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

Demographic Events, Safe Motherhood, and Water and Sanitation Practices - 2009

Scientific Report No. 110

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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

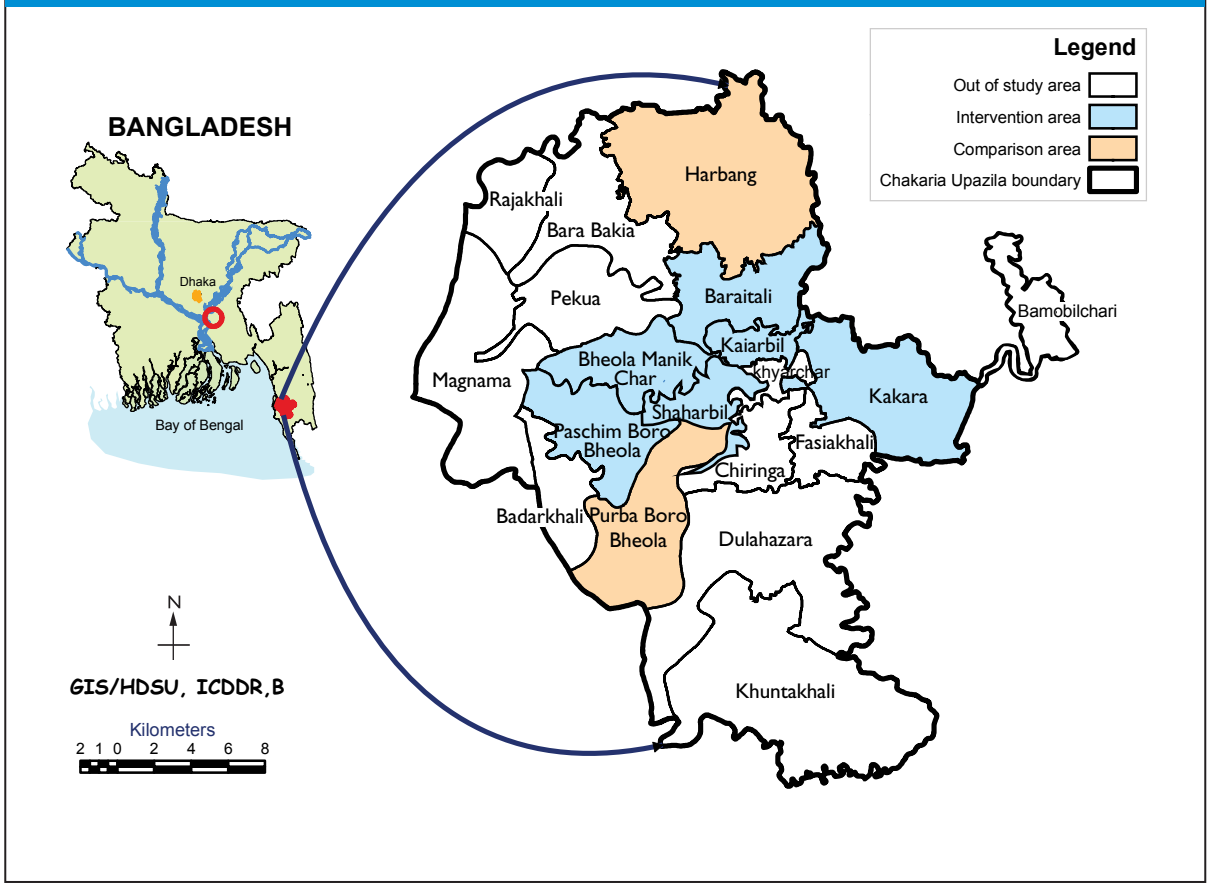
Chakaria is one of the 481 *upazilas* (sub-districts) in Bangladesh. It is located between latitudes 21°34' and 21°55' North and longitudes 91°54' and 92°13' East in the southeastern coast of the Bay of Bengal. Administratively, it is under Cox's Bazar district with an estimated population of 418,607 in 2009. 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 the intervention and comparison areas are presented in the box below. Collection of data from sample households on a quarterly basis, referred hitherto as Chakaria Health and Demographic Surveillance System (Chakaria HDSS), has been initiated in both the areas 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 2009.

Existing health services in the intervention and comparison areas, Chakaria Health and Demographic Surveillance System, 2009

Intervention area (Six unions with 122,092 population)		Comparison area (Two unions with 39,329 population)	
Healthcare facility/provider	No.	Healthcare facility/provider	No.
ICDDR,B facilitated and Community initiated		ICDDR,B facilitated and Community initiated	
Village health post	7	Village health post	0
Trained midwife	12	Trained midwife	0
Qualified physician	1	Qualified physician	0
Male paramedic	10	Male paramedic	0
Government		Government	
Union Health and Family Welfare Centre (UHFWC)	6	Union Health and Family Welfare Centre (UHFWC)	1
EPI centre	216	EPI centre	38
Rural dispensary	0	Rural dispensary	1
Family Welfare Visitor (FWV)	6	Family Welfare Visitor (FWV)	2
Sub-Assistant Community Medical Officer (SACMO)/Medical assistant	3	Sub-Assistant Community Medical Officer (SACMO)/Medical assistant	2
Family Welfare Assistant (skilled birth attendant)	23	Family Welfare Assistant (skilled birth attendant)	1
Private		Private	
Village doctor (allopathic)	186	Village doctor (allopathic)	54
Village doctor (homeopathic)	78	Village doctor (homeopathic)	24
Allopathic pharmacy	142	Allopathic pharmacy	35
Homeopathic pharmacy	13	Homeopathic pharmacy	2
Diagnostic centre	3	Diagnostic centre	0
NGO		NGO	
Health and development activities	4	Health and development activities	4

Fig 1. Map of Chakaria showing intervention and comparison areas



CHAPTER 2

Methods and Materials

The Chakaria HDSS covered 8 unions[1], namely Baraitali, Kayerbil, Bheola Manik Char, Paschim Boro Bheola, Shaharbil, Kakara, Harbang, and Purba Boro Bheola. Of these, the last two unions formed the comparison area, and the first 6 formed the intervention area. In 1999, 106,320 people were living in 20,252 households in the intervention area and 34,418 people were living in 6,727 households in the comparison area (3). 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 all the households in 8 unions, data collection was interrupted during 2001-2003. Since 2004, quarterly data collection has resumed, and data are being collected from 3,727 and 3,315 systematically randomly-chosen households in the intervention and comparison areas respectively. 27 field-trained workers collected data during 2009. The data collectors were also provided with written instructions for specific questions that required added explanations.

Six 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. 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

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

(4). The major demographic indicators, safe motherhood and water and sanitation related practices have been tabulated for the various asset quintiles.

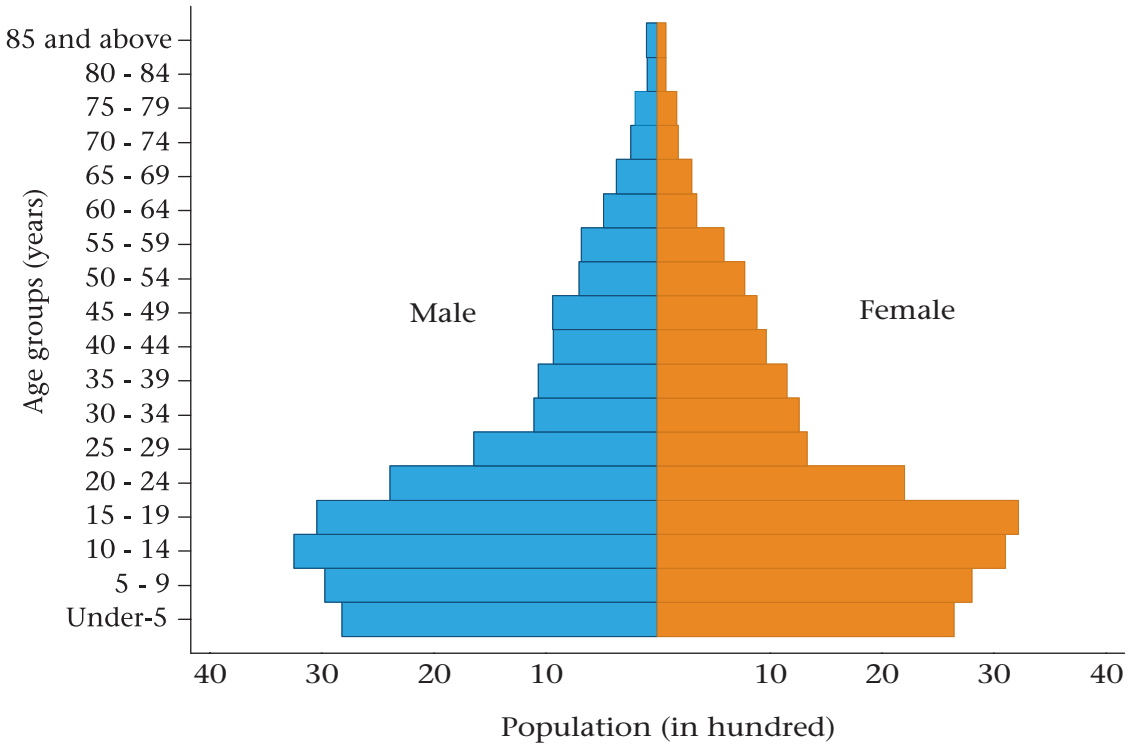
It should be mentioned that the number of observations in the tables presented in this report differ in some instances due to missing information for some variables.

CHAPTER 3

Population and Population Changes

The population pyramid based on the sample households 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 104 in 2009. The age dependency ratio[2] was 75 in 2009 (see Appendix A).

Fig. 2. Male and female population by age and sex, Chakaria HDSS, 2009



The major demographic and health indicators in the intervention and comparison areas during 1999, and 2004-2009 are presented in Table 1. A declining trend in the fertility indicators and natural rate of population increase has been observed during 1999-2009. Most of the rates in Chakaria HDSS area are much higher than those in the Matlab HDSS area, another rural field site of ICDDR,B (5). In 2009, the rate of natural increase and the annual population growth rate in the surveillance area was 1.6 % and 0.6% 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).

12.0% of births in Chakaria were delivered at facilities (Hospital or Clinic) in 2009. The percentage of births at facilities decreased from 14.4 in 2008 to 12.0 in 2009. 10.9% of the births were attended by Skilled Birth Attendant (SBA). There has been a decrease in deliveries by SBAs from 16.2% in 2008 to 10.9% in 2009 (Table 1).

The legal age of marriage is 18 years for female and 21 years for male in Bangladesh. In 2009, 39.3% of the women married before reaching their 18th birth day. The percentage of underage female marriage decreased to 39.3% in 2009 from 47.5% in 2008. 24.8% of the males were married before the age of 21 years in 2009. The proportion of male marriages before 21 years has remained similar between 2008 and 2009. The percentage of underage marriage for females remained higher than males during 2004 to 2009.

Table 1. Demographic and health indicators, Chakaria HDSS, 1999 - 2009

Rates per 1,000	Chakaria HDSS							Matlab HDSS
	1999	2004	2005	2006	2007	2008	2009	2008
Crude birth rate								
Intervention area	33.8	30.6	29.8	25.8	26 .9	24.7	23.7	23.5
Comparison area	33.9	28.8	27.4	25.3	27.2	26.5	21.9	22.1
Both areas	33.9	29.7	28.7	25.6	26.6	25.5	22.9	22.9
Total fertility rate*								
Intervention area	5.1	4.6	4.4	3.5	3.6	3.3	2.9	2.7
Comparison area	4.9	4.4	4.0	3.3	3.4	3.4	2.6	2.7
Both areas	5.1	4.5	4.2	3.4	3.5	3.3	2.8	2.7
Neonatal mortality**								
Intervention area	40.0	24.8	25.2	33.7	27.0	25.0	29.1	15.8
Comparison area	47.3	40.8	35.9	42.3	44.3	33.5	46.8	26.1
Both areas	41.7	31.9	31.5	37.6	34.8	29.0	36.8	20.7
Post-neonatal mortality**								
Intervention area	21.2	15.5	14.1	17.7	18.0	23.3	25.7	4.9
Comparison area	22.4	19.7	25.1	15.4	7.4	5.6	15.6	10.4
Both areas	21.4	17.4	17.4	16.6	13.3	14.9	21.3	7.5
Infant mortality rate**								
Intervention area	61.2	40.3	39.3	51.4	45.0	48.3	54.8	20.6
Comparison area	69.7	60.5	61.0	57.7	51.7	39.0	62.5	36.4
Both areas	63.2	49.3	48.9	54.2	48.0	43.9	58.1	28.1
Child mortality rate (1-4 yrs)								
Intervention area	9.0	8.1	7.5	6.2	4.7	3.6	5.2	3.0
Comparison area	10.6	5.5	5.3	2.4	4.4	6.2	4.1	2.9
Both areas	9.4	6.9	6.5	4.5	4.6	4.7	4.7	3.0

*Per woman; **Per 1,000 live births.

Table 1. (Contd…)

Rates per 1,000	Chakaria HDSS							Matlab HDSS
	1999	2004	2005	2006	2007	2008	2009	2008
Crude death rate								
Intervention area	6.7	5.9	5.8	5.4	5.4	5.7	6.8	6.4
Comparison area	7.9	7.0	6.5	5.7	6.8	6.7	6.1	7.2
Both areas	7.0	6.3	6.1	5.6	6.1	6.1	6.5	6.8
Rate of natural increase								
Intervention area	27.1	24.7	24.0	20.4	21.7	19.4	16.9	17.1
Comparison area	26.0	21.8	20.8	19.6	19.2	21.0	15.8	14.9
Both areas	26.9	23.4	22.5	20.0	20.6	20.2	16.4	16.0
In-migration rate								
Intervention area	-	17.1	24.5	29.7	23.4	27.1	32.0	-
Comparison area	-	16.6	23.7	30.0	26.0	26.0	27.1	-
Both areas	-	16.9	24.1	29.9	24.6	26.6	29.8	44.0
Out-migration rate								
Intervention area	-	22.2	23.8	33.8	31.0	36.2	38.8	-
Comparison area	-	19.5	25.9	34.3	33.2	34.7	42.9	-
Both areas	-	21.0	24.8	34.0	32.0	35.5	40.6	65.7
Growth rate (%)								
Intervention area	-	2.0	2.5	1.6	1.4	1.0	1.0	-
Comparison area	-	1.9	2.0	1.5	1.3	1.2	0.4	-
Both areas	-	1.9	2.1	1.6	1.3	1.1	0.6	- 0.6
Facility-based delivery (%)								
Intervention area	-	6.8	6.4	6.2	3.8	18.3	14.3	-
Comparison area	-	4.4	3.8	4.5	6.8	9.5	9.2	-
Both areas	-	5.4	4.9	5.4	5.1	14.4	12.0	-
Received assistance from SBA during delivery (%)								
Intervention area	-	14.3	9.2	16.5	20.4	18.0	10.7	-
Comparison area	-	14.8	11.6	13.8	18.2	12.8	11.1	-
Both areas	-	14.5	10.3	15.3	19.1	16.2	10.9	-
Male marriage at ages under 21 years (%)								
Intervention area	-	23.4	25.6	26.3	25.2	25.6	21.8	-
Comparison area	-	23.3	23.8	29.7	26.0	23.8	28.1	-
Both areas	-	23.3	24.7	27.9	25.6	24.7	24.8	-
Female marriage at ages under18 years (%)								
Intervention area	-	51.4	43.1	51.2	40.4	46.0	40.2	-
Comparison area	-	56.6	52.0	48.4	46.7	49.0	38.5	-
Both areas	-	53.6	47.3	49.8	43.2	47.5	39.3	-

'-' Data not available.

CHAPTER 4

Mortality

Age-specific mortality rates by area and sex are presented in Table 2. The crude death rate for the intervention and comparison areas in Chakaria, when considered together, was 6.5 per 1,000 populations in 2009. The rate was slightly higher in the intervention area than in the comparison area. Infant mortality rate for all the villages in the intervention and comparison areas was 58.1 per 1,000 live births with a lower rate in the intervention area than in the comparison area. Child mortality rate was 4.7 per 1,000 children aged 1-4 years in the intervention and comparison areas combined. The rate was higher in the intervention area than in the comparison area (Table 2).

Abridged Life Table for males and females are presented in Table 3. Life expectancy at birth was 67.4 years for males and 66.7 years for females. The rate of mortality of children aged less than 5 years (under-five mortality) was 76.8 per 1,000 live births in Chakaria in 2009 (Table 4). Figure 3 shows the probability of survival by sex during various age groups. The probability of survival of females remained same males up to age 45 years, but after age 45 probability of survival oscillated.

Table 2. Age-specific death rate (per 1,000 population) by sex, Chakaria HDSS, 2009

Age (years)	Intervention area			Comparison area			Both areas		
	Male	Female	Both	Male	Female	Both	Male	Female	Both
<1*	66.7	42.3	54.8	51.7	74.1	62.5	60.2	56.0	58.1
1-4	4.7	5.7	5.2	2.0	6.5	4.1	3.5	6.1	4.7
5-9	0.6	1.3	0.9	0.8	0.8	0.8	0.7	1.1	0.9
10-14	1.1	0.6	0.9	0.7	0.0	0.3	0.9	0.3	0.6
15-19	1.2	1.8	1.5	0.7	2.0	1.4	1.0	1.9	1.4
20-24	3.1	1.7	2.4	0.9	3.0	1.9	2.1	2.3	2.2
25-29	0.0	1.4	0.6	1.3	0.0	0.7	0.6	0.7	0.7
30-34	6.6	0.0	3.0	0.0	0.0	0.0	3.6	0.0	1.7
35-39	0.0	3.4	1.7	0.0	1.8	1.0	0.0	2.6	1.3
40-44	1.9	5.6	3.8	2.5	2.3	2.4	2.2	4.1	3.2
45-49	16.4	8.8	12.7	6.7	4.6	5.7	11.8	6.8	9.3
50-54	13.2	5.0	9.0	6.2	8.0	7.1	10.0	6.5	8.1
55-59	18.2	6.9	12.9	17.2	16.6	16.9	17.8	11.8	15.0
60-64	18.1	19.4	18.7	9.8	13.9	11.5	14.6	17.2	15.7
65-69	38.7	46.1	42.0	32.8	32.5	32.6	35.7	39.1	37.3
70-74	14.9	29.4	21.2	27.8	85.4	52.6	20.6	54.6	35.2
75-79	48.8	51.5	50.0	78.9	68.5	73.8	60.3	58.8	59.6
80-84	115.4	45.5	83.3	81.1	32.3	58.8	101.1	40.0	73.2
85+	147.5	314.3	208.3	102.6	236.8	168.8	131.3	274.0	191.9
All	7.5	6.1	6.8	5.3	6.9	6.1	6.5	6.5	6.5

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

Table 3. Abridged Life Table, Chakaria HDSS, 2009

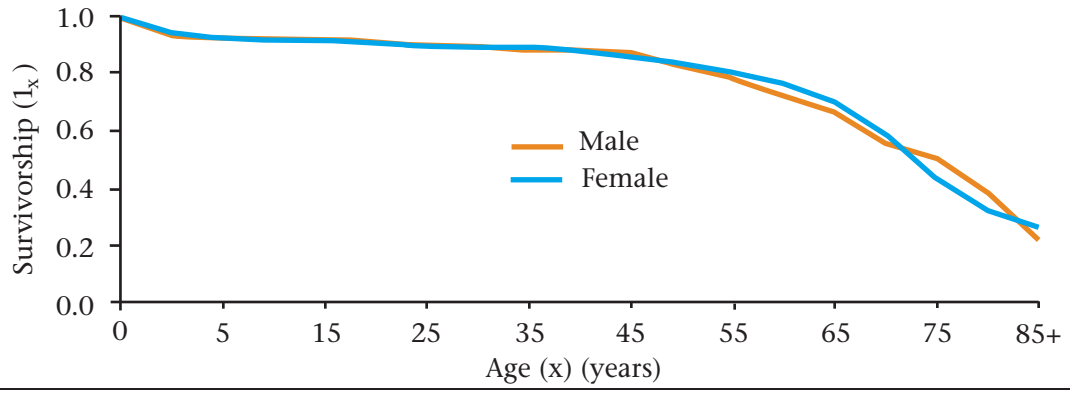
Age (years)	Male					Female				
	$_nm_x$	$_nq_x$	l_x	$_nL_x$	e_x	$_nm_x$	$_nq_x$	$_nl_x$	$_nL_x$	e_x
0	0.0626	0.0626	100,000	94,990	67.4	0.0554	0.0554	100,000	95,564	66.7
1	0.0035	0.0138	93,738	372,522	70.9	0.0061	0.0240	94,455	373,550	69.7
5	0.0007	0.0034	92,444	461,506	67.9	0.0011	0.0053	92,185	459,793	67.3
10	0.0009	0.0046	92,134	459,690	63.1	0.0003	0.0016	91,694	458,128	62.7
15	0.0010	0.0049	91,709	457,505	58.4	0.0019	0.0093	91,546	455,774	57.8
20	0.0021	0.0104	91,258	454,098	53.6	0.0023	0.0113	90,698	451,132	53.3
25	0.0006	0.0030	90,308	450,907	49.2	0.0008	0.0037	89,676	447,605	48.9
30	0.0036	0.0180	90,033	446,420	44.3	0.0000	0.0000	89,340	446,699	44.0
35	0.0000	0.0000	88,411	442,056	40.1	0.0026	0.0129	89,340	444,040	39.0
40	0.0022	0.0107	88,411	439,872	35.1	0.0041	0.0204	88,187	436,780	34.5
45	0.0118	0.0573	87,464	425,658	30.4	0.0068	0.0333	86,388	425,285	30.2
50	0.0100	0.0488	82,451	402,910	27.1	0.0064	0.0317	83,515	411,434	26.1
55	0.0177	0.0851	78,428	376,528	23.4	0.0118	0.0576	80,864	393,474	21.9
60	0.0146	0.0704	71,754	346,991	20.3	0.0171	0.0822	76,203	366,375	18.1
65	0.0357	0.1646	66,704	307,427	16.6	0.0392	0.1793	69,940	319,806	14.4
70	0.0207	0.0985	55,724	265,746	14.4	0.0543	0.2402	57,399	253,693	12.0
75	0.0603	0.2630	50,234	219,095	10.7	0.0588	0.2574	43,611	190,838	10.0
80	0.1011	0.4032	37,022	147,604	8.6	0.0395	0.1804	32,385	147,998	7.6
85+	0.1300	1.000	22,096	169,968	7.7	0.2740	1.000	26,543	96,884	3.6

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: 301-40.

$_nm_x$ = Central mortality rate
$_nq_x$ = Probability of dying between the ages x and x+n;
$_nq_x$ = $_nm_x/[(1/n) + {}_nm_x\{1/2+n/12(_nm_x-\log_e c)\}]$;
$\log_e c=.095$
l_x = Survivors to exact age x
$_nL_x$ = 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, 2009



HDSS = Health and Demographic Surveillance System.

Table 4 presents under-5 mortality rates by household asset quintiles. Under-5 mortality rate was inversely correlated with household asset scores. The mortality rate of children from the lowest quintile was nearly 7 times of children from the highest quintile.

Table 4. Under-5 mortality rate per 1,000 live births by asset quintile, Chakaria HDSS, 2009

Asset quintile	Number of births	Number of under-5 deaths	Under-5 mortality rate
Lowest	233	27	115.9
Second	170	15	88.2
Medium	153	16	104.6
Fourth	197	14	71.1
Highest	237	4	16.9
All	990	76	76.8

HDSS = Health and Demographic Surveillance System.

Causes of death

Causes of death were recorded as reported by the informed household members. A physician classified the reported causes of death with medical synonyms. Table 5 presents the number of deaths from various causes in the year 2004-2009. Stroke, senility, asthma, neoplasm, neonatal, respiratory infections, drowning, hepatitis, accident, and diabetes were the 10 leading causes of death in Chakaria in 2009.

Table 5. Causes of Death, Chakaria HDSS, 2004-09

Rank	2004		2005		2006		2007		2008		2009	
	Cause	No. of deaths	Cause	No. of deaths	Cause	No. of deaths	Cause	No. of deaths	Cause	No. of deaths	Cause	No. of deaths
1	Respiratory infections	39	Stroke	29	Stroke	31	Asthma/ Bronchitis	30	Stroke	33	Stroke	42
2	Senility	30	Respiratory infections	28	Senility	28	Neoplasm (Benign and Malignant)	29	Neoplasm (Benign and Malignant)	33	Senility	37
3	Asthma/ Bronchitis	26	Senility	28	Asthma/ Bronchitis	26	Respiratory infections	26	Asthma/ Bronchitis	26	Asthma/ Bronchitis	31
4	Neonatal (Premature and LBW, Birth asphyxia, Birth trauma, Sepsis and infection	17	Neoplasm Benign and Malignant)	23	Respiratory infections	26	Senility	25	Respiratory infections	22	Neoplasm (Benign and Malignant)	29
5	Diarrheal disease	15	Asthma Bronchitis	19	Neoplasm (Benign and Malignant)	21	Stroke	25	Senility	19	Neonatal (Premature and LBW, Birth asphyxia, Bone trauma, Sepsis and infection)	26

Table 5. (Contd...)

Rank	2004		2005		2006		2007		2008		2009	
	Cause	No. of deaths	Cause	No. of deaths	Cause	No. of deaths	Cause	No. of deaths	Cause	No. of deaths	Cause	No. of deaths
6	Hepatitis	14	Neonatal (Premature and LBW, Birth asphyxia, Bone trauma, Sepsis and infection)	14	Neonatal (Premature and LBW, Birth asphyxia, Birth trauma, Sepsis and	15	Neonatal (Premature and LBW, Birth asphyxia, Birth trauma, Sepsis and infection)	24	Hepatitis	13	Respira-tory infections	22
7	Neoplasm (Benign and Malignant)	14	Drowning	12	Drowning	11	Accident	16	Accident	9	Drowning	14
8	Cardiovascular other than stroke and hyper-tension	14	Accident	10	Hepatitis	7	Cardiovas-cular other than stroke and hyper-tension	11	Drowning	9	Hepatitis	9
9	Stroke	12	Cardiovascular other than stroke and hypertension	8	Accident	6	Diarrheal Diseases	9	Cardiovas-cular other than stroke and hyper-tension	10	Accident	8
10	Accident	11	Nutritional	7	Diarrheal diseases	6	Hepatitis	9	Diarrheal diseases	7	Diabetes	7
11	Malaria	8	Diarrheal diseases	6	Diabetes	3	Drowning	8	Hyper-tension	7	Diarrheal	7
12	Drowning	8	Hepatitis	6	Hyper-tension	3	Nutritional diseases	5	Maternal death	5	Cardiovas-cular other than stroke and hype-rtension	5

Table 5. (Contd...)

Rank	2004		2005		2006		2007		2008		2009	
	Cause	No. of deaths	Cause	No. of deaths	Cause	No. of deaths	Cause	No. of deaths	Cause	No. of deaths	Cause	No. of deaths
13	Nutritional	7	Tuber-culosis	4	Malaria	3	Diabetes	3	Diabetes	4	Suicide	3
14	Homicide	7	Typhoid	4	Cardiovascular other than stroke and hypertension	3	Hyper-tension	3	Digestive disease	3	Epilepsy	2
15	Hyper-tension	6	Urinary	4	Urinary diseases	3	Urinary diseases	3	Neonatal (Premature and LBW, Birth asphyxia, Bone trauma, Sepsis and infection)	13	Hyper-tension	2
16	Diabetes	5	Rabies	3	Rabies	3	Epilepsy	2	Tuber-culosis	4	Nutri-tional	2
17	Urinary diseases	5	Maternal death	3	Tuberculosis	3	Malaria	2	Burn	2	Other urinary	2
18	Typhoid	2	Diabetes	3	Burn	2	Maternal death	2	other urinary	2	Burn	1
19	Digestive disease	2	Hyper-tension	3	Digestive diseases	2	Suicide	2	homicide	1	Digestive disease	1
20	Maternal death	1	Homicide	3	Nutritional diseases	2	Tuber-culosis	2	nutritional	1	Disease of uterus	1

Table 5. (Contd...)

Rank	2004		2005		2006		2007		2008		2009	
	Cause	No. of deaths	Cause	No. of deaths	Cause	No. of deaths	Cause	No. of deaths	Cause	No. of deaths	Cause	No. of deaths
21	Suicide	1	Burn	2	Congenital anomalies	1	Typhoid	2	rabies	1	Dysentery	1
22	Unknown	36	Malaria	1	Leprosy	1	Dysentery	1	snake bite	1	Epestaxis	1
23			Congenital anomalies	1	Tetanus	1	Digestive disease	1	suicide	1	Homicide	1
24			Digestive disease	1	Unknown	42	Homicide	1	typhoid	1	Malaria	1
25			Suicide	1			Rabies	1	malaria	1	Maternal death	1
26			Snake bite	1			Unknown	32	unknown	46	Tuber-culosis	1
27			Epilepsy	1							Unknown	35
			Unknown	46								
Total		280		271		249		274		274		292

HDSS = Health and Demographic Surveillance System.

CHAPTER 5

Fertility

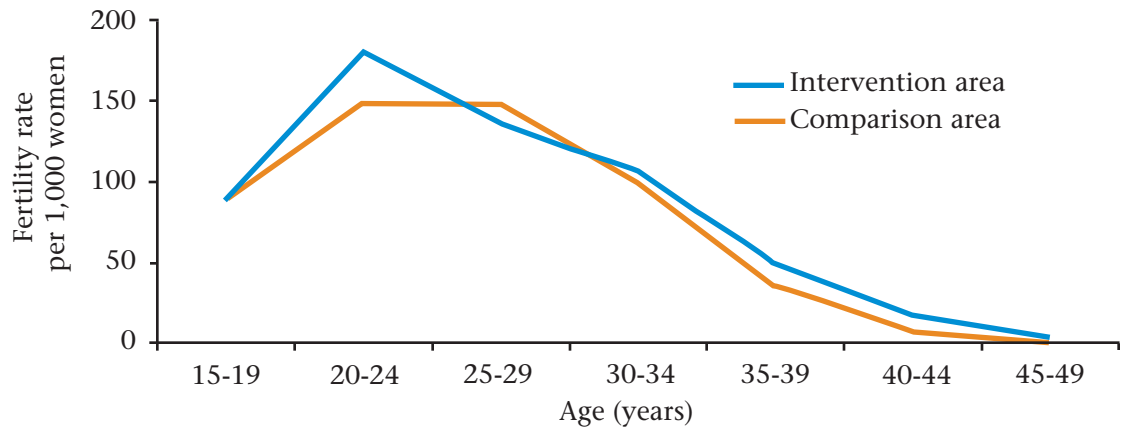
The crude birth rate in 2009 was 22.9 per 1,000 populations, which was lower than the rate in 2008 (25.5 per 1,000 population) (Table 1). Total fertility rates per woman also showed a downward trend during 1999-2009 with a value of 2.8 in 2009 (Table 1). The fertility rate was highest among women of age-group of 20-24 years (Fig. 4 and Table 6).

Table 6. Age-specific fertility rate per 1,000 women aged 15-49 years, Chakaria HDSS, 2009

Age (years)	Intervention area			Comparison area			Both areas		
	No. of females	No. of births	Birth rate	No. of females	No. of births	Birth rate	No. of females	No. of births	Birth rate
15-19	1,699	150	88.3	1,525	134	87.9	3,224	284	88.1
20-24	1,206	218	180.8	999	148	148.1	2,205	366	166.0
25-29	736	100	135.9	598	88	147.2	1,334	188	140.9
30-34	706	75	106.2	554	55	99.3	1,260	130	103.2
35-39	599	30	50.1	560	20	35.7	1,159	50	43.1
40-44	533	9	16.9	437	3	6.9	970	12	12.4
45-49	456	2	4.4	431	0	0.0	887	2	2.3
Total	5,935	584	582.5	5,104	448	525.0	11,039	1,032	555.9
TFR			2,912			2,625			2,780

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

Fig. 4. Age-specific fertility rate, Chakaria HDSS, 2009



HDSS = Health and Demographic Surveillance System.

Table 7. Crude birth rate per 1,000 population by asset quintile, Chakaria HDSS, 2009

Asset quintile	Midyear population	Number of births	Birthrate
Lowest	8,969	233	26.0
Second	9,459	170	18.0
Medium	6,464	153	23.7
Fourth	7,818	197	25.2
Highest	9,160	237	25.9
All	41,870	990	23.6

HDSS = Health and Demographic Surveillance System.

Table 7 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 2009, 12.5% of 1,268 were terminated prematurely and spontaneously, 3.7% were terminated through induction, and 2.4% resulted in stillbirths (Table 8).

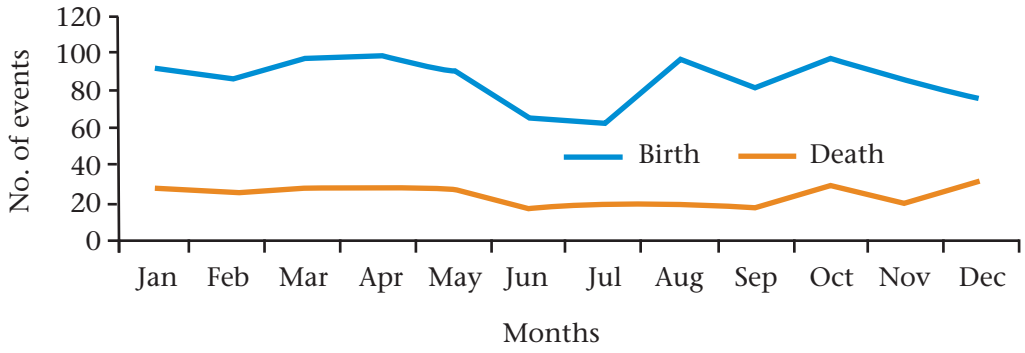
Table 8. Pregnancy outcome, Chakaria HDSS, 2009

Pregnancy outcome	Intervention area		Comparison area		Both areas	
	No.	%	No.	%	No.	%
Spontaneous abortion	87	12.3	71	12.7	158	12.5
Induced abortion	27	3.8	20	3.6	47	3.7
Stillbirth	11	1.6	20	3.6	31	2.4
Live birth*	584	82.4	448	80.1	1,032	81.4
Total number of pregnancies	709	100.0	559	100.0	1,268	100.0

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

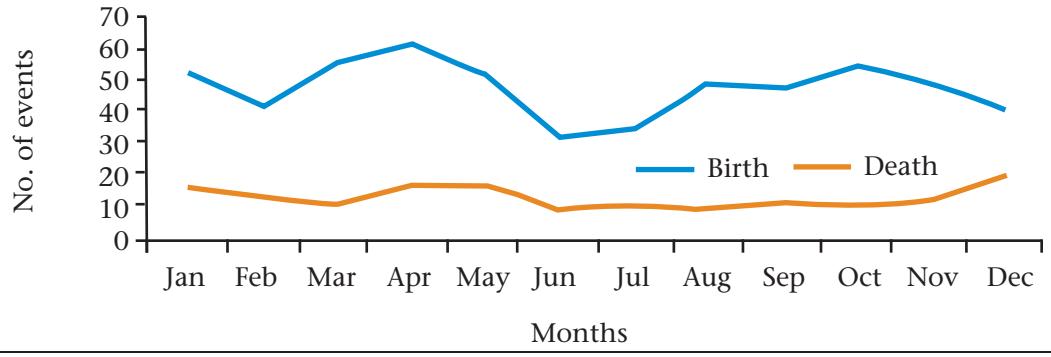
Distribution of births and deaths by month did not show any distinct seasonal pattern (Fig. 5). The seasonal patterns of birth and death were similar in the intervention and comparison areas (Fig. 6 and 7).

Fig. 5. Number of births and deaths by month, Chakaria HDSS, 2009



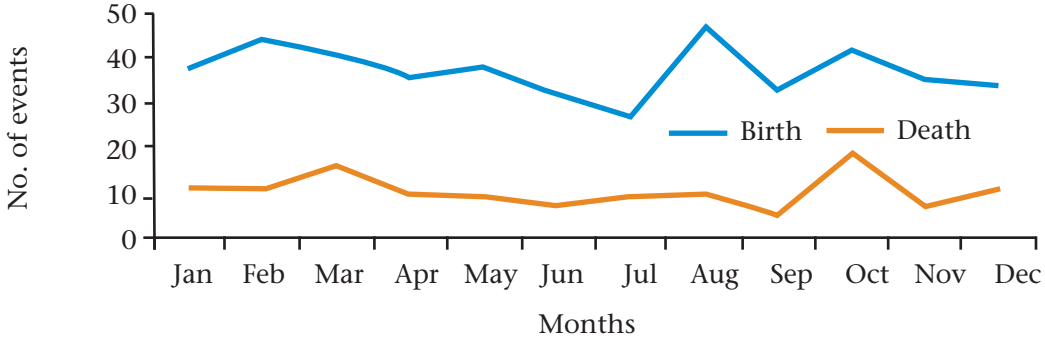
HDSS = Health and Demographic Surveillance System.

Fig. 6. Number of births and deaths by month, Intervention area, Chakaria HDSS, 2009



HDSS = Health and Demographic Surveillance System.

Fig. 7. Number of births and deaths by month, Comparison area, Chakaria HDSS, 2009



HDSS = Health and Demographic Surveillance System.

CHAPTER 6

Migration

In 2009, the rate of out-migration was higher at 41.3 per 1,000 population than that of in-migration at 28.3 per 1,000 population (Table 9). The rates were higher than in 2008. Monthly data on migration are presented in Tables 10, 11 and 12. Data showed that the number of in-migrants was lower than that of out-migrants during 2009 in both the areas. The sex differential in migration was also not prominent. The rate of in-migration among males was highest in January, and the rate was highest among female in May. The rate of out-migration was highest among the males in December and females was highest in May.

Table 9. Migration rate per 1,000 population by asset quintile, Chakaria HDSS, 2009

Asset quintile	Midyear population	In-migration rate	Out-migration rate
Lowest	8,969	23.1	29.4
Second	9,459	21.2	35.1
Medium	6,464	22.1	34.3
Fourth	7,818	31.7	43.5
Highest	9,160	42.1	62.3
All	45,098	29.8	40.6

HDSS = Health and Demographic Surveillance System.

Table 10. Number of migrants by sex and month, Chakaria HDSS, 2009

Month	In-migration			Out-migration		
	Male	Female	Both	Male	Female	Both
January	61	84	145	89	97	186
February	33	79	112	56	69	125
March	38	65	103	60	76	136
April	30	42	72	63	70	133
May	46	98	144	64	136	200
June	48	86	134	67	110	177
July	27	63	90	57	93	150
August	37	47	84	57	78	135
September	49	55	104	70	60	130
October	47	74	121	52	71	123
November	39	62	101	54	76	130
December	52	80	132	94	114	208
All	507	835	1,342	783	1,050	1,833

HDSS = Health and Demographic Surveillance System.

Table 11. Number of migrants by sex and month, intervention area, Chakaria HDSS, 2009

Month	In-migration			Out-migration		
	Male	Female	Both	Male	Female	Both
January	39	51	90	39	43	82
February	19	44	63	30	39	69
March	23	40	63	29	31	60
April	23	29	52	30	37	67
May	27	51	78	30	68	98
June	27	50	77	36	66	102
July	15	33	48	30	52	82
August	21	21	42	31	44	75
September	29	29	58	40	31	71
October	30	40	70	26	33	59
November	31	40	71	33	48	81
December	34	41	75	47	61	108
All	318	469	787	401	553	954

HDSS = Health and Demographic Surveillance System.

Table 12. Number of migrants by sex and month, comparison area, Chakaria HDSS, 2009

Month	In-migration			Out-migration		
	Male	Female	Both	Male	Female	Both
January	22	33	55	50	54	104
February	14	35	49	26	30	56
March	15	25	40	31	45	76
April	7	13	20	33	33	66
May	19	47	66	34	68	102
June	21	36	57	31	44	75
July	12	30	42	27	41	68
August	16	26	42	26	34	60
September	20	26	46	30	29	59
October	17	34	51	26	38	64
November	8	22	30	21	28	49
December	18	39	57	47	53	100
All	189	366	555	382	497	879

HDSS = Health and Demographic Surveillance System.

Origin and destination of migrants

During 2009, 4.8% of 1,342 in-migrants moved into Chakaria HDSS households from outside of Bangladesh whereas 9.3% of 1,831 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 13).

Table 13. Origin and destination of migrants by sex, Chakaria HDSS, 2009

Origin or destination	In-migration			Out-migration		
	Male (%)	Female (%)	Both (%)	Male (%)	Female (%)	Both (%)
Inside Bangladesh	88.0	99.5	95.2	79.3	99.1	90.7
Outside Bangladesh	12.0	0.5	4.8	20.7	0.9	9.3
Total	100.0	100.0	100.0	100.0	100.0	100.0
Total number of migrants	507	835	1,342	781	1,050	1,831
Inside Chakaria	79.4	73.7	75.6	74.2	73.1	73.5
Outside Chakaria	20.6	26.3	24.4	25.8	26.9	26.5
Total	100.0	100.0	100.0	100.0	100.0	100.0
Total number of migrants	412	791	1,203	493	877	1,370
Inside HDSS area	58.3	54.1	55.5	59.1	55.3	56.6
Outside HDSS area	41.7	45.9	44.5	40.9	44.7	43.4
Total	100.0	100.0	100.0	100.0	100.0	100.0
Total number of migrants	367	714	1,081	421	760	1,181

HDSS = Health and Demographic Surveillance System.

Reasons for migration

Table 14 presents the reasons of migration by sex. 39.6% of the migrants moved out due to family-related issues - mostly marriage, followed by housing (28.5%), work (26.9%), and education (5.0%). Reasons for moving out for

males were different from those of females. 51.5% of male in-migrants moved due to work related issues whereas only 9.1% of the females moved due to that reason. On the other hand, 59.1% of female in-migrants moved due to family related issues - mostly marriage, while only 12.6% of males moved due to family related reasons (Table 14). The reasons of movement for out-migration were mostly similar to the reasons for in-migration.

Table 14. Reasons for migration, Chakaria HDSS, 2009

Reasons for migration	In-migration			Out-migration		
	Male (%)	Female (%)	Both (%)	Male (%)	Female (%)	Both (%)
Family-related	12.6	59.1	41.8	15.7	58.1	39.6
Work-related	51.5	9.1	24.9	48.8	9.6	26.9
Housing-related	26.6	25.6	26.0	28.5	28.2	28.5
Education	9.3	6.2	7.3	7.0	4.1	5.0
Total	100.0	100.0	100.0	100.0	100.0	100.0
Total number of migrants	507	835	1,342	783	1,050	1,833

HDSS = Health and Demographic Surveillance System.

CHAPTER 7

Marriage

In total 861 marriages took place in the surveillance households in Chakaria during 2009. The highest number of marriages took place in May and the lowest in September. The number of marriages showed a downward trend from May to September (Fig. 8).

Table 15 presents singulate mean age at marriage (SMAM) and median age at first marriage. The SMAM was 27 years for males and 20 years for females. The SMAM in 2009 remained same as of 2008 for males and females. The median age at first marriage for males and females were 27 and 20 years. Both the indicators for males and females were almost positively associated with household socioeconomic status.

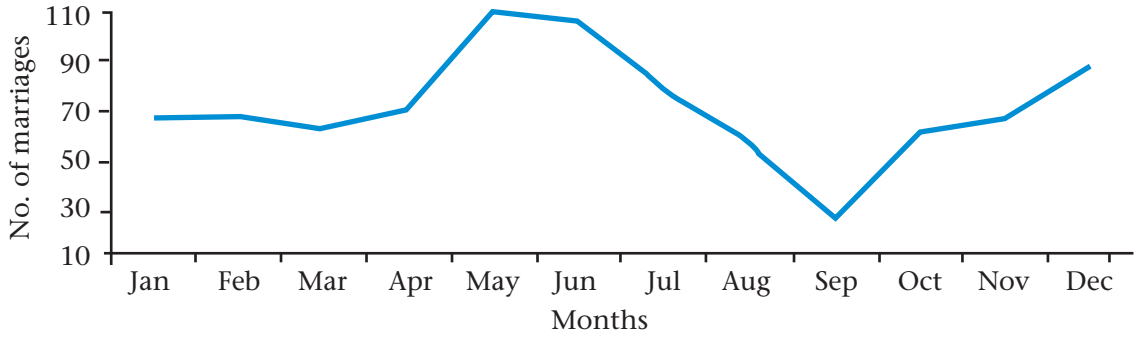
Table 15. Age at marriage by sex, Chakaria HDSS, 2009

Asset quintile	Male		Female	
	SMAM*	Median age at first marriage*	SMAM*	Median age at first marriage
Lowest	23.7	22.8	18.8	19.9
Second	26.1	25.3	19.8	20.5
Medium	27.1	26.1	19.4	19.7
Fourth	28.1	27.8	19.7	20.4
Highest	29.5	28.8	20.6	21.0
All	27.3	26.6	19.7	20.3

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. 8. Number of marriages by month, Chakaria HDSS, 2009



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. The services provided by these midwives were not strictly restricted to the intervention area. The women from the comparison area also availed their services to some extent. 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, 6 Union Health and Family Welfare Centres (UHFWCs) of the government and 7 village health posts which were initiated by the community members provide healthcare services in the intervention area. At the same level, one UHFWC and one Rural Dispensary (RD) of the government provide health services in the comparison area. The Family Development Services and Research (FDSR), an NGO, also provides healthcare services both in intervention and comparison areas.

Use of antenatal care services

During 2009, 65.0% of 987 pregnant women in Chakaria received at least one antenatal check-up (ANC). The percentage of women receiving at least one ANC was higher in the intervention area (69.4%) than in the comparison area (59.5%). The women in the intervention area received services from various sources. Among these sources, the nurses/doctors were dominant, followed by midwives and then FDSR and BRAC. In the comparison area, the dominant source was also Nurse/doctor, but was followed by FDSR and BRAC and then midwives. (Table 16).

The use of ANC was very inequitable in both the intervention and the comparison areas. Of the various sources, services from nurse and doctor has been the most inequitable (Table 16).

Table 16. Antenatal care by type of sources and asset quintile, Chakaria HDSS, 2009

Area	Asset quintile	Received any ANC (%)	Midwife* (%)	FWV* (%)	Nurse/ doctor* (%)	FDSR/ CMH* (%)	None (%)	No. of women
Intervention area	Lowest	56.1	24.4	4.9	14.6	12.2	43.9	123
	Second	67.3	21.4	8.2	19.4	18.4	32.7	98
	Middle	70.5	28.4	4.5	27.3	10.2	29.5	88
	Fourth	74.0	15.4	6.7	42.3	9.6	26.0	104
	Highest	78.2	7.7	0.7	66.9	2.8	21.8	142
	Total	69.4	18.6	4.7	36.0	10.1	30.6	555
Comparison area	Lowest	45.4	7.4	7.4	3.7	26.9	54.6	108
	Second	52.8	13.9	2.8	11.1	25.0	47.2	72
	Middle	61.5	6.2	20.0	26.2	9.2	38.5	65
	Fourth	69.9	8.6	6.5	40.9	14.0	30.1	93
	Highest	69.1	7.4	2.1	55.3	4.3	30.9	94
	Total	59.5	8.6	7.2	27.5	16.2	40.5	432
Both areas	Lowest	51.1	16.5	6.1	9.5	19.0	48.9	231
	Second	61.2	18.2	5.9	15.9	21.2	38.8	170
	Middle	66.7	19.0	11.1	26.8	9.8	33.3	153
	Fourth	72.1	12.2	6.6	41.6	11.7	27.9	197
	Highest	74.6	7.6	1.3	62.3	3.4	25.4	236
	Total	65.0	14.2	5.8	32.3	12.8	35.0	987

*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

Use of postnatal care services

It was observed that only 30.0% of the pregnant women received at least one postnatal care (PNC) during 2009. This percentage was higher in the intervention area (32.8%) than the comparison area (26.4%). The nurses, doctors and midwifes were the dominant sources for PNC in both the areas, and the utilization of services was characterized by large inequities (Table 17).

Table 17. Postnatal care by type of sources and asset quintile, Chakaria HDSS, 2009

Area	Asset quintile	Received any PNC (%)	Midwife* (%)	FWV* (%)	Nurse/ doctor* (%)	FDSR/ CMH* (%)	None (%)	No. of women
Intervention area	Lowest	17.9	4.9	0.0	11.4	1.6	82.1	123
	Second	22.4	5.1	0.0	15.3	2.0	77.6	98
	Middle	30.7	17.0	1.1	12.5	0.0	69.3	88
	Fourth	46.2	5.8	1.9	37.5	1.0	53.8	104
	Highest	44.4	7.7	0.0	36.6	0.0	55.6	142
	Total	32.8	7.7	0.5	23.6	0.9	67.2	555
Comparison area	Lowest	16.7	2.8	0.0	12.0	1.9	83.3	108
	Second	20.8	4.2	1.4	15.3	0.0	79.2	72
	Middle	18.5	6.2	0.0	12.3	0.0	81.5	65
	Fourth	31.2	9.7	0.0	21.5	0.0	68.8	93
	Highest	42.6	10.6	0.0	30.9	1.1	57.4	94
	Total	26.4	6.7	0.2	18.8	0.7	73.6	432
Both areas	Lowest	17.3	3.9	0.0	11.7	1.7	82.7	231
	Second	21.8	4.7	0.6	15.3	1.2	78.2	170
	Middle	25.5	12.4	0.7	12.4	0.0	74.5	153
	Fourth	39.1	7.6	1.0	29.9	0.5	60.9	197
	Highest	43.6	8.9	0.0	34.3	0.4	56.4	236
	Total	30.0	7.3	0.4	21.5	0.8	70.0	987

*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.

Assistance during delivery

In Chakaria, the traditional birth attendants (TBAs) were more popular than the skilled birth attendants (SBAs) for assisting deliveries. 73.5 percent of 930 deliveries in Chakaria were assisted by the TBAs as opposed to 26.5 of the deliveries assisted by the SBAs (e.g. nurses/doctors, FWVs, midwives). The percentage of deliveries assisted by the TBAs was slightly higher in the comparison area (76.3%) than the intervention area (71.4%) (Table 18).

Despite the fact that the services provided by the midwives of the Chakaria project were also available to some parts of the comparison area, the use of these trained midwives was similar in the intervention area compared to the comparison area (10.7% vs. 11.1%) (Table 18). At the same time, the overall use of SBAs that comprised nurses, doctors, FWVs, and midwives was higher in the intervention area (28.6%) than the comparison area (23.7%) (Table 18). The use rate of nurse/doctors by the women from the highest quintile was much higher than those by women from the lowest quintiles.

Table 18. Assistance during delivery by asset quintile, Chakaria HDSS, 2009

Area	Asset quintile	Midwife (%)	FWV (%)	Nurse/ doctor (%)	TBA (%)	No. of women
Intervention area	Lowest	5.2	0.9	6.1	87.8	115
	Second	9.0	1.1	5.6	84.3	89
	Middle	17.2	1.1	9.2	72.4	87
	Fourth	12.4	3.1	15.5	69.1	97
	Highest	10.9	2.2	36.5	50.4	137
	Total	10.7	1.7	16.2	71.4	525
Comparison area	Lowest	5.0	0.0	3.0	92.0	100
	Second	10.1	1.4	4.3	84.1	69
	Middle	8.3	1.7	8.3	81.7	60
	Fourth	12.4	3.4	7.9	76.4	89
	Highest	19.5	1.1	31.0	48.3	87
	Total	11.1	1.5	11.1	76.3	405
Both areas	Lowest	5.1	0.5	4.7	89.8	215
	Second	9.5	1.3	5.1	84.2	158
	Middle	13.6	1.4	8.8	76.2	147
	Fourth	12.4	3.2	11.8	72.6	186
	Highest	14.3	1.8	34.4	49.6	224
	Total	10.9	1.6	14.0	73.5	930

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

Place of delivery

Eighty eight percent of the deliveries took place at home. Only 12.0% of 988 deliveries took place either at hospitals or at clinics. The percentage of deliveries taking place at the hospitals was higher in the intervention area (14.3%) compared to the comparison area (9.2%) (Table 19). 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 19. Place of delivery by asset quintile, Chakaria HDSS, 2009

Area	Asset quintile	Hospital/Clinic (%)	Home (%)	No. of women
Intervention area	Lowest	5.7	94.3	123
	Second	5.1	94.9	98
	Middle	8.0	92.0	88
	Fourth	14.4	85.6	104
	Highest	31.9	68.1	141
	Total	14.3	85.7	554
Comparison area	Lowest	3.6	96.4	110
	Second	4.2	95.8	72
	Middle	3.1	96.9	65
	Fourth	7.5	92.5	93
	Highest	25.5	74.5	94
	Total	9.2	90.8	434
Both areas	Lowest	4.7	95.3	233
	Second	4.7	95.3	170
	Middle	5.9	94.1	153
	Fourth	11.2	88.8	197
	Highest	29.4	70.6	235
	Total	12.0	88.0	988

HDSS = Health and Demographic Surveillance System.

Table 20 shows caesarean-section delivery by household asset quintile in 2009. Caesarean-section delivery accounted for 4% of the deliveries in the Chakaria HDSS area in 2009. Although the number of caesarean sections was small, the number of women with caesarean sections from the highest quintile was 4 times the number of women from the lowest quintile.

Table 20. Proportion of caesarean-section delivery by asset quintile, Chakaria HDSS, 2009

Asset quintile	No. of caesarean-section delivery	Caesarean-section delivery (%)	Total number of deliveries
Lowest	5	2.1	233
Second	1	0.6	170
Middle	2	1.3	153
Fourth	9	4.6	197
Highest	19	8.0	237
Total	36	3.6	990

HDSS = Health and Demographic Surveillance System.

CHAPTER 9

Water and Sanitation Practices

Tubewell was the universal source of drinking water in Chakaria. As a source it increased from 99.3% in 1994 to 99.9% in 2009. No variation persists in drinking water sources among the people belonging to the five asset quintiles (Table 21).

Table 21. Sources of drinking water by asset quintile, Chakaria HDSS, 1994 and 2009

Asset quintile	Sources					
	1994			2009		
	Tube Well %	Well/Ditch/ River/ Pond (%)	No. of Households	Tube Well %	Well/ Ditch/ River/ Pond (%)	No. of Households
Lowest	99.7	0.3	369	100	0.0	336
Second	99.7	0.3	367	100	0.0	336
Medium	98.4	0.6	374	99.7	0.3	330
Fourth	99.5	0.5	353	100	0.0	328
Highest	99.2	0.8	365	100	0.0	339
All	99.3	0.7	1,828	99.9	0.1	1,669

The major source of water for bathing had shifted between1994 to 2009. River, pond, ditch, and canal were the dominant sources of water for bathing (77.8%) in 1994 opposed to 37.9% in 2009. The sources varied by asset quintile both in 1994 and in 2009. Tubewell water was more popular in the highest quintile (Table 22).

Table 22. Sources of water for bathing by asset quintile, Chakaria HDSS, 1994 and 2009

Asset quintile	Sources					
	1994			2009		
	Tube Well (%)	Well/Ditch/ River/Pond (%)	No. of Households	Tube Well %	Well/Ditch/ River/Pond (%)	No. of Households
Lowest	18.4	81.6	369	56.8	42.2	336
Second	19.3	80.7	367	54.4	45.6	336
Medium	17.4	82.6	374	59.4	39.6	330
Fourth	22.9	77.1	353	64.3	35.7	328
Highest	32.9	67.1	365	75.8	24.2	339
All	22.2	77.8	1,828	62.1	37.9	1,669

Table 23. Latrine use by asset quintile, Chakaria HDSS, 1994 and 2009

Asset quintile	1994						2009					
	Fixed place						Fixed place					
	No fixed place %	Faeces drained into surface water bodies %	Faeces drained into simple pit latrine %	Faeces drained into concrete pit latrine %	Faeces drained into septic tank %	No. of house-holds	No fixed place %	Faeces drained into surface water bodies %	Faeces drained into simple pit latrine %	Faeces drained into concrete pit latrine %	Faeces drained into septic tank %	No. of house-holds
Lowest	35.0	26.3	34.4	4.3	0.0	369	9.2	20.2	31.6	38.4	0.6	336
Second	25.3	30.2	33.2	11.2	0.0	367	4.5	19.1	33.3	42.9	0.3	336
Medium	26.7	25.9	39.0	8.3	0.0	374	5.5	16.1	27.9	47.6	3.0	330
Fourth	18.1	24.9	38.0	17.3	1.7	353	3.1	22.6	24.7	45.1	4.6	328
Highest	6.0	18.4	30.4	34.0	11.2	365	2.4	13.9	16.8	49.0	18.0	339
All	22.3	25.2	35.0	14.9	2.6	1,828	4.9	18.3	26.8	44.6	5.3	1,669

Table 23 presents the percentage of households using the various types of latrine by asset quintile in 1994 and in 2009. The use of sanitary latrine increased from 17.5% in 1994 to 49.9% in 2009 in Chakaria HDSS area. Although, a variation in using sanitary latrine between the five asset quintiles persists in 1994 and 2009, there was a substantial improvement in all the households irrespective of asset quintiles. Also at the same time, the open place for defecation decreased significantly, from 22.3% in 1994 to 4.9% in 2009.

Note : In this chapter, to compare the water and sanitation practices between 1994 and 2009, the asset quintile measurement tool was applied, which was derived from a common list of assets including radio, television, bicycle, motor cycle, land ownership, occupation and education of household head, which were available in both years.

AUTHORS' COMMENTS

The report revealed that the rates for crude birth and total fertility have decreased more than expected, between 2008 and 2009. In trying to understand the factors associated with this, we examined the midyear population, number of women of reproductive age, and number of births for both years. We found the numerator (number of birth) to be the main factor for lower rates in 2009. Moreover, when checking the number of births by villages for 2008 and 2009, a discrepancy was found in the number of births in 12 villages. In these 12 villages, there were 56 births in 2009, compared to 110 births in 2008. To understand this drastic decrease we re-checked all of the conception records from those villages for that period. However, no inconsistencies were found in that data. Furthermore, we also compared the number of pregnant women for the entire DSS area for 2008 and 2009. Here we found that the number of pregnant women had decreased in 2009 from 2008. We also found that the rate of reported spontaneous abortion had increased from 8.8% in 2008 to 12.5% in 2009.

Simultaneously, we also noticed an increase in neonatal, post-neonatal and infant mortality rates in 2009, which is dependent on the denominator (number of births).

We think that the low number of conception and high rate of spontaneous abortion, contributed towards decreased birth numbers in 2009 than in 2008.

Receiving assistance from SBA decreased in the intervention area significantly. One of the reasons may be the cessation of the SBA voucher programme in May 2009.

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APPENDIX A

Midyear population by age and sex in the intervention and comparison areas, Chakaria, HDSS, 2009

Age (years)	Intervention area			Comparison area			Both areas		
	Male	Female	Both	Male	Female	Both	Male	Female	Both
<1	287	269	556	224	236	460	511	505	1,016
1-4	1,288	1,222	2,510	1,017	918	1,935	2,305	2,140	4,445
5-9	1,684	1,569	3,253	1,288	1,238	2,526	2,972	2,807	5,779
10-14	1,746	1,706	3,452	1,500	1,400	2,900	3,246	3,106	6,352
15-19	1,658	1,698	3,356	1,386	1,525	2,911	3,044	3,223	6,267
20-24	1,268	1,206	2,474	1,118	999	2,117	2,386	2,205	4,591
25-29	894	736	1,630	747	598	1,345	1,641	1,334	2,975
30-34	607	706	1,313	492	554	1,046	1,099	1,260	2,359
35-39	602	599	1,201	463	560	1,023	1,065	1,159	2,224
40-44	528	533	1,061	397	437	834	925	970	1,895
45-49	487	456	943	446	431	877	933	887	1,820
50-54	379	398	777	323	377	700	702	775	1,477
55-59	328	290	618	348	301	649	676	591	1,267
60-64	275	205	480	205	144	349	480	349	829
65-69	181	153	334	183	154	337	364	307	671
70-74	135	101	236	108	82	190	243	183	426
75-79	123	97	220	76	73	149	199	170	369
80-84	52	44	96	37	31	68	89	75	164
85+	60	35	95	39	38	77	99	73	172
All	12,582	12,023	24,605	10,397	10,096	20,493	22,979	22,119	45,098

APPENDIX B

Percentage distribution of midyear population by age and sex in the intervention and comparison areas, Chakaria HDSS, 2009

Age (years)	Intervention area			Comparison area			Both areas		
	Male	Female	Both	Male	Female	Both	Male	Female	Both
<1	2.3	2.2	2.3	2.2	2.3	2.2	2.2	2.3	2.3
1-4	10.2	10.2	10.2	9.8	9.1	9.4	10.0	9.7	9.9
5-9	13.4	13.0	13.2	12.4	12.3	12.3	12.9	12.7	12.8
10-14	13.9	14.2	14.0	14.4	13.9	14.1	14.1	14.0	14.1
15-19	13.2	14.1	13.6	13.3	15.1	14.2	13.2	14.6	13.9
20-24	10.1	10.0	10.1	10.8	9.9	10.3	10.4	10.0	10.2
25-29	7.1	6.1	6.6	7.2	5.9	6.6	7.1	6.0	6.6
30-34	4.8	5.9	5.3	4.7	5.5	5.1	4.8	5.7	5.2
35-39	4.8	5.0	4.9	4.5	5.5	5.0	4.6	5.2	4.9
40-44	4.2	4.4	4.3	3.8	4.3	4.1	4.0	4.4	4.2
45-49	3.9	3.8	3.8	4.3	4.3	4.3	4.1	4.0	4.0
50-54	3.0	3.3	3.2	3.1	3.7	3.4	3.1	3.5	3.3
55-59	2.6	2.4	2.5	3.3	3.0	3.2	2.9	2.7	2.8
60-64	2.2	1.7	2.0	2.0	1.4	1.7	2.1	1.6	1.8
65-69	1.4	1.3	1.4	1.8	1.5	1.6	1.6	1.4	1.5
70-74	1.1	0.8	1.0	1.0	0.8	0.9	1.1	0.8	0.9
75-79	1.0	0.8	0.9	0.7	0.7	0.7	0.9	0.8	0.8
80-84	0.4	0.4	0.4	0.4	0.3	0.3	0.4	0.3	0.4
85+	0.5	0.3	0.4	0.4	0.4	0.4	0.4	0.3	0.4
All	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

APPENDIX C

Number of births by age of mother, Chakaria HDSS, 2009

Age (years)	Intervention area			Comparison area			Both areas		
	Male	Female	Both	Male	Female	Both	Male	Female	Both
10-14	0	3	3	0	0	0	0	3	3
15-19	81	66	147	72	62	134	153	128	281
20-24	109	109	218	70	78	148	179	187	366
25-29	46	54	100	48	40	88	94	94	188
30-34	48	27	75	34	21	55	82	48	130
35-39	12	18	30	8	12	20	20	30	50
40-44	3	6	9	0	3	3	3	9	12
45-49	1	0	1	0	0	0	1	0	1
50-54	0	1	1	0	0	0	0	1	1
All	300	284	584	232	216	448	532	500	1,032

APPENDIX D

Number of deaths by age and sex, Chakaria HDSS, 2009

Age (years)	Intervention area			Comparison area			Both areas		
	Male	Female	Both	Male	Female	Both	Male	Female	Both
<1	20	12	32	12	16	28	32	28	60
1-4	6	7	13	2	6	8	8	13	21
5-9	1	2	3	1	1	2	2	3	5
10-14	2	1	3	1	0	1	3	1	4
15-19	2	3	5	1	3	4	3	6	9
20-24	4	2	6	1	3	4	5	5	10
25-29	0	1	1	1	0	1	1	1	2
30-34	4	0	4	0	0	0	4	0	4
35-39	0	2	2	0	1	1	0	3	3
40-44	1	3	4	1	1	2	2	4	6
45-49	8	4	12	3	2	5	11	6	17
50-54	5	2	7	2	3	5	7	5	12
55-59	5	2	7	6	5	11	12	7	19
60-64	5	4	10	2	2	4	7	6	13
65-69	7	7	14	6	5	11	13	12	25
70-74	2	3	5	3	7	10	5	10	15
75-79	6	5	11	6	5	11	12	10	22
80-84	6	2	8	3	1	4	9	3	12
85+	9	11	20	4	9	13	13	20	33
All	94	73	167	55	70	125	149	143	292

APPENDIX E

Causes of deaths by age and sex, Chakaria HDSS, 2009

Cause	All age	Age (years)					
		<1	1-4	5-14	15-49	50-59	60+
Male							
Communicable diseases							
Diarrheal	3	1	0	0	2	0	0
Dysentery	1	1	0	0	0	0	0
Tuberculosis	1	0	0	0	1	0	0
Hepatitis	7	0	0	1	3	1	2
Respiratory infections	5	5	0	0	0	0	0
Maternal and neonatal conditions							
Neonatal	9	8	0	0	0	0	1
Other neonatal	9	9	0	0	0	0	0
Non–communicable diseases							
Malignant neoplasm	7	0	0	0	2	1	4
Neoplasm	11	1	0	1	3	0	6
Diabetes	5	0	0	0	0	2	3
Stroke	21	0	0	0	5	5	11
Other cardiovascular	4	1	0	0	0	2	1
Asthma/Bronchitis	17	0	0	0	1	2	14
Digestive disease	1	0	0	0	1	0	0
Senility	11	0	0	0	0	0	11
Epilepsy	2	0	1	0	1	0	0
Injuries							
Accident	6	0	1	1	3	1	0
Drowning	7	1	5	1	0	0	0
Homicide	1	0	0	0	1	0	0
Suicide	1	0	0	1	0	0	0
Unknown	20	5	1	0	3	5	6
All	149	32	8	5	26	19	59
Female							
Communicable diseases							
Diarrheal	4	0	1	0	3	0	0
Hepatitis	2	1	0	0	0	0	1
Respiratory infection	17	16	1	0	0	0	0
Malaria	1	0	0	0	1	0	0
Maternal and neonatal conditions							
Maternal death	1	0	0	0	1	0	0
Premature and lbw	1	1	0	0	0	0	0
Other neonatal	7	7	0	0	0	0	0

Appendix E: (Contd...)

Cause	All age	Age (years)					
		<1	1-4	5-14	15-49	50-59	60+
Nutritional	2	0	1	0	1	0	0
Non–communicable diseases							
Malignant neoplasm	6	0	0	0	1	4	1
Neoplasm	5	0	0	0	2	0	3
Diabetes	2	0	0	0	0	1	1
Hypertension disease	2	0	0	0	0	0	2
Stroke	20	0	0	0	5	3	12
Other cardiovascular	1	0	0	0	1	0	0
Asthma/Bronchitis	14	0	0	0	3	2	9
Other urinary	2	0	0	0	1	0	1
Epestaxis	1	1	0	0	0	0	0
Senility	26	0	0	0	0	0	26
Disease of uterus	1	0	0	0	0	1	0
Injuries							
Accident	2	0	2	0	0	0	0
Drowning	7	0	5	2	0	0	0
Suicide	2	0	0	0	2	0	0
Burn	1	0	1	0	0	0	0
Unknown	16	2	2	2	4	1	5
All	143	28	13	4	25	12	61

APPENDIX F

Number of migrants by age and sex, Chakaria HDSS, 2009

Age (years)	Intervention area			Comparison area			Both areas		
	Male	Female	Both	Male	Female	Both	Male	Female	Both
In-migrants									
<1	13	10	23	7	8	15	20	18	38
1-4	27	37	64	12	30	42	39	67	106
5-9	36	36	72	32	25	57	68	61	129
10-14	63	44	107	28	39	67	91	83	174
15-19	46	185	231	34	142	176	80	327	407
20-24	34	68	102	20	55	75	54	123	177
25-29	33	27	60	20	20	40	53	47	100
30-34	16	15	31	6	4	10	22	19	41
35-39	14	3	17	9	3	12	23	6	29
40-44	9	1	10	3	5	8	12	6	18
45-49	3	1	4	5	2	7	8	3	11
50-54	4	7	11	3	5	8	4	7	11
55-59	3	10	13	1	4	5	6	15	21
60-64	4	8	12	0	7	7	5	12	17
65-69	4	6	10	1	8	9	4	13	17
70-74	2	4	6	2	6	8	3	12	15
75-79	4	3	7	3	1	4	6	9	15
80-84	2	1	3	3	2	5	5	2	7
85+	1	3	4	7	8	15	4	5	9
All	318	469	787	189	366	555	507	835	1,342
Out-migrants									
<1	13	15	28	20	11	31	33	26	59
1-4	36	23	59	43	30	73	79	53	132
5-9	24	36	60	23	36	59	47	72	119
10-14	68	44	112	41	41	82	109	85	194
15-19	72	169	241	68	163	231	140	332	472
20-24	54	163	217	70	128	198	124	291	415
25-29	58	47	105	54	37	91	112	84	196
30-34	22	19	41	22	11	33	44	30	74
35-39	21	5	26	18	5	23	39	10	49
40-44	6	4	10	8	2	10	14	6	20
45-49	4	1	5	3	3	6	7	4	11
50-54	3	5	8	2	3	5	5	8	13
55-59	2	8	10	1	6	7	3	14	17
60-64	5	5	10	1	2	3	6	7	13
65-69	2	2	4	2	6	8	4	8	12
70-74	4	2	6	2	4	6	6	6	12
75-79	2	2	4	2	5	7	4	7	11
80-84	2	1	3	2	2	4	4	3	7
85+	3	2	5	0	1	1	3	3	6
All	401	553	954	382	497	879	783	1,049	1,832

APPENDIX G

Migration rate per 1,000 population by age and sex, Chakaria HDSS, 2009

Age (years)	Intervention area			Comparison area			Both areas		
	Male	Female	Both	Male	Female	Both	Male	Female	Both
In-migration									
<1	45.3	37.2	41.4	31.3	33.9	32.6	39.1	35.6	37.4
1-4	21.0	30.3	25.5	11.8	32.7	21.7	16.9	31.3	23.9
5-9	21.4	22.9	22.1	24.8	20.2	22.6	22.9	21.7	22.3
10-14	36.1	25.8	31.0	18.7	27.8	23.1	28.0	26.7	27.4
15-19	27.8	108.8	68.8	24.5	93.2	60.5	26.3	101.4	65.0
20-24	26.7	56.4	41.2	17.9	54.9	35.4	22.6	55.7	38.5
25-29	37.0	36.8	36.9	26.8	33.4	29.7	32.3	35.3	33.6
30-34	26.3	21.2	23.6	12.2	7.2	9.6	20.0	15.1	17.4
35-39	23.3	5.0	14.2	19.5	5.4	11.8	21.6	5.2	13.1
40-44	17.0	1.9	9.4	7.5	11.4	9.6	12.9	6.2	9.5
45-49	6.2	2.2	4.2	11.2	4.6	8.0	8.6	3.4	6.0
50-54	10.6	17.5	14.2	9.3	13.3	11.4	5.7	9.0	7.4
55-59	9.1	34.5	21.0	2.9	13.3	7.7	8.9	25.4	16.6
60-64	14.5	38.8	24.9	0.0	48.3	20.0	10.4	34.2	20.4
65-69	22.1	39.5	30.0	5.5	51.9	26.7	11.0	42.5	25.4
70-74	14.9	39.2	25.4	18.5	73.2	42.1	12.4	65.2	35.2
75-79	32.5	30.9	31.8	39.5	13.7	26.8	30.2	52.9	40.7
80-84	38.5	22.7	31.3	81.1	62.5	72.5	56.2	26.3	42.4
85+	16.4	85.7	41.7	0.0	0.0	0.0	40.0	68.5	52.0
All	25.3	39.0	32.0	18.2	36.2	27.1	22.1	37.7	29.8
Out-migration									
<1	45.3	55.8	50.4	89.3	46.6	67.4	64.6	51.5	58.1
1-4	28.0	18.8	23.5	42.3	12.0	16.0	34.3	24.8	29.7
5-9	14.2	22.9	18.4	33.4	24.3	28.9	15.8	25.7	20.6
10-14	38.9	25.8	32.5	15.3	25.7	20.3	33.6	27.4	30.5
15-19	43.5	99.4	71.8	29.6	26.9	28.2	46.0	103.0	75.3
20-24	42.5	135.2	87.6	60.8	162.8	109.0	51.9	131.9	90.3
25-29	64.9	64.0	64.5	93.7	214.0	147.2	68.3	63.1	65.9
30-34	36.2	26.8	31.2	109.5	66.8	86.9	40.0	23.8	31.3
35-39	34.9	8.4	21.7	47.6	19.7	32.3	36.7	8.7	22.1
40-44	11.3	7.5	9.4	45.1	11.4	27.5	15.1	6.2	10.5
45-49	8.2	2.2	5.3	17.9	4.6	11.4	7.5	4.5	6.0
50-54	7.9	12.5	10.3	9.3	8.0	8.6	7.1	10.3	8.8
55-59	6.1	27.6	16.2	5.7	10.0	7.7	4.4	23.7	13.4
60-64	18.1	24.3	20.7	4.9	41.4	20.0	12.5	19.9	15.6
65-69	11.0	13.2	12.0	5.5	13.0	8.9	11.0	26.1	17.9
70-74	29.9	19.6	25.4	18.5	73.2	42.1	24.8	32.6	28.2
75-79	16.3	20.6	18.2	26.3	54.8	40.3	20.1	41.2	29.8
80-84	38.5	22.7	31.3	54.1	156.3	101.4	44.9	39.5	42.4
85+	49.2	57.1	52.1	51.3	52.6	51.9	30.0	41.1	34.7
All	31.9	46.0	38.8	36.7	49.2	42.9	34.1	47.4	40.6

APPENDIX H

Number of migrants by origin or destination, Chakaria HDSS, 2009

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	446	61	64	83	83	44	36	18	13	6	5	33
Outside Bangladesh	61	0	2	1	0	11	18	6	10	5	3	5
Inside Chakaria	327	47	45	71	65	26	21	9	7	3	2	31
Outside Chakaria	85	11	16	10	14	12	8	5	5	2	1	1
Inside HDSS area	214	29	27	47	41	16	13	8	4	2	2	25
Outside HDSS area	153	25	27	27	30	18	10	4	3	2	1	6
Female												
Inside Bangladesh	831	82	56	84	311	138	50	18	8	4	5	75
Outside Bangladesh	4	2	0	0	1	0	1	0	0	0	0	0
Inside Chakaria	583	52	45	61	208	88	32	13	7	2	3	72
Outside Chakaria	208	26	8	13	93	42	15	5	1	1	2	2
Inside HDSS area	386	34	28	51	128	47	21	10	6	2	3	56
Outside HDSS area	328	31	22	19	139	66	23	6	2	1	2	17
Out-migration												
Male												
Inside Bangladesh	746	138	55	122	126	81	87	32	29	19	7	50
Outside Bangladesh	167	2	0	2	24	59	42	17	16	2	2	1
Inside Chakaria	366	58	30	80	73	41	28	11	10	3	3	29
Outside Chakaria	127	28	9	15	24	15	14	6	5	4	2	3
Inside HDSS area	249	40	20	48	59	31	18	5	5	1	2	20
Outside HDSS area	172	29	14	39	23	19	16	9	8	3	1	11
Female												
Inside Bangladesh	1,193	102	84	100	359	314	100	33	14	8	5	74
Outside Bangladesh	9	1	0	0	1	3	1	1	0	1	0	1
Inside Chakaria	641	51	46	50	207	168	44	13	5	5	3	49
Outside Chakaria	236	14	12	18	78	75	25	7	4	5	1	2
Inside HDSS area	420	32	30	32	134	108	28	5	4	3	2	42
Outside HDSS area	340	23	21	24	113	103	30	14	3	2	2	7

APPENDIX I

Number of in-migrants by reasons for migration, Chakaria HDSS, 2009

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	11	0	0	0	1	4	3	2	0	1	0	0
Family friction/ breakdown	31	3	3	1	3	4	6	2	1	0	0	8
Others	20	3	2	1	4	3	0	0	0	0	1	6
Work-related												
New job/job transfer	98	0	2	7	19	13	23	9	11	6	5	3
To look for work/lost job	156	1	11	54	43	18	6	8	4	3	2	6
others	0	0	0	0	0	0	0	0	0	0	0	0
Housing-related												
Wanted to own home/ new house	131	49	22	13	7	10	11	0	5	1	0	13
Education												
To acquire education	46	1	28	15	1	1	0	0	0	0	0	0
Reasons not reported	14	2	0	0	2	1	4	1	2	1	0	1
All	507	59	68	91	80	54	53	22	23	12	8	37
Female												
Family related												
To join spouse	336	0	0	16	249	50	9	6	3	2	0	1
Family friction/breakdown	84	7	0	2	15	29	8	5	0	1	0	17
Others	72	6	2	2	7	9	5	4	1	1	1	34
Work-related												
New job/job transfer	6	2	0	0	1	1	2	0	0	0	0	0
To look for work/lost job	70	0	10	28	17	7	7	0	0	1	0	0
Others												
Housing-related												
Wanted to own home/new house	213	67	25	19	31	26	15	3	2	0	2	23
Education												
To acquire education	51	3	24	16	6	0	1	1	0	0	0	0
Reasons not reported	3	0	0	0	1	1	0	0	0	1	0	0
All	835	85	61	83	327	123	47	19	6	6	3	75

APPENDIX J

Number of out-migrants by reasons for migration, Chakaria HDSS, 2009

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	16	0	0	1	1	6	4	1	0	0	0	3
Family friction/ breakdown	42	2	0	3	6	10	10	3	3	0	0	5
Others	61	17	8	8	3	6	8	1	1	1	1	7
Work-related												
New job/job transfer	210	3	1	7	34	66	52	20	19	5	3	0
To look for work/ lost job	161	0	3	41	53	16	22	10	8	4	2	2
Others	0	0	0	0	0	0	0	0	0	0	0	0
Housing-related												
Wanted to own home/ new house	217	89	24	25	22	9	14	8	7	4	0	15
Education												
To acquire education	53	1	11	22	17	2	0	0	0	0	0	0
Reasons not reported	21	0	0	2	3	8	2	1	1	0	1	3
All	783	112	47	109	140	124	112	44	39	14	7	35
Female												
Family-related												
To Join spouse	425	0	0	7	214	169	28	5	1	0	0	1
Family friction/ breakdown	64	2	2	1	15	19	6	0	1	0	1	17
Others	115	17	11	5	14	28	15	5	5	0	1	14
Work-related												
New job/job transfer	13	1	0	0	1	3	2	3	0	2	0	1
To look for work/lost job	87	1	7	27	28	12	8	2	1	1	0	0
Others	0	0	0	0	0	0	0	0	0	0	0	0
Housing-related												
Wanted to own home/ new house	293	59	35	29	49	55	23	14	2	3	2	22
Education												
To acquire education	42	0	17	16	7	0	1	1	0	0	0	0
Reasons not reported	11	0	0	0	4	5	1	0	0	0	0	1
All	1,050	80	72	85	332	291	84	30	10	6	4	56

APPENDIX K

Percentage of population by age and marital status, Chakaria HDSS, 2009

Age (years)	Married	Divorced	Abandoned	Widower/ Widow	Separated	Never married	Population
Male							
10-14	0.1	0.0	0.0	0.0	0.0	99.9	3,245
15-19	3.7	0.1	0.0	0.0	0.0	96.1	3,049
20-24	25.7	0.4	0.0	0.1	0.0	73.8	2,411
25-29	56.1	1.3	0.0	0.1	0.0	42.5	1,655
30-34	82.4	0.7	0.0	0.1	0.1	16.6	1,110
35-39	95.1	0.5	0.0	0.6	0.0	3.8	1,071
40-44	97.7	0.6	0.0	0.1	0.1	1.4	932
45-49	98.8	0.1	0.1	0.7	0.1	0.1	937
50-54	98.9	0.3	0.0	0.4	0.0	0.4	703
55-59	97.8	0.1	0.0	1.9	0.0	0.1	679
60-64	97.1	0.4	0.2	2.3	0.0	0.0	484
65-69	94.8	0.3	0.0	5.0	0.0	0.0	363
70-74	93.9	0.0	0.4	5.7	0.0	0.0	244
75-79	87.5	0.5	0.0	11.0	0.0	1.0	200
80-84	79.8	1.1	0.0	19.1	0.0	0.0	89
85+	73.0	0.0	0.0	27.0	0.0	0.0	100
All	47.2	0.4	0.0	0.8	0.0	51.5	17,272
Female							
10-14	0.9	0.0	0.0	0.0	0.0	99.1	3,106
15-19	31.5	0.2	0.0	0.1	0.0	68.1	3,235
20-24	69.8	1.6	0.4	0.6	0.0	27.5	2,225
25-29	87.9	1.4	1.2	1.7	0.0	7.8	1,338
30-34	92.6	1.2	0.9	2.8	0.2	2.1	1,265
35-39	89.9	1.7	2.2	6.0	0.1	0.2	1,156
40-44	87.3	1.2	1.4	9.3	0.2	0.4	971
45-49	80.6	1.0	1.8	16.3	0.0	0.1	888
50-54	71.1	0.6	1.9	25.8	0.1	0.3	778
55-59	60.1	1.2	1.0	36.7	0.2	0.3	592
60-64	48.7	0.0	0.6	50.7	0.0	0.0	351
65-69	39.5	0.3	1.6	57.8	0.3	0.3	306
70-74	27.7	1.6	0.0	70.7	0.0	0.0	184
75-79	15.9	0.6	0.6	82.4	0.0	0.6	170
80-84	9.2	0.0	0.0	90.8	0.0	0.0	76
85+	5.5	0.0	1.4	91.8	0.0	1.4	73
All	52.9	0.8	0.7	9.3	0.0	36.1	16,714

APPENDIX L

Percentage of population by age and marital status, intervention area, Chakaria HDSS, 2009

Age (years)	Married	Divorced	Abandoned	Widower/ Widow	Separated	Never married	Population
Male							
10-14	0.1	0.0	0.0	0.0	0.0	99.8	1,746
15-19	3.6	0.1	0.0	0.0	0.0	96.3	1,658
20-24	24.4	0.3	0.0	0.1	0.0	75.2	1,283
25-29	54.6	1.6	0.0	0.2	0.0	43.6	901
30-34	81.5	1.0	0.0	0.2	0.2	17.2	615
35-39	95.4	0.7	0.0	0.3	0.0	3.6	605
40-44	97.6	0.6	0.0	0.2	0.0	1.7	532
45-49	99.0	0.2	0.0	0.8	0.0	0.0	490
50-54	98.7	0.3	0.0	0.5	0.0	0.5	379
55-59	97.9	0.3	0.0	1.5	0.0	0.3	330
60-64	97.1	0.0	0.4	2.5	0.0	0.0	276
65-69	94.5	0.0	0.0	5.5	0.0	0.0	181
70-74	96.3	0.0	0.7	3.0	0.0	0.0	135
75-79	89.5	0.8	0.0	8.1	0.0	1.6	124
80-84	76.9	1.9	0.0	21.2	0.0	0.0	52
85+	65.6	0.0	0.0	34.4	0.0	0.0	61
All	47.0	0.4	0.0	0.9	0.0	51.7	9,368
Female							
10-14	1.1	0.0	0.0	0.0	0.0	98.9	1,705
15-19	31.1	0.2	0.0	0.1	0.0	68.4	1,704
20-24	70.6	2.0	0.2	0.7	0.0	26.4	1,217
25-29	87.9	1.1	1.4	1.6	0.0	8.0	735
30-34	93.5	1.1	0.7	2.8	0.0	1.7	710
35-39	90.5	2.0	2.2	5.0	0.2	0.2	597
40-44	88.4	0.9	1.7	8.3	0.4	0.4	533
45-49	84.5	1.1	1.1	13.3	0.0	0.0	457
50-54	69.0	0.5	2.3	27.8	0.3	0.3	400
55-59	59.5	1.7	1.7	36.4	0.0	0.3	291
60-64	52.4	0.0	0.5	47.1	0.0	0.0	206
65-69	38.2	0.7	3.3	57.9	0.0	0.0	152
70-74	30.4	2.0	0.0	67.6	0.0	0.0	102
75-79	14.4	1.0	1.0	83.5	0.0	0.0	97
80-84	13.6	0.0	0.0	86.4	0.0	0.0	44
85+	2.9	0.0	0.0	94.3	0.0	2.9	35
All	53.2	0.9	0.7	8.9	0.0	36.2	8,985

APPENDIX M

Percentage of population by age and marital status, comparison area, Chakaria HDSS, 2009

Age (years)	Married	Divorced	Abandoned	Widower/ Widow	Separated	Never married	Population
Male							
10-14	0.1	0.0	0.0	0.0	0.0	99.9	1,499
15-19	3.9	0.1	0.0	0.0	0.0	96.0	1,391
20-24	27.1	0.4	0.0	0.2	0.0	72.2	1,128
25-29	58.0	0.9	0.0	0.0	0.0	41.1	754
30-34	83.6	0.4	0.0	0.0	0.0	15.8	495
35-39	94.8	0.2	0.0	0.9	0.0	4.1	466
40-44	98.0	0.8	0.0	0.0	0.3	1.0	400
45-49	98.7	0.0	0.2	0.7	0.2	0.2	447
50-54	99.1	0.3	0.0	0.3	0.0	0.3	324
55-59	97.7	0.0	0.0	2.3	0.0	0.0	349
60-64	97.1	1.0	0.0	1.9	0.0	0.0	208
65-69	95.1	0.5	0.0	4.4	0.0	0.0	182
70-74	90.8	0.0	0.0	9.2	0.0	0.0	109
75-79	84.2	0.0	0.0	15.8	0.0	0.0	76
80-84	83.8	0.0	0.0	16.2	0.0	0.0	37
85+	84.6	0.0	0.0	15.4	0.0	0.0	39
All	47.5	0.3	0.0	0.8	0.0	51.4	7,904
Female							
10-14	0.7	0.0	0.0	0.0	0.0	99.3	1,401
15-19	31.9	0.3	0.1	0.0	0.0	67.7	1,531
20-24	68.9	1.2	0.5	0.4	0.0	28.9	1,008
25-29	87.9	1.8	1.0	1.8	0.0	7.5	603
30-34	91.5	1.3	1.3	2.7	0.4	2.5	555
35-39	89.3	1.4	2.1	7.0	0.0	0.2	559
40-44	86.1	1.6	1.1	10.5	0.0	0.5	438
45-49	76.6	0.9	2.6	19.5	0.0	0.2	431
50-54	73.3	0.8	1.6	23.8	0.0	0.3	378
55-59	60.8	0.7	0.3	36.9	0.3	0.3	301
60-64	43.4	0.0	0.7	55.9	0.0	0.0	145
65-69	40.9	0.0	0.0	57.8	0.6	0.6	154
70-74	24.4	1.2	0.0	74.4	0.0	0.0	82
75-79	17.8	0.0	0.0	80.8	0.0	1.4	73
80-84	3.1	0.0	0.0	96.9	0.0	0.0	32
85+	7.9	0.0	2.6	89.5	0.0	0.0	38
All	52.5	0.8	0.7	9.8	0.1	36.0	7,729

APPENDIX N

Chakaria HDSS project team, 2009

Name of Staff	Designation
Dhaka	
Abbas Bhuiya	Project Director
Mohammad Iqbal	Senior Operations Researcher
SM Manzoor Ahmed Hanifi	Assistant Scientist
Rumesa R Aziz	Research Investigator
Tania Wahed	Senior Operations Researcher
Shehrin Shaila Mahmood	Assistant Scientist
Farhana Urni	Senior Statistical Officer
Md. Kashem Iqbal	Senior Administrative Officer
Ayesha Begum	Senior Data Management Assistant
Chakaria	
Shahidul Hoque	Senior Field Research Officer
Ariful Moula	Field Research Officer
Mijanur Rahaman	Field Research Officer
Ashish Paul	Senior Data Management Assistant
Md. Sharif Al-Hasan	Field Research Supervisor
Snehasish Dutta	Field Research Assistant
Md. Rehmat Ali	Senior Field Assistant
Afroza Yeasmin	Data Collector
Armanul Maowa	Data Collector
Aymun Nahar	Data Collector
Fatema Johura Surma	Data Collector
Fatema Zannat	Data Collector
Helena Khanom Happy	Data Collector
Hosaina Begum	Data Collector
Ismat Jahan Khuki	Data Collector
Kawsar Jannat	Data Collector
Kawsar Jannat Mukta	Data Collector
Kulsuma Aktar	Data Collector
Mina Dhar	Data Collector
Mobasseratul Zannat	Data Collector
Monuara Begum	Data Collector
Nazma Akter	Data Collector
Nigar Sultana	Data Collector
Noor Ayesha Begum	Data Collector
Rawnak Zahan	Data Collector
Riasmin Zannat	Data Collector
Rosan Ara	Data Collector
Sabina Yesmin	Data Collector
Setara Begum	Data Collector
Shamima Khanam	Data Collector
Tanjina Zannat Ara	Data Collector
Tanjimul Zannat	Data Collector
Zannatul Ferdous	Data Collector
Zosna Begum	Data Collector

icddr,b

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