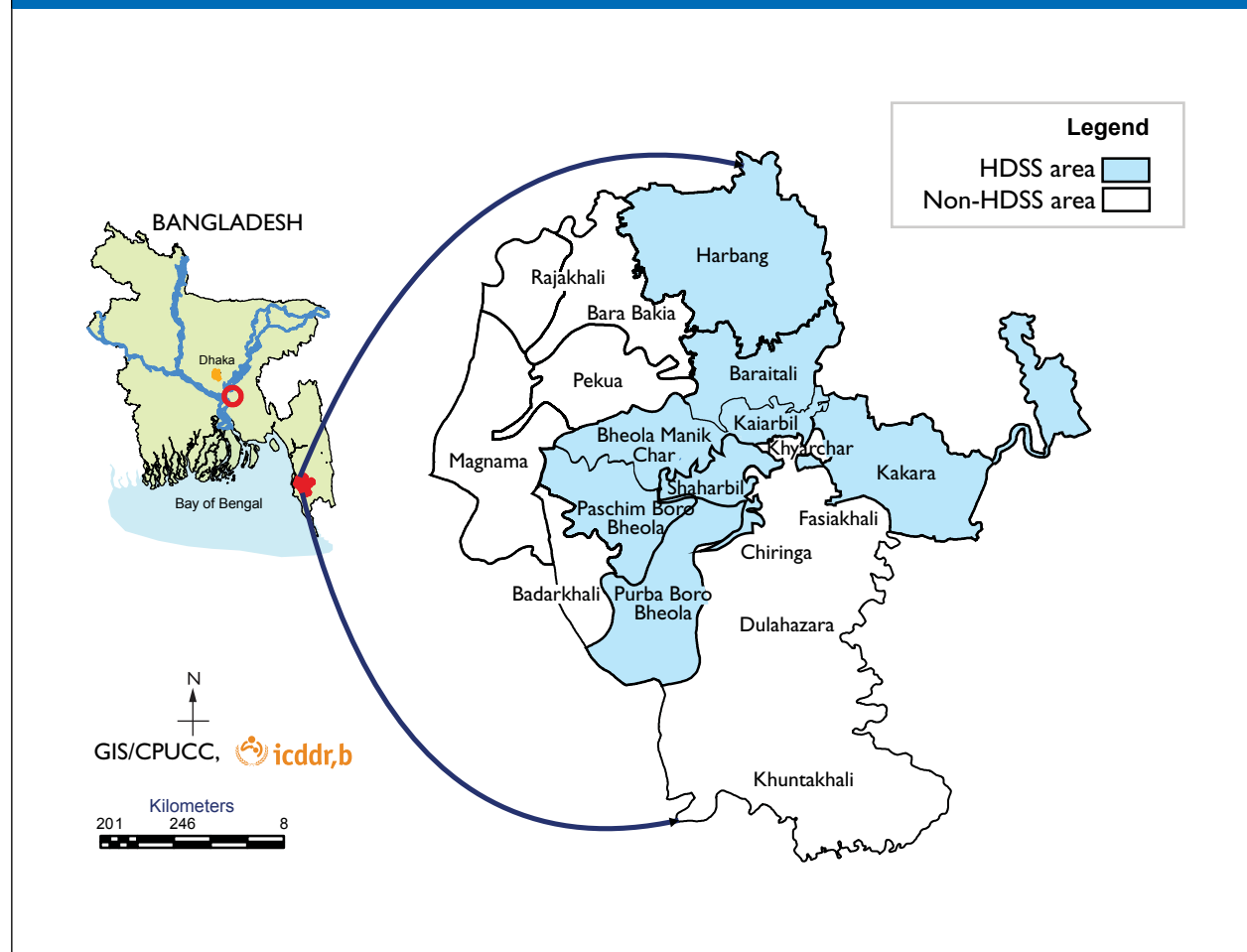
Introduction

Chakaria is one of the 500 upazilas (sub-districts) in Bangladesh. It is located between latitudes 21°34' and 21°55' North and longitudes 91°54' and 92°13' East in the southeastern coast of the Bay of Bengal. Administratively, it is under Cox's Bazar district with an estimated population of 500,576 in 2012. The highway from Chittagong to Cox's Bazar passes through Chakaria. The east side of Chakaria is hilly, while on the west side towards the Bay of Bengal is lowland. A map showing the location of Chakaria is presented in Figure 1.

icddr,b started its activities in Chakaria in 1994. The focus of the activities has been to facilitate local initiatives for the improvement of health of the villagers in general and of children, women, and the poor in particular. Thus, the activities of the project have been participatory with emphasis on empowering the people by raising awareness about health, inducing positive preventive behaviour through health education, and providing technical assistance to any health initiatives taken by the village-based indigenous self-help organizations. Some major initiatives taken by the villagers included assessment of health needs, defining actions for health, implementing them, and monitoring their implementation and outputs. Among the health-related activities, identification of volunteers for health education, mobilizing local resources for the establishment of village health posts and their management, introduction of a pre-paid family health card, and establishment of health cooperatives have been the major ones. Details of the activities of the project and the outcomes have been reported elsewhere (1;2). Health services that are currently available in surveillance area are presented in the box below. Collection of data from households on a quarterly basis, referred hitherto as Chakaria Health and Demographic Surveillance System (Chakaria HDSS), has been initiated in this area since 1999. The primary purpose of this surveillance system is to monitor the impact of interventions with equity focus and generate relevant health, demographic and socioeconomic information for policies and programmes, and further research. This report presents data collected through the Chakaria HDSS during 2012.

Existing health services in Chakaria HDSS area, 2012	
Healthcare facility/provider	No.
icddr,b facilitated and Community initiated	
Village health post	7
Trained midwife	12
Qualified physician	1
Male paramedic	10
Government	
Union Health and Family Welfare Centre (UHFWC)	10
EPI centre	254
Rural dispensary	1
Family Welfare Visitor (FWV)	8
Sub-Assistant Community Medical Officer (SACMO)/Medical assistant	4
Family Welfare Assistant (skilled birth attendant)	18
Community Clinics	23
Community Healthcare Provider	24
Private	
Village doctor (allopathic)	240
Village doctor (homeopathic)	102
Allopathic pharmacy	177
Homeopathic pharmacy	15
Diagnostic centre	3
NGO	
Health and development activities	8
HDSS = Health and Demographic Surveillance System.	

Fig. 1. Map of Chakaria showing Chakaria HDSS area



HDSS = Health and Demographic Surveillance System.

CHAPTER 2

Methods and Materials

The Chakaria HDSS covered 8 unions¹, namely Baraitali, Kaiarbil, Bheola Manik Char, Paschim Boro Bheola, Shaharbil, Kakara, Harbang, and Purba Boro Bheola. In 1999, 166,405 people were living in 26,979 households. A household is defined as blood or otherwise related group of members and unrelated individuals living in the same compound at least once a month and sharing the food from the same kitchen. A household member is considered to have migrated out if s/he has left the household and does not intend to come back within six months of the time s/he left. A person is considered to have migrated in if s/he was not previously included in the list of household members and intends to live in the household for at least once in a month for the next six months.

Although Chakaria HDSS started in 1999, covering 183 villages of 166,405 individuals living in 26,979 households, data collection was interrupted during 2001–03. Since 2004, quarterly data collection has resumed, and data have been systematically collected from 7,042 households, randomly chosen from the total of 26,979 households. Data have been collected through quarterly visits by a team of surveillance workers (SWs) with supervision from a team of two supervisors. On a typical day, a SW would come to the office and take a list of households assigned by the supervisors, travel to respondents' households, update the events and return the collected data sheets to the office. Using this system, data collection and data management took a significant amount of time and money, involving daily travel to the households by SWs. The above system of data collection was modified in 2011. The modification involved choosing 49 villages randomly from a total of 183. The 49 villages were divided into 14 work areas and 14 SWs were recruited from the 14 work areas where they resided. Most of the households included in the system prior to this modification were also included in the new system. The modification of the system has resulted in the SWs visiting almost double the number of households in comparison with the previous system, saving time spent on travel in the earlier system. In addition, the modification allowed the possibility of estimating migration as the system includes complete villages. Currently, surveillance covers 80,166 individuals (15,633 households).

Two supervisors supervised the data-collection process. To detect any anomalies, the supervisors re-visited 5% of the households, chosen randomly, within 2 days of data collection by the field workers. Later on, the supervisors and the relevant field workers together sorted out any inconsistencies in the collected data. All the filled-up questionnaires were manually checked for completeness and for any inconsistencies.

¹ Government has restructured the existing 8 unions into 11 in 2005.

Subsequently, computer-based data-editing procedures were applied to ensure the quality of data.

Asset quintiles based on ownership of various assets by any member of the households were used to examine differences in various dependant variables. The list of assets included *almirah*, table/chair, van/rickshaw, *choki/khat*, radio, television, cycle, motorcycle, fridge, sofa, electric fan, sewing machine, telephone and electricity. The principal component analytical technique was used for calculating weights of the assets to derive household asset index scores (3). The major demographic indicators and safe motherhood practices have been tabulated for the various asset quintiles.

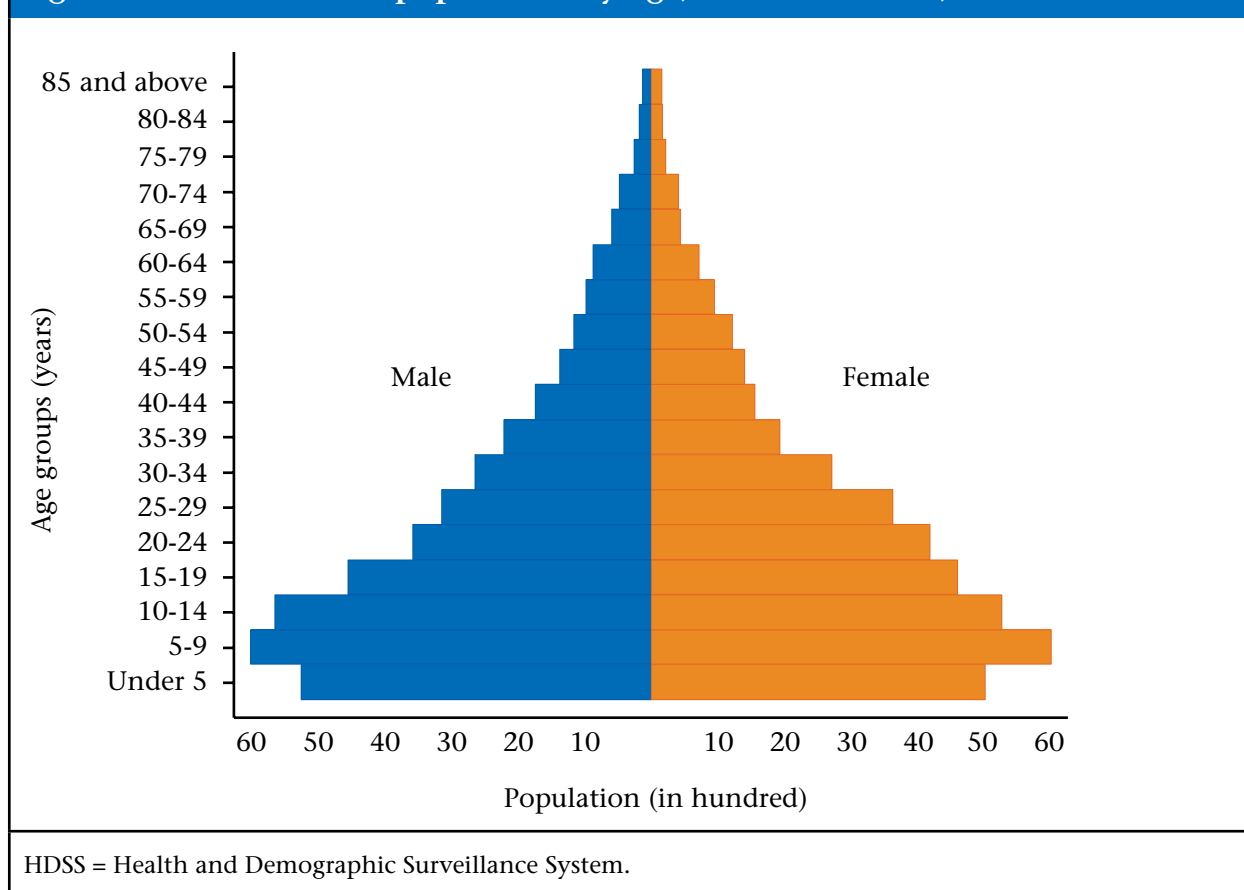
It should be mentioned that the number of observations in the tables presented in this report differ in some instances due to missing information for some variables.

CHAPTER 3

Population and Population Changes

The population pyramid based on the population of 2012 is presented in Figure 2. The shape of the pyramid is typical of a developing country with declining mortality and fertility. The sex ratio (male per 100 females) was 101 in 2012. The age dependency ratio² was 80 in 2012 (see Appendix A).

Fig. 2. Male and female population by age, Chakaria HDSS, 2012



The major demographic and health indicators during 2007-12 are presented in Table 1. A declining trend in the fertility indicators and natural rate of population increase had been observed during 2007-10, but these rates increased in 2011 and again it decreased in 2012. Most of the rates in Chakaria HDSS area are much higher than those in the Matlab government service area, another rural field site of icddr,b (4). In 2012, the rate of natural increase and the annual population growth rate in the surveillance area was 2.0 % and 1.9% respectively (Table 1).

² The age dependency ratio represents the ratio of the combined child population (under 15) and aged population (65 and over) to the population of intermediate age (15 to 64).

Sixteen percent of births in Chakaria were delivered at facilities (Hospital or Clinic) in 2012. The percentage of births at facilities in 2012 increased than to 2011. About one-third of the births were attended by Skilled Birth Attendant (SBA) in Chakaria and there has been an increase in deliveries by SBAs from 25.7% in 2011 to 29.2% in 2012 (Table 1).

The legal age of marriage is 18 years for female and 21 years for male in Bangladesh. In 2012, 37.1% of the women married before reaching their 18th birthday. The percentage of underage female marriage increased to 37.1% in 2012 from 33.6% in 2011. 23.4% of the males were married before the age of 21 years in 2012. The proportion of male marriages before 21 years has increased between 2011 and 2012. The percentage of underage marriage for females remained higher than males during 2007 to 2012.

Table 1. Demographic and health indicators, Chakaria HDSS, 2007– 2012							
Rates per 1,000	Chakaria HDSS area						Matlab HDSS Govt. area 2011
	2007	2008	2009	2010	2011	2012	
Crude birth rate	26.6	25.5	22.9	22.7	27.7	25.4	21.1
Total fertility rate*	3.5	3.3	2.8	2.7	3.3	2.9	2.5
Neonatal mortality**	34.8	29.0	36.8	32.1	38.1	28.0	25.5
Post-neonatal mortality**	13.3	14.9	21.3	17.5	14.5	13.7	6.9
Infant mortality rate**	48.0	43.9	58.1	49.6	52.6	41.7	32.4
Child mortality rate (1-4 yrs)	4.6	4.7	4.7	4.5	3.4	3.7	2.9
Crude death rate	6.1	6.1	6.5	6.0	5.7	5.6	6.4
Rate of natural increase	20.6	20.2	16.4	16.8	22.0	19.8	14.8
In-migration rate	24.6	26.6	29.8	28.7	36.8	33.9	41.5
Out-migration rate	32.0	35.5	40.6	42.2	39.7	35.2	57.6
Growth rate (%)	1.3	1.1	0.6	0.3	1.9	1.9	-0.1
Facility-based delivery (%)	5.1	14.4	12.0	14.1	14.0	16.1	-
Received assistance from SBA during delivery (%)	19.1	16.2	25.3	28.1	25.7	29.2	-
Male marriage at ages under 21 years (%)	25.6	24.7	24.8	25.0	22.8	23.4	-
Female marriage at ages under 18 years (%)	43.2	47.5	39.3	36.4	33.6	37.1	-

*Per woman; **Per 1,000 live births; '-' Data not available.
HDSS = Health and Demographic Surveillance System.

CHAPTER 4

Mortality

Age-specific mortality rates by sex are presented in Table 2. The crude death rate was 5.6 per 1,000 population in 2012. Infant mortality rate was 41.7 per 1,000 live births. Child mortality rate was 3.7 per 1,000 children aged 1-4 years (Table 2).

Abridged Life Table for males and females are presented in Table 3. Life expectancy at birth was 68 years for males and 70 years for females. The rate of mortality of children aged less than 5 years (under-five mortality) was 56.8 per 1,000 live births in Chakaria in 2012 (Table 4). Figure 3 shows the probability of survival by sex during various age groups. The probability of survival of females remained same as males up to age 45 years, but after age 45 probability of survival increased for females.

Table 2. Age-specific death rate per 1,000 population by sex, Chakaria HDSS, 2012

Age (years)	No. of death			Death rate		
	Male	Female	Both	Male	Female	Both
<1*	41	44	85	38.8	44.9	41.7
<1 month	33	24	57	31.2	24.5	28.0
1-11 month	8	20	28	7.6	20.4	13.7
1-4	18	12	30	4.3	3.0	3.7
5-9	11	6	17	1.9	1.0	1.4
10-14	4	3	7	0.7	0.6	0.6
15-19	6	7	13	1.3	1.6	1.4
20-24	2	1	3	0.6	0.2	0.4
25-29	3	3	6	1.0	0.8	0.9
30-34	5	1	6	1.9	0.4	1.1
35-39	6	4	10	2.8	2.1	2.5
40-44	5	7	12	2.9	4.5	3.7
45-49	14	3	17	10.3	2.1	6.2
50-54	8	8	16	6.9	6.6	6.7
55-59	16	12	28	16.3	12.8	14.6
60-64	12	9	21	13.9	12.9	13.4
65-69	13	19	32	22.2	43.9	31.4
70-74	24	14	38	50.2	35.1	43.3
75-79	29	10	39	115.5	47.4	84.4
80-84	16	13	29	89.9	81.3	85.8
85+	15	27	42	116.3	182.4	151.6
All	248	203	451	6.2	5.1	5.6

*Per 1,000 live births; HDSS = Health and Demographic Surveillance System.

Table 3. Abridged Life Table, Chakaria HDSS, 2012

Age (years)	Male					Female				
	${}_n m_x$	${}_n q_x$	l_x	${}_n L_x$	e_x	${}_n m_x$	${}_n q_x$	l_x	${}_n L_x$	e_x
0	0.0397	0.0383	100,000	96,551	68.1	0.0466	0.0447	100,000	95,974	70.1
1	0.0043	0.0172	96,168	381,362	69.8	0.0030	0.0119	95,527	379,824	72.4
5	0.0019	0.0092	94,513	470,387	67.0	0.0010	0.0051	94,385	470,726	69.3
10	0.0007	0.0036	93,642	467,373	62.6	0.0006	0.0029	93,905	468,852	64.6
15	0.0013	0.0066	93,307	464,988	57.8	0.0016	0.0078	93,636	466,363	59.8
20	0.0006	0.0028	92,688	462,784	53.2	0.0002	0.0012	92,909	464,262	55.2
25	0.0010	0.0048	92,426	461,010	48.3	0.0008	0.0042	92,795	462,998	50.3
30	0.0019	0.0096	91,978	457,680	43.6	0.0004	0.0019	92,404	461,586	45.5
35	0.0028	0.0137	91,094	452,353	39.0	0.0021	0.0105	92,231	458,735	40.6
40	0.0029	0.0145	89,848	445,977	34.5	0.0045	0.0223	91,263	451,229	36.0
45	0.0103	0.0501	88,543	431,634	29.9	0.0021	0.0107	89,228	443,762	31.7
50	0.0069	0.0339	84,110	413,422	26.4	0.0066	0.0325	88,277	434,212	27.0
55	0.0163	0.0784	81,259	390,361	22.2	0.0128	0.0619	85,408	413,833	22.9
60	0.0139	0.0670	74,886	361,877	18.9	0.0129	0.0625	80,125	388,115	19.2
65	0.0222	0.1051	69,865	330,971	15.1	0.0439	0.1977	75,121	338,473	15.3
70	0.0502	0.2230	62,523	277,751	11.5	0.0351	0.1613	60,269	277,041	13.5
75	0.1155	0.4482	48,577	188,453	9.1	0.0474	0.2119	50,548	225,966	10.6
80	0.0899	0.3670	26,804	109,429	9.5	0.0813	0.3377	39,839	165,563	7.8
85+	0.1163	1.0000	16,968	145,921	8.6	0.1824	1.0000	26,387	144,638	5.5

HDSS = Health and Demographic Surveillance System.

The Abridged life table is constructed applying the Greville's method illustrated in "The Methods and Materials of Demography", edited by Jacob S. Siegel and David A. Swanson, Second edition; Elsevier Academic Press, 2004: 301-340.

${}_n m_x$ = Central mortality rate

${}_n q_x$ = Probability of dying between the ages x and x+n;

${}_n q_x = \frac{{}_n m_x}{(1/n) + \frac{{}_n m_x}{2} \{1/2 + n/12({}_n m_x - \log_e c)\}}$;
 $\log_e c = .095$

l_x = Survivors to exact age x

${}_n L_x$ = Numbers of years lived by the total of the cohort of 100,000 births in the interval;

$L_0 = .20l_0 + .80l_1$, $L_{85+} = l_{85+}/m_{85+}$

e_x = Life expectancy at age x

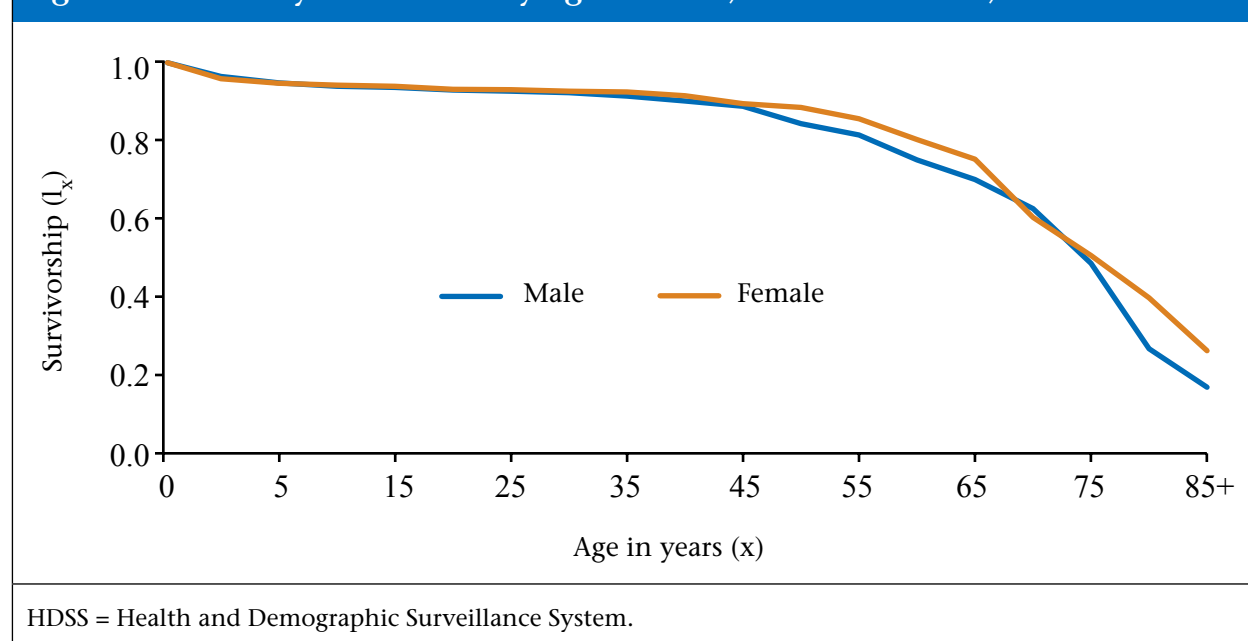
Fig. 3. Probability of survival by age and sex, Chakaria HDSS, 2012

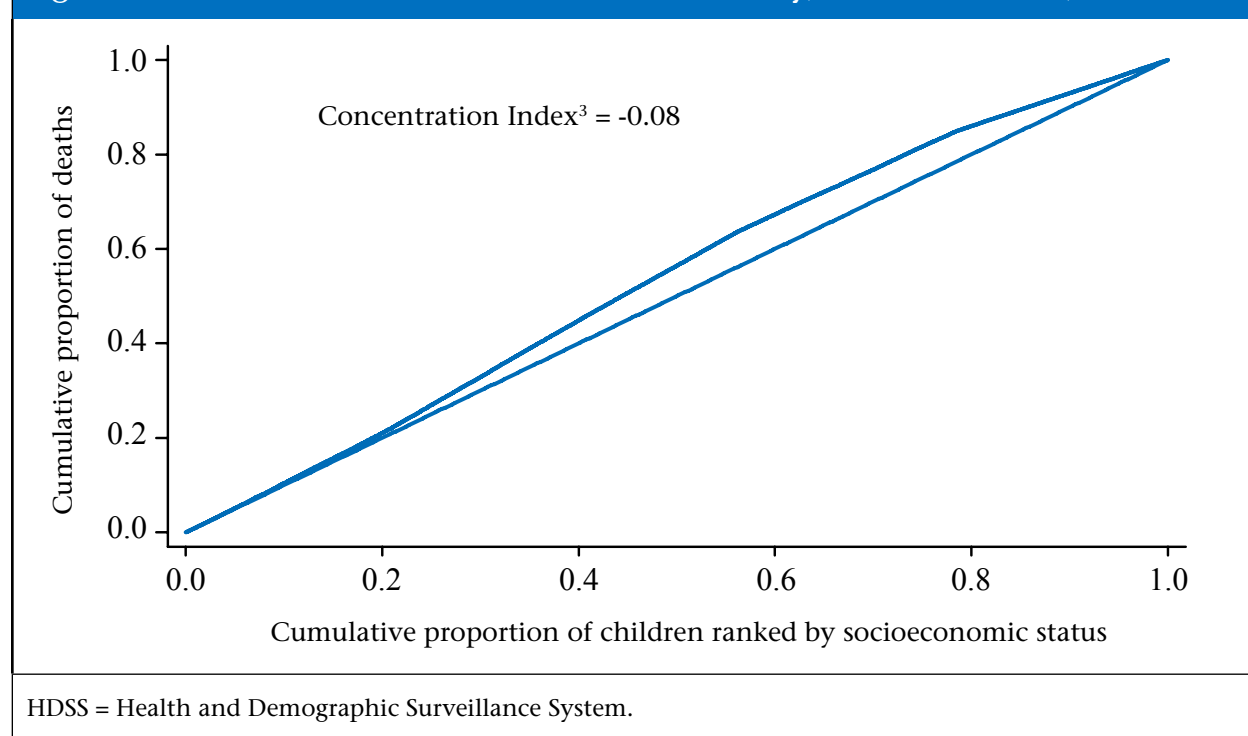
Table 4 presents under-5 mortality rates by household asset quintile. Under-5 mortality rate was inversely correlated with household asset scores. The mortality rate of children from the lowest quintile was 1.5 times of children from the highest quintile. Figure 4 also shows that under-5 deaths concentrated to the poorer segment of the population.

Table 4. Under-5 mortality rate per 1,000 live births by asset quintile, Chakaria HDSS, 2012

Asset quintile	No. of births	No. of under-5 deaths	Under-5 mortality rate
Lowest	417	25	60.0
Second	377	26	69.0
Middle	316	21	66.5
Fourth	446	24	53.8
Highest	434	17	39.2
All	1,990	113	56.8

HDSS = Health and Demographic Surveillance System.

Fig. 4. Concentration curve for under-5 mortality, Chakaria HDSS, 2012



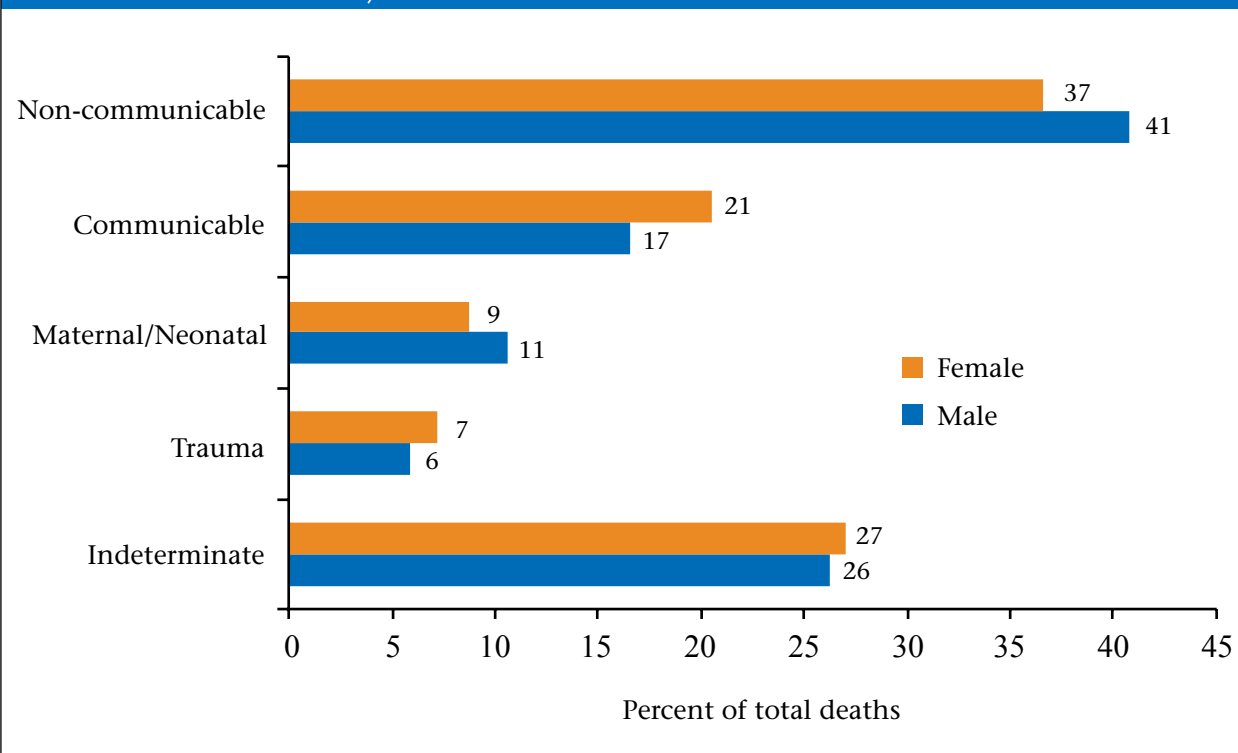
Causes of death

Verbal autopsy data on signs, symptoms and circumstances leading to death, and medical history of the deceased were collected during the quarterly household visits from an informed household member. A total of 451 deaths were registered in 2012. Data was analyzed using “InterVA-4.01” (5) to ascertain causes of death.

Broad pattern of cause of death

Non-communicable conditions (39%) were the leading cause of death for both men and women. This was followed by communicable diseases (19%), maternal and neonatal condition (10%), and trauma (7%). For non-communicable diseases, the proportion of deaths was higher for males than for females. In case of communicable diseases, the proportion of deaths was higher for females than for males (Fig. 5). Maternal and neonatal conditions were the leading cause of death in children and accounts for one-third of child deaths. Non-communicable diseases were the leading cause of death for adults and elderly people (Table 5).

³ Concentration Index (CI) is a measure of the socioeconomic inequality of health based upon information on the socioeconomic ranks and the health levels of all individuals in the population. A positive value of CI indicates that health is distributed in favour of the rich, and a negative one that it is distributed in favour of the poor (6). A value of zero indicates no relation between health and socioeconomic status (7).

Fig. 5. Distribution of deaths by leading causes for males and females, Chakaria HDSS, 2012

HDSS = Health and Demographic Surveillance System.

Table 5. Distribution of causes of death, Chakaria HDSS, 2012

Cause group	Children (%)	Adults (%)	Elderly (%)
01 Communicable	15.0	9.7	22.6
02 Non-communicable	8.7	40.7	56.1
03 Maternal/Neonatal	30.5	1.0	0.0
04 Trauma	13.5	6.6	2.3
05 Indeterminate	32.3	42.0	19.0
Total	100.0	100.0	100.0

HDSS = Health and Demographic Surveillance System.

18 Pulmonary tuberculosis, chronic obstructive pulmonary diseases, acute respiratory infection (including pneumonia), stroke, and diabetes mellitus are the leading five causes of death for all ages. Table 6 presents the distribution of cause of death for males and females.

Table 6. Distribution of causes of death among males and females, Chakaria HDSS, 2012

Causes	Male	Female	Both
01.01 Sepsis (non-obstetric)	0.2	0.2	0.2
01.02 Acute respiratory infection, including pneumonia	5.4	5.2	5.3
01.03 HIV/AIDS related death	0.0	0.4	0.2
01.04 Diarrhoeal diseases	0.7	1.4	1.0
01.05 Malaria	0.0	0.6	0.3
01.06 Measles	0.0	0.5	0.2
01.07 Meningitis and encephalitis	0.4	1.9	1.0
01.09 Pulmonary tuberculosis	7.9	9.1	8.4
01.10 Pertussis	0.0	0.5	0.2
01.11 Haemorrhagic fever	0.1	0.0	0.1
01.99 Other and unspecified infectious diseases	1.9	0.8	1.4
02.01 Oral neoplasms	0.0	0.4	0.2
02.02 Digestive neoplasms	3.3	2.7	3.0
02.03 Respiratory neoplasms	6.2	2.3	4.4
02.04 Breast neoplasms	0.0	0.8	0.4
02.05 & 02.06 Reproductive neoplasms M, F	0.2	0.6	0.4
02.99 Other and unspecified neoplasms	4.1	1.2	2.8
03.01 Severe anaemia	0.1	0.9	0.5
03.02 Severe malnutrition	0.7	0.3	0.5
03.03 Diabetes mellitus	3.7	6.8	5.1
04.01 Acute cardiac disease	3.1	1.5	2.4
04.02 Stroke	4.2	6.4	5.2
04.99 Other and unspecified cardiac diseases	2.9	1.9	2.5
05.01 Chronic obstructive pulmonary disease	5.5	5.6	5.6
05.02 Asthma	1.5	0.2	0.9
06.01 Acute abdomen	1.4	1.6	1.5
06.02 Liver cirrhosis	1.3	0.5	0.9
07.01 Renal failure	1.3	2.2	1.7
08.01 Epilepsy	0.6	0.3	0.5
09.03 Pregnancy-induced hypertension	0.0	0.3	0.1
10.01 Prematurity	4.8	2.0	3.5
10.02 Birth asphyxia	2.7	2.1	2.4
10.03 Neonatal pneumonia	1.1	1.3	1.2
10.04 Neonatal sepsis	0.0	0.3	0.1
10.06 Congenital malformation	0.0	0.4	0.2

Table 6. (contd...)

Causes	Male	Female	Both
10.99 Other and unspecified neonatal causes of death	2.0	2.4	2.2
12.01 Road traffic accident	0.5	0.0	0.3
12.03 Accidental fall	0.3	0.5	0.4
12.04 Accidental drowning and submersion	4.0	4.3	4.1
12.05 Accidental exposure to smoke fire & flame	0.0	0.9	0.4
12.06 Contact with venomous plant/animal	0.0	0.0	0.0
12.07 Accidental poisoning & noxious substances	0.3	0.0	0.2
12.08 Intentional self-harm	0.4	1.2	0.8
12.09 Assault	0.4	0.0	0.2
12.99 Other and unspecified external causes of death	0.0	0.3	0.1
98 Other and unspecified non-communicable diseases	0.7	0.4	0.6
99 Indeterminate	16.3	15.4	15.9
XX VA not completed	10.0	11.5	10.7
All	100.0	100.0	100.0
HDSS = Health and Demographic Surveillance System.			

CHAPTER 5

Fertility

The crude birth rate in 2012 was 25.4 per 1,000 population, which was lower than the rate in 2011 (27.7 per 1,000 population) (Table 1). The fertility rate was highest among women of age-group of 20-24 years (Table 7).

Table 7. Age-specific fertility rate per 1,000 women aged 15-49 years, Chakaria HDSS, 2012

Age (years)	No. of females	No. of births			Birth rate
		Male	Female	Both	
15-19	4,496	135	143	278	61.8
20-24	4,069	450	366	816	200.5
25-29	3,546	287	285	572	161.3
30-34	2,667	127	126	253	94.9
35-39	1,897	46	49	95	50.1
40-44	1,552	8	10	18	11.6
45-49	1,399	5	1	6	4.3
Total	19,626	1,058	980	2,038	
TFR					2,923

TFR = Total fertility rate per 1,000 women; HDSS = Health and Demographic Surveillance System.

Table 8. Crude birth rate per 1,000 population by asset quintile, Chakaria HDSS, 2012

Asset quintile	Midyear population	No. of births	Birthrate
Lowest	13,012	417	32.0
Second	15,319	377	24.6
Middle	16,722	316	18.9
Fourth	16,581	446	26.9
Highest	17,291	434	25.1
All	78,925	1,990	25.2

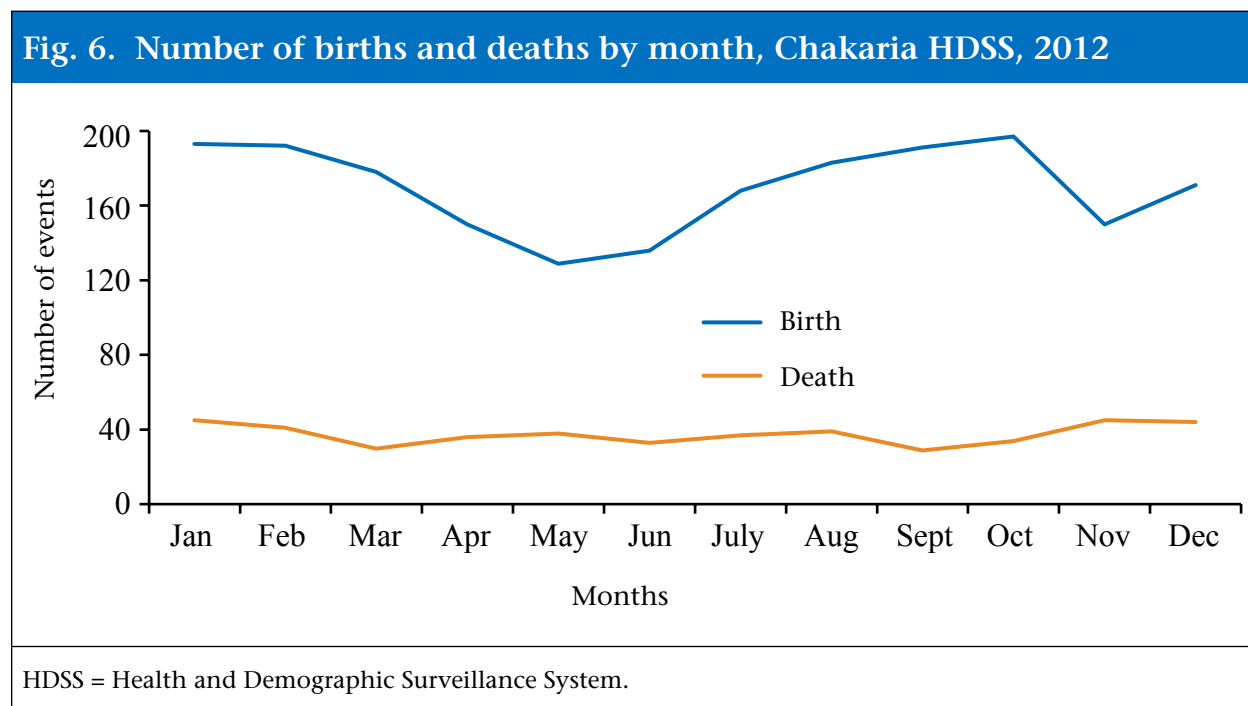
HDSS = Health and Demographic Surveillance System.

Table 8 presents the crude birth rates by household asset quintiles. The crude birth rate showed a 'U' shaped relationship with household socioeconomic status measured by asset quintiles.

Of the pregnancies in 2012, 8.2% of 2,366 were terminated prematurely and spontaneously, 3.4% were terminated through induction, and 2.2% resulted in stillbirths (Table 9).

Table 9. Pregnancy outcome, Chakaria HDSS, 2012		
Pregnancy outcome	No.	%
Spontaneous abortion	195	8.2
Induced abortion	81	3.4
Stillbirth	52	2.2
Live birth*	2,038	86.1
Total no. of pregnancies	2,366	100.0

*Multiple live births included; HDSS = Health and Demographic Surveillance System.



Distribution of deaths by month did not show any distinct seasonal pattern. The number of births was highest in October and lowest in May (Fig. 6).

CHAPTER 6

Migration

In 2012, the rate of out-migration was higher at 34.4 per 1,000 population than that of in-migration at 32.4 per 1,000 population (Table 10). Monthly data on migration are presented in Table 11. Data showed that the number of in-migrants was lower than that of out-migrants during 2012. The sex differential in migration was prominent. The rates of in and out-migration were highest in June for both males and females.

Table 10. Migration rate per 1,000 population by asset quintile, Chakaria HDSS, 2012

Asset quintile	Midyear population	In-migration rate	Out-migration rate
Lowest	13,012	24.8	24.6
Second	15,319	25.3	29.2
Middle	16,722	29.9	30.0
Fourth	16,581	32.9	37.6
Highest	17,291	46.3	47.7
All	78,925	32.4	34.4

HDSS = Health and Demographic Surveillance System.

Table 11. Number of migrants by sex and month, Chakaria HDSS, 2012

Month	In-migration			Out-migration		
	Male	Female	Both	Male	Female	Both
January	114	149	263	136	141	277
February	88	135	223	115	134	249
March	68	133	201	140	129	269
April	109	169	278	112	138	250
May	100	162	262	130	131	261
June	167	259	426	150	177	327
July	52	108	160	115	126	241
August	69	95	164	101	105	206
September	58	99	157	87	123	210
October	85	133	218	61	126	187
November	69	136	205	63	125	188
December	58	106	164	60	95	155
All	1,037	1,684	2,721	1,270	1,550	2,820

HDSS = Health and Demographic Surveillance System.

Origin and destination of migrants

During 2012, 4.2% of 2,721 in-migrants moved into Chakaria HDSS households from outside of Bangladesh whereas 16.4% of 2,819 out-migrants moved out of Bangladesh from Chakaria HDSS area. The proportion of migrants that moved out of Bangladesh was higher than the proportion of migrants that moved into Bangladesh. Overall, the rates of movement of people to and from Chakaria were similar (Table 12).

Table 12. Origin and destination of migrants by sex, Chakaria HDSS, 2012						
Origin or destination	In-migration			Out-migration		
	Male (%)	Female (%)	Both (%)	Male (%)	Female (%)	Both (%)
Inside Bangladesh	89.9	99.5	95.9	64.2	99.6	83.6
Outside Bangladesh	10.1	0.5	4.2	35.8	0.5	16.4
Total	100.0	100.0	100.0	100.0	100.0	100.0
Total number of migrants	1,037	1,684	2,721	1,270	1,549	2,819
Cox's Bazar District						
Inside Chakaria	83.47	83.22	83.31	80.0	80.0	80.0
Outside Chakaria	16.53	16.78	16.69	20.0	20.0	20.0
Total	100.0	100.0	100.0	100.0	100.0	100.0
Total no. of migrants	720	1,371	2,091	1,025	1,197	2,222
Chakaria Upazila						
Inside HDSS area	70.5	70.96	70.8	88.08	79.28	83.32
Outside HDSS area	29.5	29.04	29.2	11.92	20.72	16.68
Total	100.0	100.0	100.0	100.0	100.0	100.0
Total no. of migrants	600	1,140	1,740	965	1,139	2,104
HDSS = Health and Demographic Surveillance System.						

Reasons for migration

Table 13 presents the reasons of migration by sex. 42.8% of the migrants moved out due to family-related issues - mostly marriage, followed by work (25.9%), housing (20.1%), and education (7.4%). Reasons for moving out for males were different from those of females. 42.4% of male in-migrants moved due to work related issues whereas only 19.7% of the females moved due to that reason. On the other hand, 63.4% of female in-migrants moved due to family related issues - mostly marriage, while 29.3% of males moved due to family related reasons (Table 13). The reasons of movement for out-migration were mostly similar to the reasons for in-migration.

Table 13. Reasons for migration, Chakaria HDSS, 2012

Reasons for migration	In-migration			Out-migration		
	Male (%)	Female (%)	Both (%)	Male (%)	Female (%)	Both (%)
Family-related	29.3	63.4	50.4	18.4	62.8	42.8
Work-related	42.4	19.7	28.4	44.3	10.9	25.9
Housing-related	17.0	10.5	13.0	25.7	15.5	20.1
Education	6.9	4.0	5.1	8.7	6.3	7.4
Other	4.4	2.3	3.1	2.9	4.5	3.8
Total	100.0	100.0	100.0	100.0	100.0	100.0
Total no. of migrants	1,037	1,684	2,721	1,270	1,550	2,820

HDSS = Health and Demographic Surveillance System.

CHAPTER 7

Marriage

In total 1,491 marriages took place in the surveillance villages in Chakaria during 2012 and the crude marriage rate was 18.6 per 1,000 population. The highest number of marriages took place in May and the lowest in December. The number of marriages showed a downward trend from May to August (Fig.7). Table 14 presents singulate mean age at marriage (SMAM) and median age at first marriage. The SMAM was 27.1 years for males and 20.6 years for females. The SMAM was increased for both males and females between 2011 and 2012. The median age at first marriage for males and females were 27.1 and 20.0 years. Both the indicators for males and females were almost positively associated with household socioeconomic status (Table 14)

Table 14. Age at marriage by sex, Chakaria HDSS, 2012

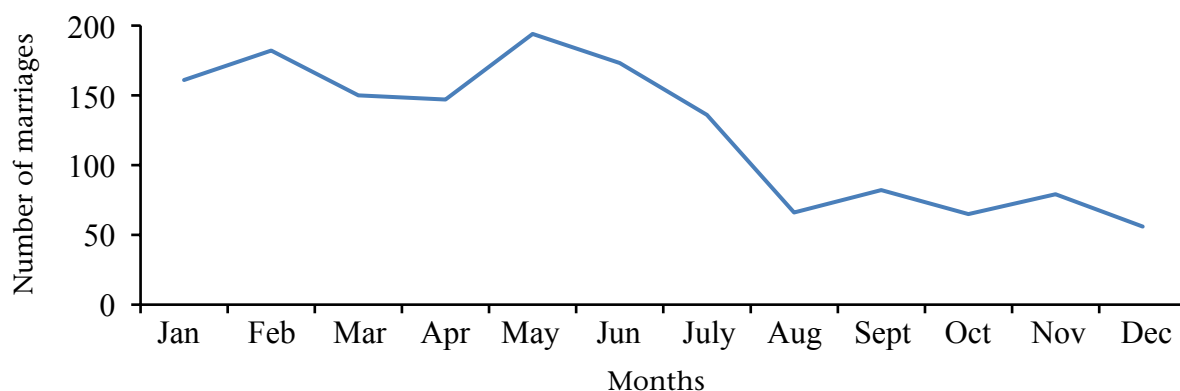
Asset quintile	Male		Female	
	SMAM*	Median age at first marriage*	SMAM*	Median age at first marriage*
Lowest	23.8	23.6	19.5	19.3
Second	25.4	25.3	19.5	19.3
Middle	27.3	27.3	20.4	20.1
Fourth	27.7	27.4	20.6	19.9
Highest	29.7	29.9	21.2	20.4
All	27.1	27.1	20.6	20.0

HDSS = Health and Demographic Surveillance System.

SMAM = Singulate mean age at marriage

* The SMAM and median age at first marriage are calculated by applying indirect methods illustrated in "The Methods and Materials of Demography", edited by Jacob S. Siegel and David A. Swanson, Second edition; Elsevier Academic Press, 2004: 196-202.

Fig. 7. Number of marriages by month, Chakaria HDSS, 2012



HDSS = Health and Demographic Surveillance System.

CHAPTER 8

Safe Motherhood Practices

The health-related activities of icddr,b in Chakaria included facilitation of provision of safe motherhood services (e.g. antenatal care, postnatal care, and delivery services) by the trained midwives who were based in the seven village health posts that had been established and managed by the villagers since the late nineties. Apart from this, the physicians employed by icddr,b with financial support from the community, also provided healthcare services once a week to the villagers from these village health posts during 1998 and 2005.

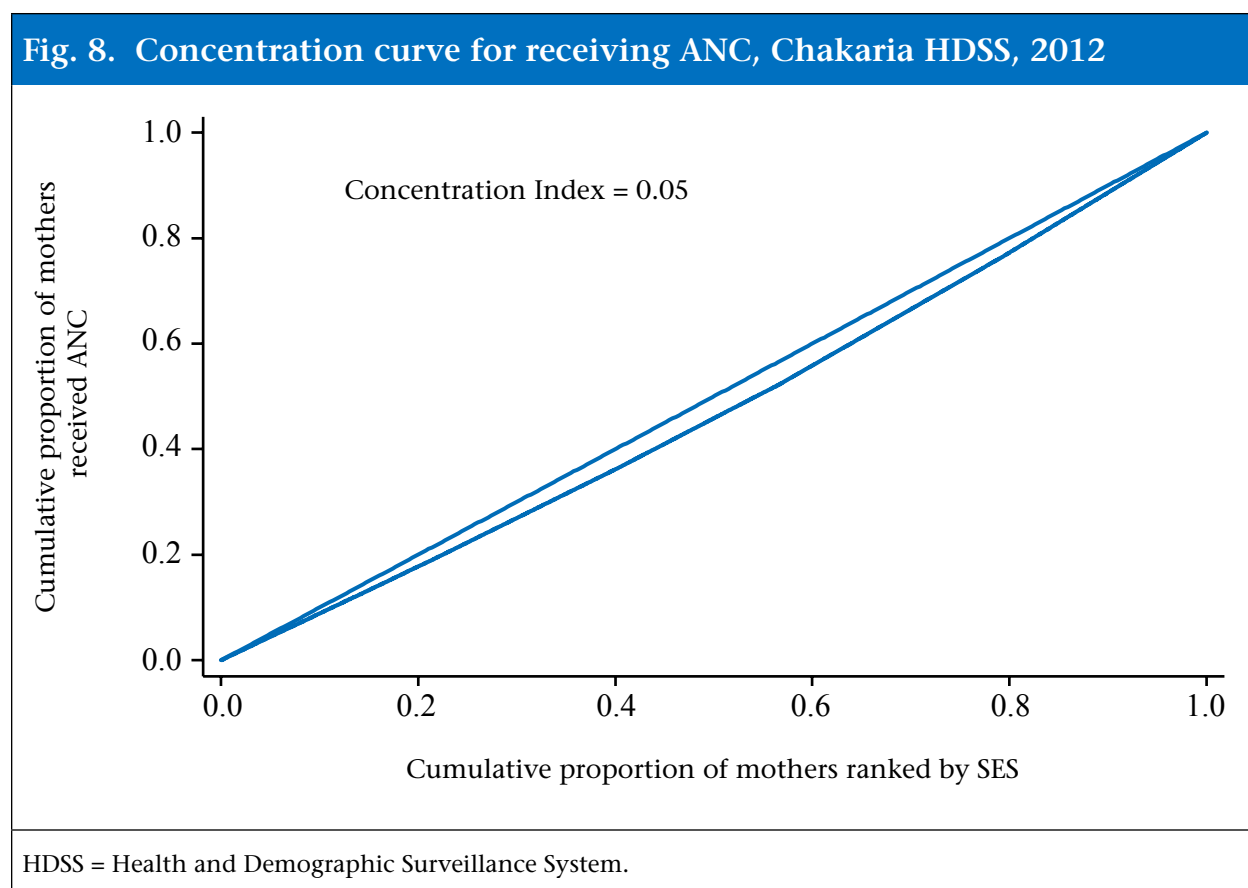
At present, the Upazila Health Complex of the government and four private hospitals provide healthcare services at the headquarters of Chakaria. At the union level, 10 Union Health and Family Welfare Centres (UHFWCs) of the government, 7 village health posts which were initiated by the community members and one Rural Dispensary (RD) of the government provide health services. The Family Development Services and Research (FDSR), an NGO also provides healthcare services in Chakaria surveillance area.

Use of antenatal care services

Table 15. Antenatal care by type of sources and asset quintile, Chakaria HDSS, 2012							
Asset quintile	Received any ANC (%)	Midwife* (%)	FWV* (%)	Nurse/doctor* (%)	FDSR/CMH* (%)	None (%)	No. of women
Lowest	62.4	20.6	18.9	18.5	19.4	37.6	417
Second	64.7	21.0	21.0	21.2	21.0	35.3	377
Middle	71.5	20.3	27.2	26.9	17.1	28.5	316
Fourth	70.6	14.6	20.2	38.8	16.4	29.4	446
Highest	71.4	6.2	9.2	60.1	8.1	28.6	434
Total	68.1	16.1	18.8	34.0	16.2	31.9	1,990
*Multiple responses recorded ANC = Antenatal care FWV = Family Welfare Visitor FDSR = Family Development Services and Research CMH = Christian Memorial Hospital HDSS = Health and Demographic Surveillance System.							

Among 1,990 pregnant women who gave live births, 68.1% of them received at least one antenatal check-up (ANC). The women received services from various sources.

Among these sources, the nurses/doctors were dominant, followed by FWV and FDSR/CMH and then midwives (Table 15). Also Table 15 and Figure 8 indicated that the use of ANC services concentrated to richer segments of the population.



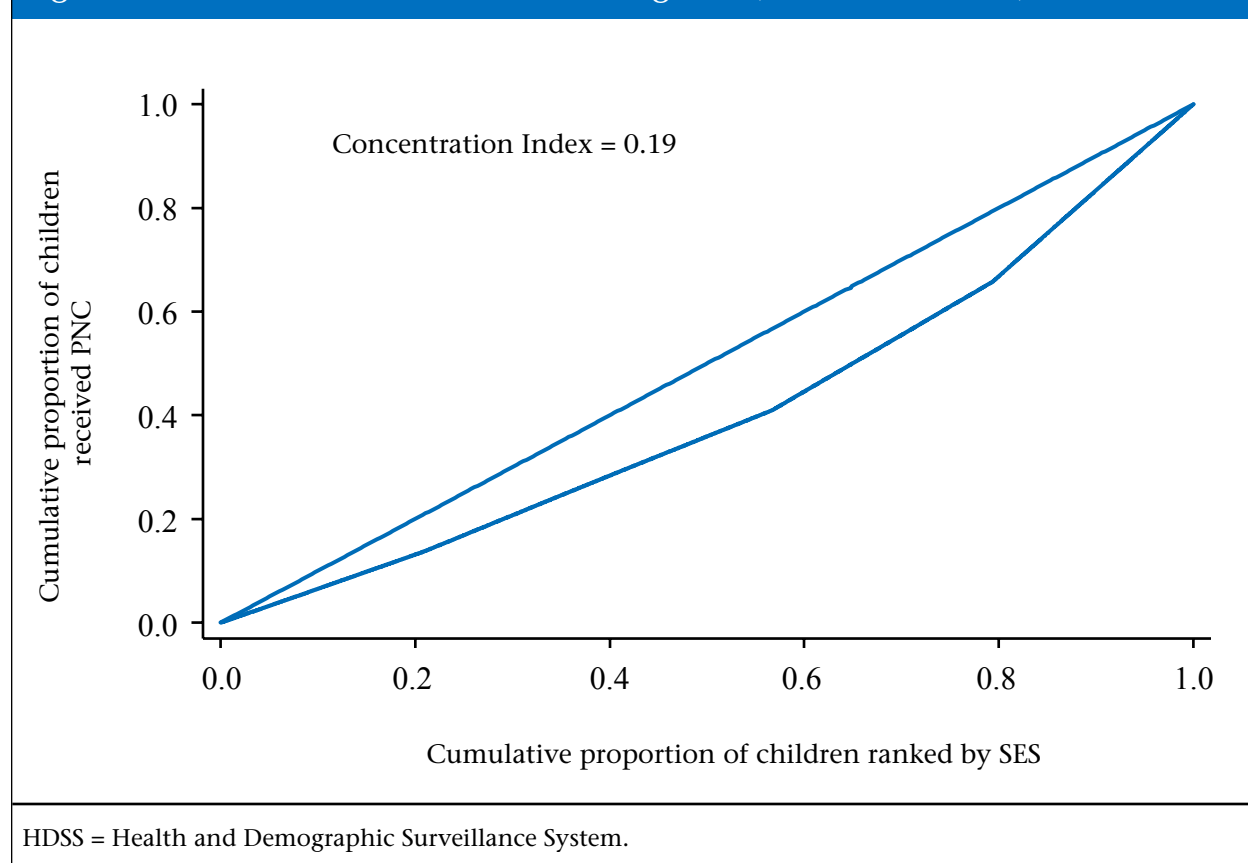
Use of postnatal care services

It was observed that only 35.9% of the pregnant women received at least one postnatal care (PNC) in 2012. The nurses, doctors and midwives were the dominant sources for PNC. The utilization of services was characterized by large inequities and the services concentrated to the richest segment of the society (Table 16 and Fig. 9).

Table 16. Postnatal care by type of sources and asset quintile, Chakaria HDSS, 2012

Asset quintile	Received any PNC (%)	Midwife* (%)	FWV* (%)	Nurse/doctor* (%)	FDSR/CMH* (%)	None (%)	No. of women
Lowest	24.0	6.5	2.6	17.0	0.5	76.0	417
Second	28.9	8.5	3.4	18.0	0.5	71.1	377
Middle	28.5	7.3	4.1	19.9	0.6	71.5	316
Fourth	38.1	5.8	4.0	28.7	1.6	61.9	446
Highest	56.7	11.1	4.6	45.9	1.2	43.3	434
Total	35.9	7.8	3.8	26.6	0.9	64.1	1,990

*Multiple responses recorded
PNC = Postnatal care
FWV = Family Welfare Visitor
FDSR = Family Development Services and Research
CMH = Christian Memorial Hospital
HDSS = Health and Demographic Surveillance System.

Fig. 9. Concentration curve for receiving PNC, Chakaria HDSS, 2012

Assistance during delivery

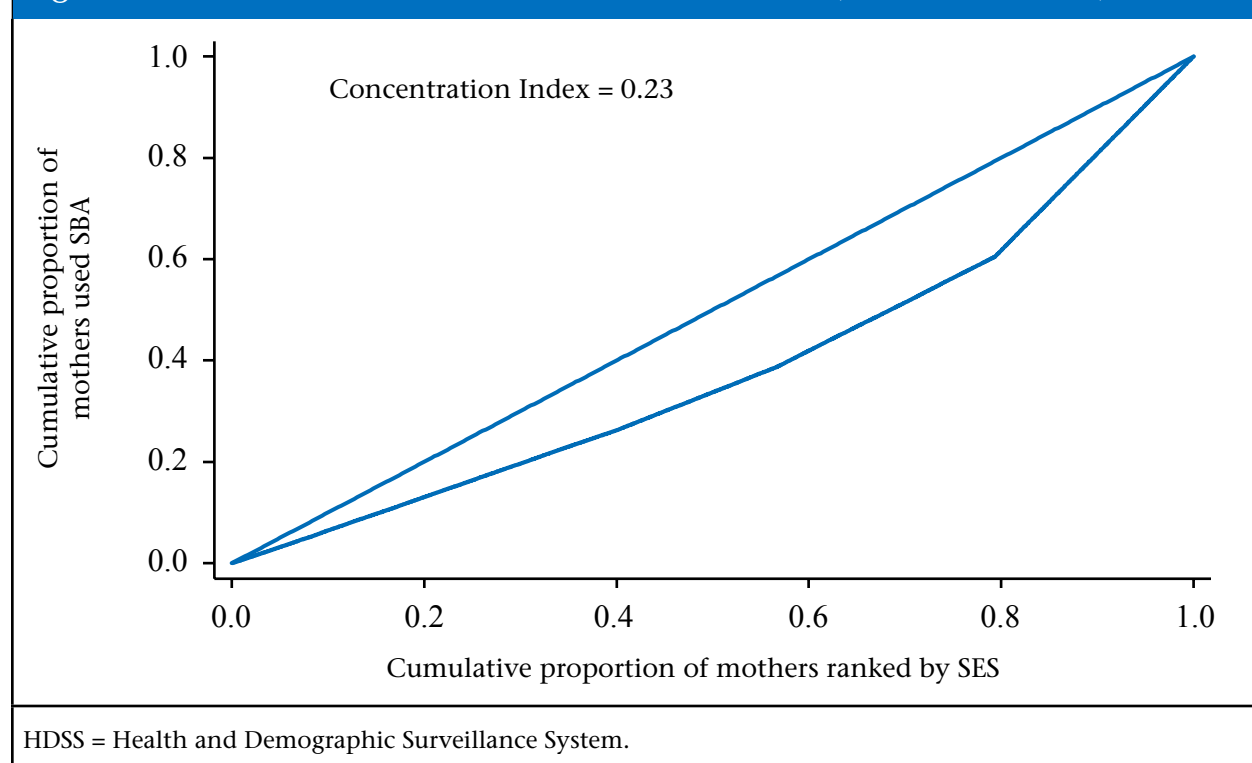
Table 17. Assistance during delivery by asset quintile, Chakaria HDSS, 2012

Asset quintile	Midwife (%)	FWV (%)	Nurse/ doctor (%)	TBA (%)	No. of women
Lowest	7.0	2.2	8.2	82.7	417
Second	10.3	1.6	6.4	81.7	377
Middle	8.9	3.8	9.2	78.2	316
Fourth	7.2	3.8	15.0	74.0	446
Highest	13.6	6.0	39.2	41.2	434
Total	9.4	3.5	16.3	70.8	1,990

FWV = Family Welfare Visitor
HDSS = Health and Demographic Surveillance System.

In Chakaria, the traditional birth attendants (TBAs) were used more than the skilled birth attendants (SBAs) for assisting deliveries. 70.8% of 1,990 deliveries in Chakaria were assisted by the TBAs as opposed to 29.2% of the deliveries assisted by the SBAs (e.g. nurses/doctors, FWVs, midwives) (Table 17). The use rate of nurses/doctors by the women from the highest quintile was much higher than those by women from the lowest quintiles (Table 17 and Fig. 10).

Fig. 10. Concentration curve for use of SBA services, Chakaria HDSS, 2012



Place of delivery

Eighty four percent of the deliveries took place at home. Only 16.1% of 1,990 deliveries took place either at hospitals or at clinics (Table 18). The women from the households in the highest asset quintile had a much higher rate of facility based delivery than those from the lowest quintile (Table 18 and Fig. 11).

Table 18. Place of delivery by asset quintile, Chakaria HDSS, 2012

Asset quintile	Hospital/Clinic (%)	Home (%)	No. of women
Lowest	8.2	91.8	417
Second	6.1	93.9	377
Middle	7.6	92.4	316
Fourth	15.2	84.8	446
Highest	39.4	60.6	434
Total	16.1	83.9	1,990

HDSS = Health and Demographic Surveillance System.

Fig. 11. Concentration curve for facility-based delivery, Chakaria HDSS, 2012

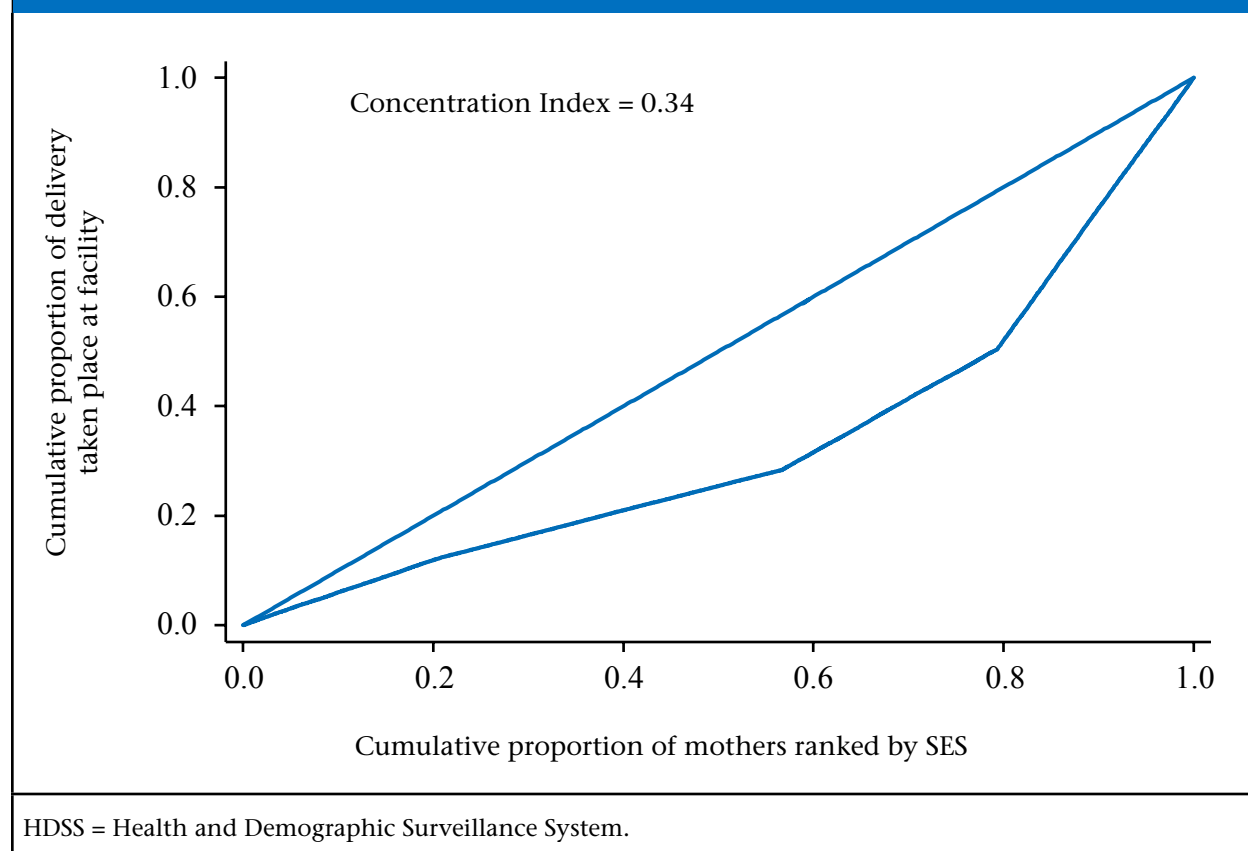
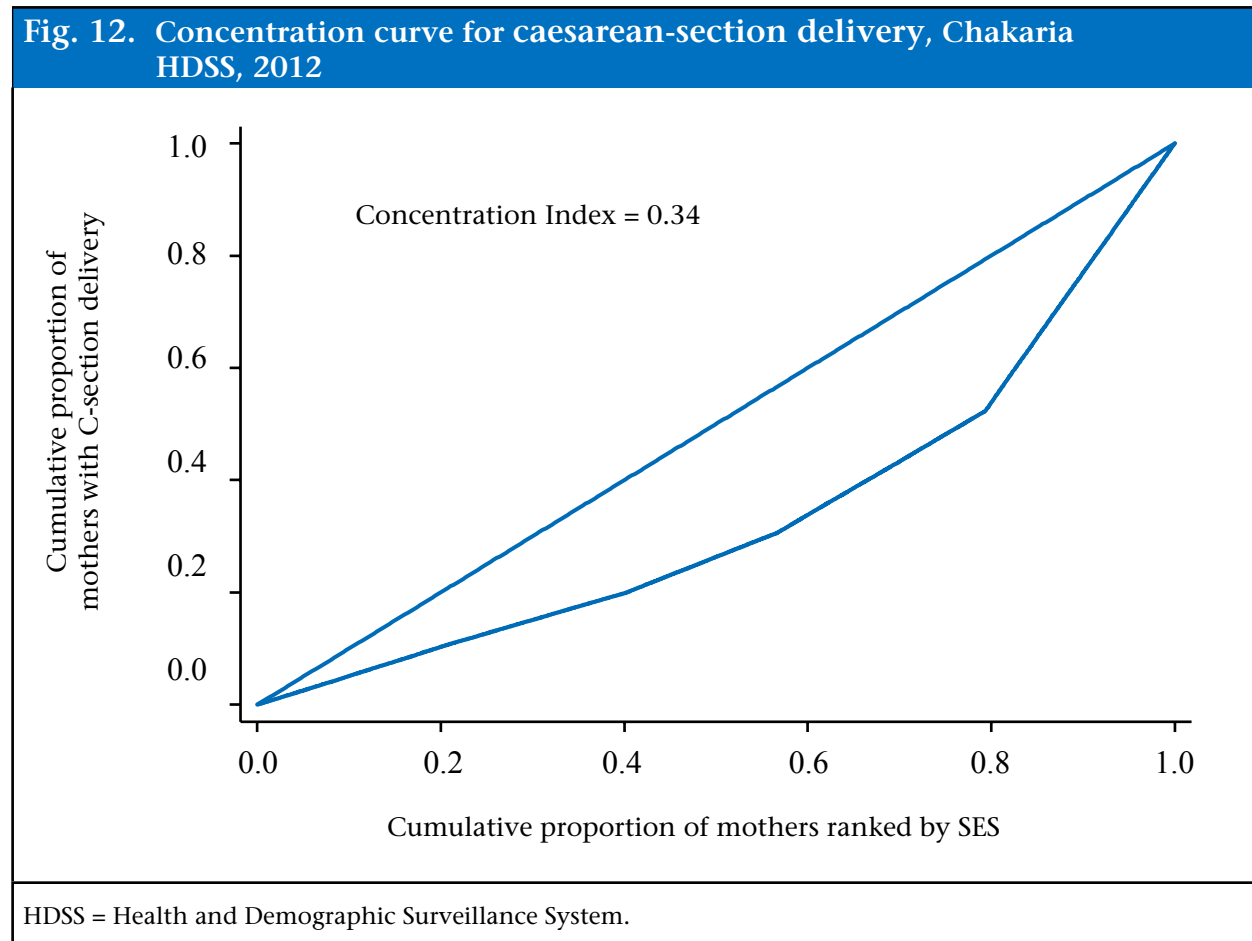


Table 19 shows caesarean-section delivery by household asset quintile in 2012. Caesarean-section delivery accounted for 7.6% of the deliveries in the Chakaria HDSS area in 2012. Although the number of caesarean sections was small, the number of women with caesarean sections exhibited huge discrepancies between highest and lowest quintile (Table 19 and Fig. 12).

Table 19. Proportion of caesarean-section delivery by asset quintile, Chakaria HDSS, 2012			
Asset quintile	No. of caesarean-section delivery	Caesarean-section delivery (%)	Total no. of deliveries
Lowest	15	3.6	417
Second	14	3.7	377
Middle	16	5.1	316
Fourth	30	6.7	446
Highest	76	17.5	434
Total	151	7.6	1,990

HDSS = Health and Demographic Surveillance System.



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APPENDIX A

Midyear population by age and sex, Chakaria HDSS, 2012

Age (years)	Midyear population			Percentage distribution of midyear population		
	Male	Female	Both	Male	Female	Both
<1	1,033	944	1,977	2.6	2.4	2.5
1-4	4,148	3,993	8,141	10.3	10.0	10.2
5-9	5,939	5,887	11,826	14.7	14.8	14.8
10-14	5,591	5,213	10,804	13.9	13.1	13.5
15-19	4,502	4,496	8,998	11.2	11.3	11.2
20-24	3,535	4,069	7,604	8.8	10.2	9.5
25-29	3,090	3,546	6,636	7.7	8.9	8.3
30-34	2,587	2,667	5,254	6.4	6.7	6.6
35-39	2,178	1,897	4,075	5.4	4.8	5.1
40-44	1,710	1,552	3,262	4.2	3.9	4.1
45-49	1,363	1,399	2,762	3.4	3.5	3.4
50-54	1,160	1,211	2,371	2.9	3.0	3.0
55-59	980	940	1,920	2.4	2.4	2.4
60-64	865	698	1,563	2.1	1.8	1.9
65-69	586	433	1,019	1.5	1.1	1.3
70-74	478	399	877	1.2	1.0	1.1
75-79	251	211	462	0.6	0.5	0.6
80-84	178	160	338	0.4	0.4	0.4
85+	129	148	277	0.3	0.4	0.3
All	40,303	39,863	80,166	100.0	100.0	100.0

APPENDIX B

Distribution of causes of death by age and sex, Chakaria HDSS, 2012

Causes	Age groups (years)						
	Neonate	Infant	1-4	5-14	15-49	50-64	65+
Male							
01.01 Sepsis (non-obstetric)	0.0	1.6	0.0	0.0	0.0	0.0	0.1
01.02 Acute respiratory infection including pneumonia	0.0	19.0	19.9	7.8	1.8	6.0	6.1
01.03 HIV/AIDS related death	0.0	0.0	0.0	0.0	0.0	0.8	0.0
01.04 Diarrhoeal diseases	0.0	12.9	2.3	2.9	0.7	0.0	0.0
01.05 Malaria	0.0	0.0	0.0	0.0	0.0	0.0	0.1
01.06 Measles	0.0	0.0	0.0	0.0	0.0	0.0	0.0
01.07 Meningitis and encephalitis	0.0	2.9	2.2	0.0	1.1	0.0	0.0
01.09 Pulmonary tuberculosis	0.0	0.0	0.0	0.0	9.3	19.0	16.7
01.10 Pertussis	0.0	1.6	0.0	0.0	0.0	0.0	0.0
01.11 Haemorrhagic fever	0.0	0.0	0.0	0.7	0.0	0.0	0.0
01.99 Other and unspecified infectious diseases	0.0	0.0	3.3	6.3	1.5	0.5	2.7
02.01 Oral neoplasms	0.0	0.0	0.0	0.0	0.0	0.0	0.0
02.02 Digestive neoplasms	0.0	0.0	0.0	0.0	5.6	3.7	2.9
02.03 Respiratory neoplasms	0.0	0.0	0.0	0.0	5.9	3.2	7.0
02.04 Breast neoplasms	0.0	0.0	0.0	0.0	0.0	0.0	0.0
02.05 & 02.06 Reproductive neoplasms M, F	0.0	0.0	0.0	0.0	0.3	0.0	1.1
02.99 Other and unspecified neoplasms	0.0	0.0	0.0	2.9	9.3	8.0	4.0
03.01 Severe anaemia	0.0	0.0	0.0	0.0	0.0	0.0	1.0
03.02 Severe malnutrition	0.0	3.2	1.9	2.9	0.0	0.0	0.2
03.03 Diabetes mellitus	0.0	0.0	0.0	0.0	3.1	2.8	8.1
04.01 Acute cardiac disease	0.0	0.0	0.0	0.0	3.0	0.5	4.7
04.02 Stroke	0.0	0.0	0.0	0.0	5.5	9.8	8.0
04.99 Other and unspecified cardiac diseases	0.0	0.0	0.0	2.5	0.0	5.7	5.1
05.01 Chronic obstructive pulmonary disease	0.0	0.0	0.0	0.0	0.0	6.2	7.9
05.02 Asthma	0.0	0.0	0.0	0.0	0.0	3.6	1.7
06.01 Acute abdomen	0.6	0.0	0.0	3.7	2.6	0.0	1.8
06.02 Liver cirrhosis	0.0	0.0	0.0	1.4	3.5	3.6	1.2
07.01 Renal failure	0.0	0.0	2.1	0.0	1.9	1.4	2.0
08.01 Epilepsy	0.0	5.7	1.5	2.5	0.5	0.0	0.6

Appendix B (contd...)

Causes	Age groups (years)						
	Neonate	Infant	1-4	5-14	15-49	50-64	65+
09.03 Pregnancy-induced hypertension	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10.01 Prematurity	28.5	0.0	0.0	0.0	0.0	0.0	0.0
10.02 Birth asphyxia	19.4	0.0	0.0	0.0	0.0	0.0	0.0
10.03 Neonatal pneumonia	8.3	0.0	0.0	0.0	0.0	0.0	0.0
10.04 Neonatal sepsis	1.2	0.0	0.0	0.0	0.0	0.0	0.0
10.06 Congenital malformation	0.0	7.0	0.0	0.0	0.0	0.0	0.0
10.99 Other and unspecified neonatal causes of death	14.7	0.0	0.0	0.0	0.0	0.0	0.0
12.01 Road traffic accident	0.0	0.0	0.0	1.5	1.0	1.2	0.0
12.03 Accidental fall	0.0	0.0	0.0	0.0	3.8	1.4	0.3
12.04 Accidental drowning and submersion	0.0	3.2	38.6	20.6	1.0	0.0	0.0
12.05 Accidental exposure to smoke fire & flame	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12.06 Contact with venomous plant/ animal	0.0	0.0	0.0	0.0	0.0	0.0	0.3
12.07 Accidental poisoning & noxious substances	0.0	0.0	2.3	9.2	0.0	0.0	0.0
12.08 Intentional self-harm	0.0	0.0	0.0	2.4	0.0	0.8	0.3
12.09 Assault	0.0	0.0	0.0	0.0	1.9	0.0	0.0
12.99 Other and unspecified external causes of death	0.0	0.0	0.0	0.9	0.8	0.0	0.0
98 Other and unspecified non-communicable diseases	0.0	0.0	0.0	0.0	0.0	1.5	0.3
99 Indeterminate	25.7	26.8	10.1	23.1	29.1	15.7	14.7
XX VA not completed	1.7	16.1	15.9	8.8	6.8	4.7	1.4
All	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Appendix B (contd...)

Causes	Age groups (years)						
	Neonate	Infant	1-4	5-14	15-49	50-64	65+
Female							
01.01 Sepsis (non-obstetric)	0.0	0.8	1.9	0.0	0.0	0.0	0.0
01.02 Acute respiratory infection including pneumonia	0.0	22.0	19.4	0.0	3.2	4.5	8.4
01.03 HIV/AIDS related death	0.0	0.7	0.0	0.0	0.0	0.8	0.0
01.04 Diarrhoeal diseases	0.0	7.4	11.4	5.1	2.2	0.0	0.7
01.05 Malaria	0.0	0.8	2.9	7.4	0.0	0.0	0.0
01.06 Measles	0.0	3.6	0.0	1.4	0.0	0.0	0.0
01.07 Meningitis and encephalitis	1.4	6.0	3.7	1.6	3.6	0.0	0.0
01.09 Pulmonary tuberculosis	0.0	0.0	0.0	0.0	6.0	16.1	15.7
01.10 Pertussis	0.0	2.7	0.0	0.0	0.0	0.0	0.0
01.11 Haemorrhagic fever	0.0	0.0	0.0	0.0	0.0	0.0	0.0
01.99 Other and unspecified infectious diseases	0.0	1.0	2.8	13.9	3.1	0.8	1.1
02.01 Oral neoplasms	0.0	0.0	0.0	0.0	0.0	0.0	0.3
02.02 Digestive neoplasms	0.0	0.0	0.0	0.0	1.0	3.8	2.0
02.03 Respiratory neoplasms	0.0	0.0	0.0	0.0	4.6	4.7	3.4
02.04 Breast neoplasms	0.0	0.0	0.0	0.0	1.1	0.0	0.5
02.05 & 02.06 Reproductive neoplasms M, F	0.0	0.0	0.0	0.0	1.1	0.0	1.5
02.99 Other and unspecified neoplasms	0.0	0.0	2.3	0.0	3.8	7.6	2.5
03.01 Severe anaemia	0.0	0.0	0.0	0.0	0.0	0.4	1.1
03.02 Severe malnutrition	0.0	1.8	0.0	0.0	1.1	0.0	0.6
03.03 Diabetes mellitus	0.0	0.0	0.0	7.0	5.6	6.0	10.4
04.01 Acute cardiac disease	0.0	0.0	0.0	0.0	0.0	1.6	2.0
04.02 Stroke	0.0	0.0	0.0	0.0	6.2	8.8	8.7
04.99 Other and unspecified cardiac diseases	0.0	0.0	0.0	0.0	2.8	3.5	4.3
05.01 Chronic obstructive pulmonary disease	0.0	0.0	0.0	0.0	0.0	12.5	7.2
05.02 Asthma	0.0	0.0	0.0	0.0	0.4	4.4	1.4
06.01 Acute abdomen	0.5	2.4	0.0	14.6	3.1	3.1	0.9
06.02 Liver cirrhosis	0.0	0.0	0.0	0.0	3.2	2.6	0.0
07.01 Renal failure	0.0	0.0	2.1	0.0	6.1	2.8	2.1
08.01 Epilepsy	0.0	0.0	6.2	0.0	0.0	0.0	0.7
09.03 Pregnancy-induced hypertension	0.0	0.0	0.0	0.0	1.8	0.0	0.0
10.01 Prematurity	15.5	0.0	0.0	0.0	0.0	0.0	0.0
10.02 Birth asphyxia	27.4	0.0	0.0	0.0	0.0	0.0	0.0

Appendix B (contd...)

Causes	Age groups (years)						
	Neonate	Infant	1-4	5-14	15-49	50-64	65+
10.03 Neonatal pneumonia	6.8	0.0	0.0	0.0	0.0	0.0	0.0
10.04 Neonatal sepsis	0.7	0.0	0.0	0.0	0.0	0.0	0.0
10.06 Congenital malformation	1.0	9.1	0.0	0.0	0.0	0.0	0.0
10.99 Other and unspecified neonatal causes of death	16.5	0.0	0.0	0.0	0.0	0.0	0.0
12.01 Road traffic accident	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12.03 Accidental fall	0.0	1.8	0.0	0.0	0.0	0.0	0.4
12.04 Accidental drowning and submersion	0.0	3.6	23.3	29.2	1.0	0.0	0.3
12.05 Accidental exposure to smoke fire & flame	0.9	0.0	0.0	0.0	0.0	0.0	1.8
12.06 Contact with venomous plant/ animal	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12.07 Accidental poisoning & noxious substances	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12.08 Intentional self-harm	0.0	0.0	0.0	0.0	4.0	1.7	0.3
12.09 Assault	0.0	0.0	0.0	0.0	0.5	0.0	0.0
12.99 Other and unspecified external causes of death	0.0	0.0	3.4	4.1	2.2	0.5	0.0
98 Other and unspecified non-communicable diseases	0.0	0.0	0.0	0.0	0.0	0.0	0.3
99 Indeterminate	28.2	20.2	18.4	15.9	26.1	11.9	17.4
XX VA not completed	1.1	16.4	2.3	0.0	6.5	2.0	4.2
All	100.0	100.0	100.0	100.0	100.0	100.0	100.0

APPENDIX C

Migration rate per 1,000 population by age and sex, Chakaria HDSS, 2012

Age (years)	No. of migrants			Migration rate per 1,000 population		
	Male	Female	Both	Male	Female	Both
In-migration						
<1	49	48	97	47.4	50.8	49.1
1-4	141	132	273	34.0	33.1	33.5
5-9	125	165	290	21.0	28.0	24.5
10-14	90	143	233	16.1	27.4	21.6
15-19	94	475	569	20.9	105.6	63.2
20-24	116	307	423	32.8	75.4	55.6
25-29	133	154	287	43.0	43.4	43.2
30-34	113	78	191	43.7	29.2	36.4
35-39	61	37	98	28.0	19.5	24.0
40-44	31	21	52	18.1	13.5	15.9
45-49	11	20	31	8.1	14.3	11.2
50-54	20	16	36	17.2	13.2	15.2
55-59	13	15	28	13.3	16.0	14.6
60-64	11	13	24	12.7	18.6	15.4
65-69	10	21	31	17.1	48.5	30.4
70-74	6	15	21	12.6	37.6	23.9
75-79	5	9	14	19.9	42.7	30.3
80-84	5	10	15	28.1	62.5	44.4
85+	3	5	8	23.3	33.8	28.9
All	1,037	1,684	2,721	25.7	42.2	33.9
Out-migration						
<1	38	31	69	36.8	32.8	34.9
1-4	88	86	174	21.2	21.5	21.4
5-9	88	102	190	14.8	17.3	16.1
10-14	97	163	260	17.3	31.3	24.1
15-19	188	461	649	41.8	102.5	72.1
20-24	267	393	660	75.5	96.6	86.8
25-29	187	154	341	60.5	43.4	51.4
30-34	132	39	171	51.0	14.6	32.5
35-39	66	19	85	30.3	10.0	20.9
40-44	55	11	66	32.2	7.1	20.2
45-49	12	11	23	8.8	7.9	8.3
50-54	16	9	25	13.8	7.4	10.5
55-59	5	9	14	5.1	9.6	7.3
60-64	7	13	20	8.1	18.6	12.8
65-69	6	18	24	10.2	41.6	23.6
70-74	7	16	23	14.6	40.1	26.2
75-79	4	5	9	15.9	23.7	19.5
80-84	4	8	12	22.5	50.0	35.5
85+	3	2	5	23.3	13.5	18.1
All	1,270	1,550	2,820	31.5	38.9	35.2

APPENDIX D

Number of migrants by origin or destination, Chakaria HDSS, 2012

Origin/ Destination	All age	Age (years)										
		<5	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50+
In-migration												
Male												
Inside Bangladesh	932	189	125	89	87	100	105	92	48	25	7	65
Outside Bangladesh	105	1	0	1	4	19	28	21	13	6	4	8
Inside Chakaria	601	115	86	62	61	59	65	59	26	16	5	47
Outside Chakaria	119	29	17	13	12	13	10	7	11	1	2	4
Inside HDSS area	423	80	58	44	46	39	51	39	16	8	3	39
Outside HDSS area	177	35	28	18	15	20	13	20	10	8	2	8
Female												
Inside Bangladesh	1,676	180	164	142	467	311	154	77	36	22	19	104
Outside Bangladesh	8	0	1	1	3	1	0	1	0	0	1	0
Inside Chakaria	1,141	123	110	96	326	212	92	47	23	16	13	83
Outside Chakaria	230	19	19	23	78	38	27	11	5	2	2	6
Inside HDSS area	809	77	80	81	230	137	63	31	15	13	11	71
Outside HDSS area	331	46	27	15	97	76	29	16	8	3	2	12
Out-migration												
Male												
Inside Bangladesh	815	125	88	92	98	111	103	77	37	31	6	47
Outside Bangladesh	455	1	0	5	90	156	84	55	29	24	6	5
Inside Chakaria	820	79	60	72	126	177	114	82	41	31	7	31
Outside Chakaria	205	18	9	11	42	50	33	20	6	10	2	4
Inside HDSS area	850	58	60	64	122	196	131	95	46	35	8	35
Outside HDSS area	115	29	11	11	17	11	11	9	5	4	1	6
Female												
Inside Bangladesh	1,542	116	102	163	459	389	153	39	19	11	11	80
Outside Bangladesh	7	1	0	0	1	4	1	0	0	0	0	0
Inside Chakaria	958	71	63	116	279	237	79	23	12	10	6	62
Outside Chakaria	239	11	16	24	87	67	25	4	4	0	0	1
Inside HDSS area	903	61	63	107	259	228	69	19	12	8	5	72
Outside HDSS area	236	20	15	23	66	56	37	9	1	2	3	4

APPENDIX E

Number of in-migrants by reasons for migration, Chakaria HDSS, 2012

Reason for migration	All age	Age (years)										
		<5	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50+
Male												
Family-related												
To join spouse	98	14	12	6	6	10	14	14	8	3	1	10
Family friction/ breakdown	177	11	9	10	15	25	30	28	12	8	1	28
Others	29	2	3	1	3	2	3	1	3	1	0	10
Work-related												
New job/job transfer	141	1	0	3	17	23	43	26	13	5	4	6
To look for work/ lost job	274	141	69	39	14	7	1	2	0	1	0	0
Others	25	0	0	2	2	8	0	6	4	2	0	1
Housing-related												
Wanted to own home/new house	172	5	4	11	13	39	32	29	17	7	3	12
Education												
To acquire education	71	4	22	15	18	3	4	2	1	0	1	1
Reasons not reported	50	12	6	3	3	2	6	5	3	4	1	5
All	1,037	190	125	90	91	119	133	113	61	31	11	73
Female												
Family related												
To join spouse	678	9	13	19	361	180	48	20	8	4	6	10
Family friction/ breakdown	351	11	22	38	40	69	54	28	15	10	8	56
Others	39	1	4	3	3	3	3	3	1	2	0	16
Work-related												
New job/job transfer	6	0	0	0	0	1	2	1	1	0	0	1
To look for work/ lost job	322	142	83	38	20	15	11	7	2	2	1	1
Others	4	0	0	0	0	0	3	0	1	0	0	0
Housing-related												
Wanted to own home/new house	171	7	12	23	31	34	27	13	5	0	4	15
Education												
To acquire education	68	5	29	19	5	5	1	3	0	0	0	1
Reasons not reported	45	5	2	3	10	5	5	3	3	4	1	4
All	1,684	180	165	143	470	312	154	78	36	22	20	104

APPENDIX F

Number of out-migrants by reasons for migration, Chakaria HDSS, 2012

Reason for migration	All age	Age (years)										
		<5	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50+
Male												
Family-related												
To Join spouse	47	0	1	2	7	6	13	5	4	5	0	4
Family friction/ breakdown	174	0	18	39	6	94	2	4	0	1	0	10
Others	13	0	0	1	5	3	1	3	0	0	0	0
Work-related												
New job/job transfer	344	0	0	1	52	113	67	51	33	16	5	6
To look for work/ lost job	120	0	0	7	37	41	15	8	4	7	1	0
Others	15	1	0	0	2	4	4	2	1	0	0	1
Housing-related												
Wanted to own home/new house	313	15	18	46	55	57	47	32	11	15	3	14
Education												
To acquire education	61	0	2	0	9	14	9	14	4	4	1	4
Reasons not reported	183	17	28	23	18	24	29	13	9	7	2	13
All	1,270	33	67	119	191	356	187	132	66	55	12	52
Female												
Family-related												
To Join spouse	700	0	1	39	304	252	72	13	4	4	1	10
Family friction/ breakdown	263	2	35	36	109	18	12	4	3	3	1	40
Others	10	0	0	0	1	7	2	0	0	0	0	0
Work-related												
New job/job transfer	42	0	0	3	8	18	7	1	2	0	2	1
To look for work/ lost job	2	0	0	0	0	2	0	0	0	0	0	0
Others	1	0	0	0	0	0	1	0	0	0	0	0
Housing-related												
Wanted to own home/new house	230	2	31	62	49	31	27	9	7	0	2	10
Education												
To acquire education	56	2	3	4	17	15	7	0	0	0	2	6
Reasons not reported	246	11	30	30	62	52	26	12	3	4	3	13
All	1,550	17	100	174	550	395	154	39	19	11	11	80

APPENDIX G

**Population, births, deaths, in and out-migration by village,
Chakaria HDSS, 2012**

Village	Population	Birth	Death	In-migration	Out-migration	Birth rate	Death rate	In-migration rate	Out-migration rate
Maizpara	1,595	32	10	39	43	20.1	6.3	24.5	27.0
Daingakata	2,006	58	16	24	50	28.9	8.0	12.0	24.9
Baniachara	3,077	78	18	180	121	25.3	5.8	58.5	39.3
Dakshin Baraitali	2,273	50	21	44	93	22.0	9.2	19.4	40.9
Gobindapur	4,513	99	21	109	152	21.9	4.7	24.2	33.7
Hapaliakata	3,426	81	26	89	69	23.6	7.6	26.0	20.1
Baraitali	16,890	398	112	485	528	23.6	6.6	28.7	31.3
Katakhal	372	8	2	13	7	21.5	5.4	34.9	18.8
Rakhainpara	667	11	3	33	18	16.5	4.5	49.5	27.0
Shantinagar	1,663	36	11	104	64	21.6	6.6	62.5	38.5
Kulalpara	187	5	2	2	5	26.7	10.7	10.7	26.7
Palpara	248	4	1	7	9	16.1	4.0	28.2	36.3
Stationpara	604	12	3	13	22	19.9	5.0	21.5	36.4
Kattoli	414	17	2	28	7	41.1	4.8	67.6	16.9
Harbang	4,155	93	24	200	132	22.4	5.8	48.1	31.8
Purbo Kunakhali	1,621	44	4	58	56	27.1	2.5	35.8	34.5
Maddhya Kunakhali	4,370	127	28	137	131	29.1	6.4	31.4	30.0
Furotia Khali	2,942	90	13	106	98	30.6	4.4	36.0	33.3
Konakhali	8,933	261	45	301	285	29.2	5.0	33.7	31.9

Appendix G (contd...)

Village	Population	Birth	Death	In-migration	Out-migration	Birth rate	Death rate	In-migration rate	Out-migration rate
Krisnapur	1,477	34	12	39	68	23.0	8.1	26.4	46.0
Chhainama Para	2,553	73	13	64	78	28.6	5.1	25.1	30.6
Dakshin Bahaddarkata	2,296	60	13	84	84	26.1	5.7	36.6	36.6
BM Char	6,326	167	38	187	230	26.4	6.0	29.6	36.4
Chotta Bheola	858	31	2	28	18	36.1	2.3	32.6	21.0
Hasimar Kata	996	23	8	17	27	23.1	8.0	17.1	27.1
Hamidullah Sikderpara	797	28	9	29	53	35.1	11.3	36.4	66.5
Dwipkul	993	26	8	11	34	26.2	8.1	11.1	34.2
Baniarkum	1,115	29	4	27	51	26.0	3.6	24.2	45.7
Dakshin Khilsadok	1,786	45	10	26	60	25.2	5.6	14.6	33.6
Kaiarbil	6,545	182	41	138	243	27.8	6.3	21.1	37.1
Kaddachura	1,622	37	9	48	40	22.8	5.5	29.6	24.7
Sikder Para	3,810	104	26	107	117	27.3	6.8	28.1	30.7
Baniarchar	864	22	9	26	24	25.5	10.4	30.1	27.8
Kalagazi Sikderpara	1,318	19	10	46	71	14.4	7.6	34.9	53.9
Mabiar Baper Para	657	18	6	47	35	27.4	9.1	71.5	53.3
Jele Para	599	28	5	10	15	46.7	8.3	16.7	25.0
Purba B. Bheola	8,870	228	65	284	302	25.7	7.3	32.0	34.0
Sharharbil Purba Para	1,166	25	4	55	48	21.4	3.4	47.2	41.2
Shaharbil Paschim Para	995	25	6	46	33	25.1	6.0	46.2	33.2
Madrasa Para	493	12	2	10	31	24.3	4.1	20.3	62.9
Maizghona Purba Para	1,377	53	7	67	48	38.5	5.1	48.7	34.9
Shahapura	942	27	5	19	33	28.7	5.3	20.2	35.0
Failla Para	334	8	0	9	9	24.0	0.0	26.9	26.9
Shaharbil	5,307	150	24	206	202	28.3	4.5	38.8	38.1

Appendix G (contd...)

Village	Population	Birth	Death	In-migration	Out-migration	Birth rate	Death rate	In-migration rate	Out-migration rate
Saker Mohammad Char	4,898	116	20	212	230	23.7	4.1	43.3	47.0
Uttar Lotony	1,771	48	5	58	71	27.1	2.8	32.7	40.1
Proper Kakara	2,916	65	13	91	142	22.3	4.5	31.2	48.7
Kakara	9,585	229	38	361	443	23.9	4.0	37.7	46.2
Dakshin Surajpur	1,268	33	4	44	32	26.0	3.2	34.7	25.2
Dakshin Manikpur	2,799	66	19	116	107	23.6	6.8	41.4	38.2
Uttar Manikpur	4,170	107	16	191	132	25.7	3.8	45.8	31.7
Surajpur Manikpur	8,237	206	39	351	271	25.0	4.7	42.6	32.9
Muchar Para	484	12	2	23	28	24.8	4.1	47.5	57.9
Demoshia Bazar Para	1,028	24	7	47	36	23.3	6.8	45.7	35.0
Ammer Dera Para	1,369	28	7	47	41	20.5	5.1	34.3	29.9
Daskhali Para	875	16	0	35	31	18.3	0.0	40.0	35.4
Dhemoshia	3,756	80	16	152	136	21.3	4.3	40.5	36.2
Darbhskata Manik Para	711	22	5	32	22	30.9	7.0	45.0	30.9
Tekhsira Para	851	22	4	24	26	25.9	4.7	28.2	30.6
Paschim B. Bheola	1,562	44	9	56	48	28.2	5.8	35.9	30.7
All	80,166	2,038	451	2,721	2,820	25.4	5.6	33.9	35.2

APPENDIX H

Percentage of population by age and marital status, Chakaria HDSS, 2012

Age (years)	Married	Divorced	Widower/ Widow	Never married	Population
Male					
10-14	0.0	0.0	0.0	100.0	5,585
15-19	4.5	0.1	0.0	95.5	4,495
20-24	24.9	0.1	0.0	75.0	3,520
25-29	59.2	0.7	0.1	40.0	3,070
30-34	86.4	1.0	0.3	12.3	2,579
35-39	96.2	0.7	0.2	3.0	2,168
40-44	98.6	0.2	0.2	1.0	1,708
45-49	98.9	0.5	0.4	0.3	1,360
50-54	98.5	0.3	1.1	0.1	1,157
55-59	98.6	0.0	1.2	0.2	978
60-64	98.4	0.0	1.4	0.2	864
65-69	94.4	0.3	5.1	0.2	586
70-74	92.3	1.0	6.7	0.0	478
75-79	89.8	0.0	10.3	0.0	252
80-84	81.4	0.5	18.0	0.0	177
85+	69.5	2.0	28.5	0.0	129
All	50.2	0.3	0.8	48.7	29,106
Female					
10-14	1.4	0.0	0.0	98.6	5,202
15-19	32.8	0.3	0.0	66.9	4,481
20-24	77.3	0.9	0.2	21.7	4,047
25-29	91.3	1.7	1.1	5.9	3,521
30-34	94.9	1.3	2.5	1.3	2,658
35-39	91.2	2.0	6.1	0.7	1,895
40-44	90.5	1.1	8.0	0.4	1,551
45-49	83.2	1.2	15.0	0.6	1,395
50-54	76.0	1.1	22.7	0.2	1,209
55-59	69.7	0.8	29.1	0.4	938
60-64	55.0	1.2	43.8	0.0	697
65-69	41.1	0.2	58.7	0.0	431
70-74	24.7	0.2	75.1	0.0	397
75-79	19.7	0.4	79.8	0.0	210
80-84	7.1	0.0	92.9	0.0	160
85+	5.1	0.0	94.9	0.0	148
All	58.4	0.8	8.1	32.7	28,940

APPENDIX I

Chakaria HDSS project team, Chakaria HDSS, 2012

Name of Staff	Designation
Dhaka	
Abbas Bhuiya	Project Director
Mohammad Iqbal	Deputy Project Coordinator
SM Manzoor Ahmed Hanifi	Associate Scientist
Sabrina Rasheed	Associate Scientist
Farhana Urni	Statistician
Amena Sultana	Dr. Stan D'Souza Fellow
Mohammad Nahid Mia	Dr. Stan D'Souza Fellow
Md. Kashem Iqbal	Office Manager
Chakaria	
Shahidul Hoque	Field Research Manager
Mijanur Rahaman	Senior Field Research Officer
Ashish Paul	Data Management Officer
Md. Sharif -Al Hasan	Field Research Officer
Md. Rehmat Ali	Senior Field Assistant
Armanul Maowa	Surveillance Worker
Papi Prova Das	Surveillance Worker
Fatema Johura Surma	Surveillance Worker
Fatema Zannat	Surveillance Worker
Jannatul Bakea Rima	Surveillance Worker
Sharmin Akter	Surveillance Worker
Ismat Jahan Khuki	Surveillance Worker
Kawsar Jannat	Surveillance Worker
Jesmin Jannat Rano	Surveillance Worker
Kulsuma Aktar	Surveillance Worker
Mina Dhar	Surveillance Worker
Mobasseratul Zannat	Surveillance Worker
Monuara Begum	Surveillance Worker
Nazma Akter	Surveillance Worker
Merina Jannat Resmi	Surveillance Worker
Riasmin Zannat	Surveillance Worker
Rosan Ara	Surveillance Worker
Jesmin Jannat	Surveillance Worker
Tanjina Zannat Ara	Surveillance Worker
Zannatul Ferdous	Surveillance Worker
Zosna Begum	Surveillance Worker
HDSS = Health and Demographic Surveillance System.	



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