

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

**Demographic Profile and Utilization of
Healthcare Services - 2006**

**Scientific Report No. 102
March 2008**



Chakaria Health and Demographic Surveillance System

Focusing on the Poor and Vulnerable

Demographic Profile and Utilization of
Healthcare Services - 2006

Abbas Bhuiya
S.M.A. Hanifi
Farhana Urni



icddr,b

KNOWLEDGE FOR
GLOBAL LIFESAVING SOLUTIONS

The annual reports of the Chakaria Health and Demographic Surveillance System (Chakaria HDSS) are not copyrighted and may be freely quoted as long as the source is properly indicated.

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

ISBN-978-984-551-291-6

Scientific Report No. 102

March 2008

Published by

ICDDR,B
GPO Box 128, Dhaka 1000
Mohakhali, Dhaka 1212, Bangladesh
Telephone: 8860523-32 (10 lines); Fax: (880-2)-8826050
Email: msik@icddr.org
URL: <http://www.icddr.org>

Printed by

Dynamic Printers, Dhaka

ACKNOWLEDGEMENTS

Data presented in this report were collected through the Chakaria Health and Demographic Surveillance System, one of the activities of the Chakaria Community Health Project, maintained by ICDDR,B. The analysis of data for this report was possible with DFID (Department for International Development), UK grants to ICDDR,B through Johns Hopkins University, USA, for the Research Programme Consortium on Health Systems, Economics and Financing, and through the IHP (Improved Health for the Poor), Health Nutrition and Population Research Project of the government of Bangladesh. ICDDR,B acknowledges with gratitude the commitment of DFID to its research efforts.

The project team is grateful to the villagers, authorities of the healthcare facilities and their users for their cooperation in providing invaluable information. The team is also grateful to Dr. Abdur Razzaque and Dr. Carel T. van Mels for reviewing an earlier version of the report. The untiring efforts of the team members of the Chakaria Community Health Project in maintaining the surveillance system are gratefully acknowledged.

CONTENTS

	CHAPTER 1	
INTRODUCTION		7
	CHAPTER 2	
METHODS AND MATERIALS		10
	CHAPTER 3	
POPULATION AND POPULATION CHANGES		12
	CHAPTER 4	
MORTALITY		15
	CHAPTER 5	
FERTILITY		20
	CHAPTER 6	
MIGRATION		23
	CHAPTER 7	
MARRIAGE		27
	CHAPTER 8	
HEALTH AND FAMILY PLANNING PRACTICES		28
	CHAPTER 9	
INEQUITIES IN UTILIZATION OF FACILITY-BASED HEALTH SERVICES		34
TABLES		
Table 1. Demographic and health indicators, Chakaria HDSS, 1999-2006		13
Table 2. Age-specific death rate (per 1,000 people) by sex Chakaria HDSS, 2006		15
Table 3. Abridged life table, Chakaria HDSS, 2006.....		16
Table 4. Under-5 mortality rate per 1,000 live births, Chakaria HDSS, 2006		17
Table 5. Causes of death, Chakaria HDSS, 2004-06		18
Table 6. Age-specific fertility rate per 1,000 women aged 15-49 years, Chakaria HDSS, 2006		20
Table 7. Crude birth rate per 1,000 population by asset quintile, Chakaria HDSS, 2006		21

Table 8. Pregnancy outcome, Chakaria HDSS, 2006.....	21
Table 9. Migration rate per 1,000 population by asset quintile, Chakaria HDSS, 2006.....	23
Table 10. In- and out-migration by sex and month, Chakaria HDSS, 2006.....	23
Table 11. In- and out-migration by sex and month, intervention area, Chakaria HDSS, 2006.....	24
Table 12. In- and out-migration by sex and month, comparison area, Chakaria HDSS, 2006.....	24
Table 13. Origin and destination of migrants by sex, Chakaria HDSS, 2006.....	25
Table 14. Reasons for migration, Chakaria HDSS, 2006.....	26
Table 15. Age at marriage by sex, Chakaria HDSS, 2006.....	27
Table 16. Antenatal care by type of sources and asset quintile, Chakaria HDSS, 2006.....	29
Table 17. Postnatal care by type of sources and asset quintile, Chakaria HDSS, 2006.....	30
Table 18. Assistance during delivery by asset quintile, Chakaria HDSS, 2006.....	31
Table 19. Place of delivery by asset quintile, Chakaria HDSS, 2006.....	32
Table 20. Proportion of caesarean-section delivery by asset quintile, Chakaria HDSS, 2006.....	32
Table 21. Use of modern family-planning methods among currently-married women aged less than 49 years by asset quintile, Chakaria HDSS,2006.....	33
Table 22. Percentage distributon of family planning methods used, Chakaria HDSS, 2006.....	33
Table 23. Sampling methods used and duration of data collection for health facility monitoring, Chakaria, 2006.....	34

FIGURES

Fig. 1. Map of Chakaria showing intervention and comparison areas.....	9
Fig. 2. Male and female population by age and sex, Chakaria HDSS, 2006.....	12
Fig. 3. Probability of survival by age and sex, Chakaria HDSS, 2006.....	17
Fig. 4. Age-specific fertility rate, Chakaria HDSS, 2006.....	20
Fig. 5. Number of births and deaths by month, Chakaria HDSS, 2006.....	22
Fig. 6. Number of births and deaths by month, intervention area, Chakaria HDSS, 2006.....	22
Fig. 7. Number of births and deaths by month, comparison area, Chakaria HDSS, 2006.....	22
Fig. 8. Marriages by month, Chakaria HDSS, 2006.....	27

Fig. 9. Proportion of users in Upazila Health Complex by asset quintile, Chakaria, March-May 2006	35
Fig. 10. Proportion of users in Union Health and Family Welfare Centre (UHFWC) by asset quintile, Chakaria, March-May 2006	35
Fig. 11. Proportion of users in private clinic by asset quintile, Chakaria, March-May 2006	36
Fig. 12. Proportion of users in Christian Memorial Hospital by asset quintile, Chakaria, March-May 2006	36

REFERENCES	37
-------------------------	-----------

ADDITIONAL READINGS.....	38
---------------------------------	-----------

Appendix A: Midyear population by age and sex in the intervention and comparison areas, Chakaria, HDSS, 2006.....	40
Appendix B: Percentage distribution of midyear population by age and sex in the intervention and comparison areas, Chakaria HDSS, 2006.....	40
Appendix C: Number of births by age of mother, Chakaria HDSS, 2006	41
Appendix D: Number of deaths by age and sex, Chakaria HDSS, 2006	41
Appendix E: Causes of death by age and sex, Chakaria HDSS, 2006	42
Appendix F: Number of migrants by age and sex, Chakaria HDSS, 2006	43
Appendix G: Migration rate per 1,000 population by age and sex, Chakaria HDSS, 2006	44
Appendix H: Number of migrants by origin or destination, Chakaria HDSS, 2006	45
Appendix I: Number of in-migrants by reasons for migration, Chakaria HDSS, 2006	46
Appendix J: Number of out-migrants by reasons for migration, Chakaria HDSS, 2006.....	47
Appendix K: Percentage of population by age and marital status, Chakaria HDSS, 2006	48
Appendix L: Percentage of population by age and marital status, intervention area, Chakaria HDSS, 2006.....	49
Appendix M: Percentage of population by age and marital status, intervention area, Chakaria HDSS, 2006	50
Appendix N: Chakaria HDSS project team, 2006.....	51

CHAPTER I

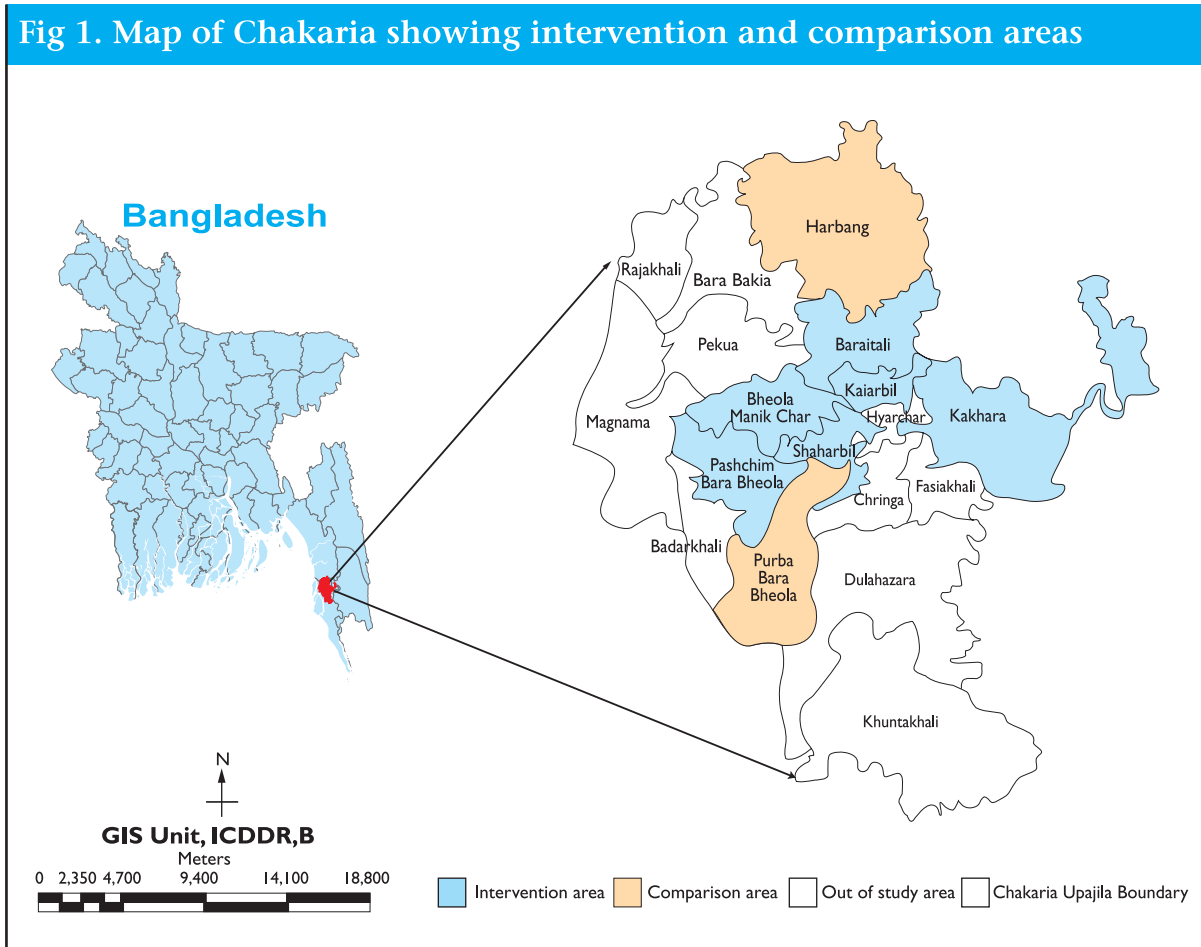
Introduction

Chakria is one of the 465 *upazilas* (sub-districts) in Bangladesh. It is located between latitudes 21°34' North 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 a population of around 410,770 in 2006. The highway from Chittagong to Cox's Bazar passes through Chakria. The east side of Chakria is hilly, while on the west side towards the Bay of Bengal is lowland. A map showing the location of Chakria is presented in Figure 1.

ICDDR,B started its activities in Chakria 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 Chakria Health and Demographic Surveillance System (Chakria 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 programs, and further research. This report presents data collected through the Chakria HDSS during 2006.

Existing health services in the intervention and comparison areas, Chakaria Health and Demographic Surveillance System, 2006			
Intervention area (Six unions with 117,999 population)		Comparison area (Two unions with 38,199 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	158	EPI centre	38
Rural dispensary	0	Rural dispensary	1
Family welfare visitor (FWV)	5	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)	3	Family welfare assistant (skilled birth attendant)	1
Private		Private	
Village doctor (allopathic)	159	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	3	NGO	3
Health and development activities		Health and development activities	

Fig 1. Map of Chakaria showing intervention and comparison areas



Methods and materials

The Chakaria HDSS covered 8 unions, 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 does not live in the household at least once a month continuously for at least six months. A person is considered to have migrated in if s/he was not previously included in the list of household members and has lived in the household at least once a month for the last 6 months.

Although the 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. 24 field-trained workers collected data during 2006. The data collectors were 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.

The report derived the socioeconomic status of households following the asset quintile approach. A list of assets included almirah, table/chair, mosquito bed-net, watch/clock, van/rickshaw, *choki/khat*, radio, television, and telephone. The principal component analytical technique was used for calculating weights of the assets to derive household asset index scores. The major demographic indicators and safe motherhood related practices have been tabulated for the various asset quintiles.

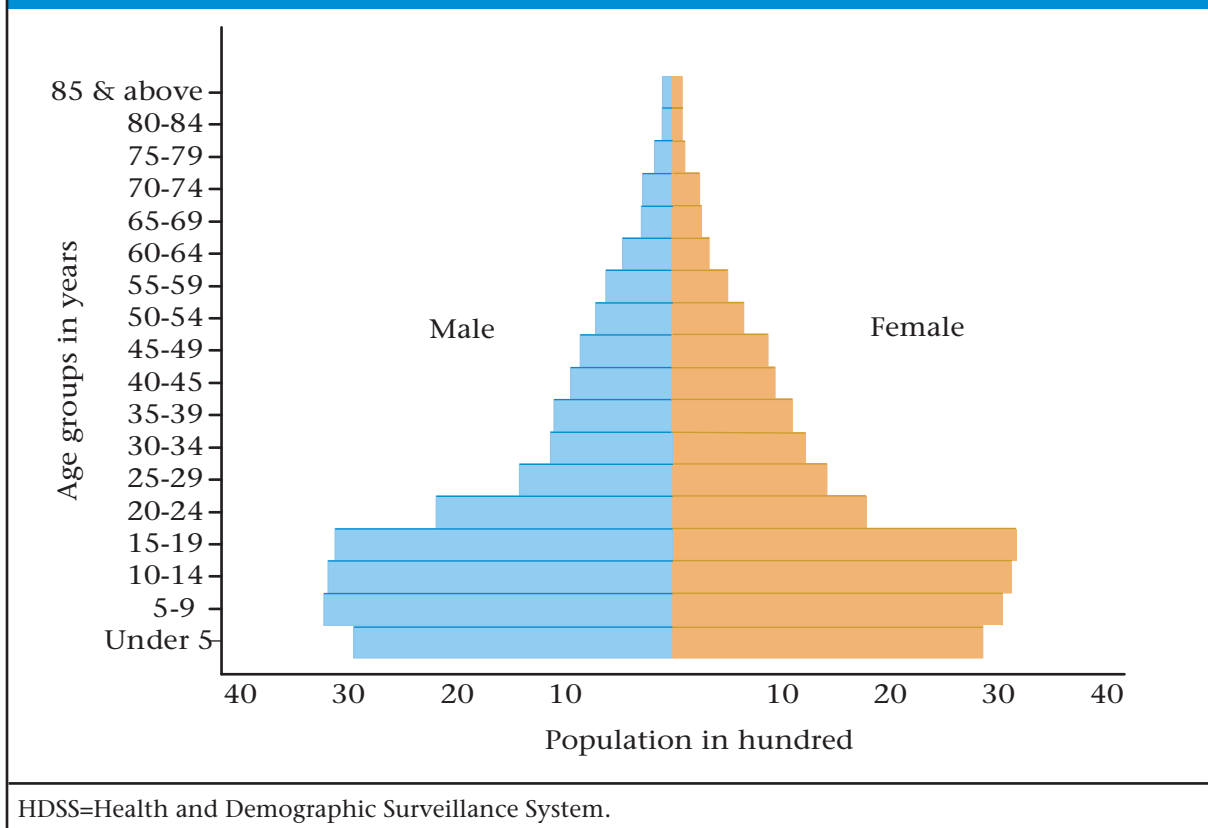
Benefit Incident Analysis was used to examine the inequities in the utilization of facility based services. Details of this method are described in chapter 9.

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.

Population and population changes

The population pyramid based on the sample households is presented in Figure 2. The shape of the pyramid indicates a population that is growing rapidly. Each cohort is smaller than the younger cohort with the exception of the 0-5 year age cohort. The smaller size of the 0-5 year cohort compared to the 5-9 year cohort indicates a fall in fertility in the recent past. The age-sex composition is similar for all age-groups excepting the 20-24 years age group (55% male vs 45% female). One of the possible causes of the low proportion of females in the 20-24 year age group is the outmigration of women of this age group from Chakaria.

Fig. 2. Male and female population by age and sex, Chakaria HDSS, 2006



The major demographic and health indicators in the intervention and comparison areas during 1999, and 2004-2006 are presented in Table 1. A declining trend in the mortality and fertility indicators and a natural rate of increase has been observed during 1999-2006. All the rates in Chakaria HDSS area are much higher than those in the Matlab HDSS area, another

rural field site of ICDDR,B (4). In 2006, the rate of natural increase and the annual growth rate in the surveillance area was 2.0% and 1.6% respectively (Table 1).

5.4% of births in Chakaria were delivered at facilities (Hospital or Clinic) in 2006. The percentage of births at facilities remained similar over the last three years. 15.3% of the births were attended by Skilled Birth Attendant (SBA). There has been an increase in deliveries by SBAs from 10.3% in 2005 to 15.3% in 2006 (Table 1).

The legal age of marriage is 18 years for female and 21 years for male in Bangladesh. In 2006, 49.8% of the women married before reaching their 18th birth day. The percentage of underage female marriage remained similar during 2004 to 2006. 27.9% of the males were married before the age of 21 years in 2006. The proportion of male marriages before 21 years has shown an increasing trend during 2004-2006 (Table 1).

Table 1. Demographic and health indicators, Chakaria HDSS, 1999-2006

Rates per 1,000	Chakaria HDSS area				Matlab HDSS area 2005
	1999	2004	2005	2006	
Crude birth rate					
Intervention area	33.8	30.6	29.8	25.8	23.2
Comparison area	33.9	28.8	27.4	25.3	23.1
Both areas	33.9	29.7	28.7	25.6	23.2
Total fertility rate*					
Intervention area	5.1	4.6	4.4	3.5	2.7
Comparison area	4.9	4.4	4.0	3.3	2.8
Both areas	5.1	4.5	4.2	3.4	2.8
Contraceptive-use rate					
Intervention area	24.8	-	36.0	40.0	71.4
Comparison area	24.2	-	37.5	43.0	47.4
Both areas	24.7	-	36.7	41.4	-
Infant mortality rate**					
Intervention area	61.2	40.3	39.3	51.4	36.0
Comparison area	69.7	60.5	61.0	57.7	45.0
Both areas	63.2	49.3	48.9	54.2	40.5
Child mortality rate (1-4 years)					
Intervention area	9.0	8.1	7.5	6.2	2.4
Comparison area	10.6	5.5	5.3	2.4	4.0
Both areas	9.4	6.9	6.5	4.5	3.2

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

Rates per 1,000	Chakaria HDSS Area				Matlab HDSS area 2005
	1999	2004	2005	2006	
Crude death rate					
Intervention area	6.7	5.9	5.8	5.4	6.9
Comparison area	7.9	7.0	6.5	5.7	7.0
Both areas	7.0	6.3	6.1	5.6	6.9
Rate of natural increase					
Intervention area	27.1	24.7	24.0	20.4	16.3
Comparison area	26.0	21.8	20.8	19.6	16.1
Both areas	26.9	23.4	22.5	20.0	16.2
In-migration rate					
Intervention area	-	17.1	24.5	29.7	-
Comparison area	-	16.6	23.7	30.0	-
Both areas	-	16.9	24.1	29.9	35.7
Out-migration rate					
Intervention area	-	22.2	23.8	33.8	-
Comparison area	-	19.5	25.9	34.3	-
Both areas	-	21.0	24.8	34.0	53.3
Growth rate (%)					
Intervention area	-	2.0	2.5	1.6	-
Comparison area	-	1.9	2.0	1.5	-
Both areas	-	1.9	2.1	1.6	-0.1
Facility-based delivery (%)					
Intervention area	-	6.8	6.4	6.2	-
Comparison area	-	4.4	3.8	4.5	-
Both areas	-	5.4	4.9	5.4	-
Received assistance from SBA during delivery (%)					
Intervention area	-	14.3	9.2	16.5	-
Comparison area	-	14.8	11.6	13.8	-
Both areas	-	14.5	10.3	15.3	-
Male marriage at ages under 21 years (%)					
Intervention area	-	23.4	25.6	26.3	-
Comparison area	-	23.3	23.8	29.7	-
Both areas	-	23.3	24.7	27.9	-
Female marriage at ages under 18 years (%)					
Intervention area	-	51.4	43.1	51.2	-
Comparison area	-	56.6	52.0	48.4	-
Both areas	-	53.6	47.3	49.8	-

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 5.6 per 1,000 population in 2006. The rate was slightly higher in the comparison area than in the intervention area. Infant mortality rate for all the villages in the intervention and comparison areas was 54.2 per 1,000 live births with a lower rate in the intervention area than in the comparison area. Child mortality rate was 4.5 per 1,000 children aged 1-4 years. 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 69.4 years for males and 71.0 years for females. The rate of mortality of children aged less than 5 years (under-five mortality) was 72.6 per 1,000 live births in Chakaria in 2006 (Table 4). Figure 3 shows the probability of survival by sex during the whole life span.

Table 2. Age-specific death rate (per 1,000 population) by sex, Chakaria HDSS, 2006

Age (years)	Intervention area			Comparison area			Both areas		
	Male	Female	Both	Male	Female	Both	Male	Female	Both
<1*	46.0	57.2	51.4	63.8	50.4	57.7	54.3	54.2	54.2
1-4	10.1	2.3	6.2	1.8	3.0	2.4	6.3	2.6	4.5
5-9	1.7	1.2	1.5	2.1	0.7	1.4	1.9	1.0	1.4
10-14	0.0	0.0	0.0	0.0	1.4	0.7	0.0	0.6	0.3
15-19	0.6	0.0	0.3	2.1	0.7	1.4	1.3	0.3	0.8
20-24	0.0	0.0	0.0	1.0	0.0	0.5	0.5	0.0	0.3
25-29	1.3	1.3	1.3	0.0	3.2	1.6	0.7	2.1	1.4
30-34	1.6	0.0	0.8	2.0	1.8	1.9	1.8	0.8	1.3
35-39	1.6	1.7	1.7	4.1	0.0	2.0	2.7	0.9	1.8
40-44	3.8	0.0	2.0	2.3	2.2	2.2	3.2	1.1	2.1
45-49	0.0	2.3	1.1	2.3	4.7	3.5	1.2	3.5	2.3
50-54	10.8	6.1	8.6	8.6	3.1	6.0	9.7	4.6	7.3
55-59	6.2	11.5	8.5	33.9	0.0	18.8	19.4	6.0	13.4
60-64	12.3	28.7	19.2	22.4	13.2	18.7	17.2	21.5	18.9
65-69	24.8	34.7	29.5	7.4	16.9	11.9	16.9	26.7	21.5
70-74	32.9	41.0	36.5	45.1	50.8	47.8	38.6	45.8	41.9
75-79	68.6	80.6	73.2	69.4	19.2	48.4	69.0	52.6	62.5
80-84	105.3	41.7	76.2	43.5	184.2	107.1	77.7	104.7	89.9
85+	86.2	150.0	112.2	102.6	125.0	114.9	92.8	136.4	113.5
All	5.9	4.9	5.4	6.5	5.0	5.7	6.2	5.0	5.6

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

Table 3. Abridged Life Table, Chakaria HDSS, 2006

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	0.0543	0.0543	100,000	95,658	69.4	0.0542	0.0542	100,000	95,664	71.0
1	0.0063	0.0250	94,572	373,841	72.4	0.0026	0.0105	94,579	376,458	74.0
5	0.0020	0.0097	92,208	458,969	70.2	0.0010	0.0049	93,589	466,884	70.8
10	0.0000	0.0000	91,310	456,548	65.8	0.0006	0.0032	93,129	464,960	66.1
15	0.0013	0.0064	91,310	455,203	60.8	0.0003	0.0016	92,832	463,810	61.3
20	0.0005	0.0023	90,726	453,156	56.2	0.0000	0.0000	92,681	463,403	56.4
25	0.0007	0.0035	90,520	451,866	51.3	0.0021	0.0105	92,680	461,160	51.4
30	0.0018	0.0088	90,202	449,184	46.5	0.0008	0.0041	91,708	457,682	46.9
35	0.0027	0.0135	89,410	444,263	41.9	0.0009	0.0046	91,335	455,710	42.1
40	0.0032	0.0157	88,202	437,822	37.4	0.0011	0.0053	90,916	453,466	37.3
45	0.0012	0.0058	86,821	432,947	33.0	0.0035	0.0172	90,433	448,571	32.5
50	0.0097	0.0477	86,319	422,037	28.2	0.0046	0.0228	88,877	439,701	28.0
55	0.0194	0.0926	82,204	393,194	24.4	0.0060	0.0298	86,851	428,258	23.6
60	0.0172	0.0825	74,594	358,578	21.7	0.0215	0.1022	84,260	401,091	19.2
65	0.0169	0.0813	68,438	329,193	18.4	0.0267	0.1257	75,648	355,826	16.1
70	0.0386	0.1767	62,877	287,911	14.8	0.0458	0.2065	66,141	297,964	13.0
75	0.0690	0.2951	51,765	221,469	12.4	0.0526	0.2335	52,485	232,865	10.8
80	0.0777	0.3260	36,491	153,148	11.5	0.1047	0.4141	40,229	159,166	8.3
85	0.0928	1.0000	24,596	265,093	10.8	0.1364	1.0000	23,572	172,859	7.3

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.

${}_n m_x$ = Central mortality rate

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

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

l_x = Survivors to exact age x

${}_n L_x$ = Number 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

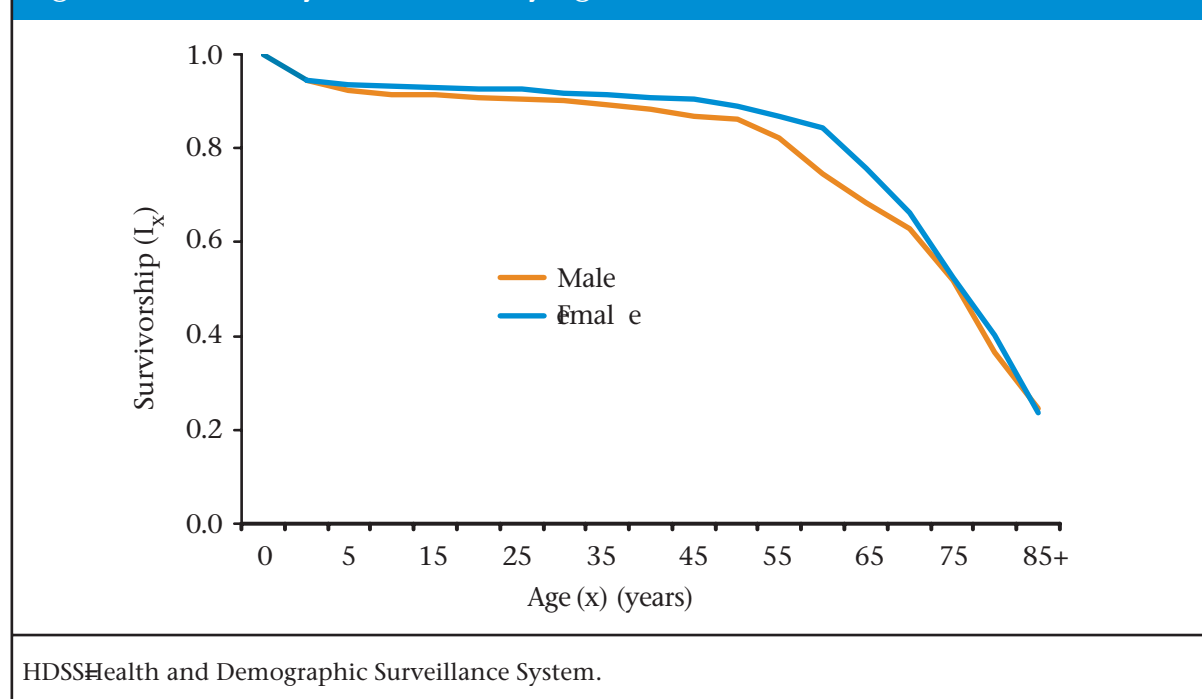
Fig. 3. Probability of survival by age and sex, Chakaria HDSS, 2006

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 twice that of children from the highest quintile.

Table 4. Under-5 mortality rate per 1,000 live births, Chakaria HDSS, 2006

Asset quintile	Number of births	Number of deaths	Under-5 mortality rate
Lowest	282	27	95.7
Second	151	15	99.3
Medium	225	11	48.9
Fourth	209	15	71.8
Highest	276	15	54.3
All	1,143	83	72.6

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 2004-2006. Stroke, senility, asthma, respiratory infection, neoplasm, various conditions during neonatal period, drowning, hepatitis, accidents, and diarrhoeal diseases were the 10 leading causes of death in Chakaria in 2006.

Table 5. Causes of death, Chakaria HDSS, 2004-06						
Rank	2004		2005		2006	
	Cause	No. of deaths	Cause	No. of deaths	Cause	No. of deaths
1	Respiratory infections	39	Stroke	29	Stroke	31
2	Senility	30	Respiratory infections	28	Senility	28
3	Asthma/Bronchitis	26	Senility	28	Asthma/Bronchitis	26
4	Neonatal (Premature and LBW, Birth asphyxia, Birth trauma, Sepsis and infection)	17	Neoplasm (Benign and Malignant)	23	Respiratory infections	26
5	Diarrheal disease	15	Asthma/Bronchitis	19	Neoplasm (Benign and Malignant)	21
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 infection)	15
7	Neoplasm (Benign and Malignant)	14	Drowning	12	Drowning	11
8	Cardiovascular other than stroke and hypertension	14	Accident	10	Hepatitis	7
9	Stroke	12	Cardiovascular other than stroke and hypertension	8	Accident	6
10	Accident	11	Nutritional	7	Diarrheal diseases	6
11	Malaria	8	Diarrheal diseases	6	Diabetes	3
12	Drowning	8	Hepatitis	6	Hypertension	3
13	Nutritional	7	Tuberculosis	4	Malaria	3

Rank	2004		2005		2006	
	Cause	No. of deaths	Cause	No. of deaths	Cause	No. of deaths
14	Homicide	7	Typhoid	4	Cardiovascular other than stroke and hypertension	3
15	Hypertension	6	Urinary	4	Urinary diseases	3
16	Diabetes	5	Rabies	3	Rabies	3
17	Urinary diseases	5	Maternal death	3	Tuberculosis	3
18	Typhoid	2	Diabetes	3	Burn	2
19	Digestive disease	2	Hypertension	3	Digestive diseases	2
20	Maternal death	1	Homicide	3	Nutritional diseases	2
21	Suicide	1	Burn	2	Congenital anomalies	1
22	Unknown	36	Malaria	1	Leprosy	1
23			Congenital anomalies	1	Tetanus	1
24			Digestive disease	1	Unknown	42
25			Suicide	1		
26			Snake bite	1		
27			Epilepsy	1		
			Unknown	46		
Total		280		271		249
HDSS=Health and Demographic Surveillance System.						

CHAPTER 5

Fertility

The crude birth rate in 2006 was 25.6 per 1,000 population, which was lower than the rates for the previous years (Table 1). Total fertility rates per woman also showed a downward trend during 1999-2006 with a value of 3.4 in 2006 (Table 1). The fertility rate was highest among women of age-group of 20-30 years (Fig. 4 and Table 6).

Table 6. Age-specific fertility rate per 1,000 women aged 15-49 years, Chakaria HDSS, 2006

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	1,670	156	93.4	1,499	141	94.1	3,169	297	93.7
20-24	963	181	188.0	826	163	197.3	1,789	344	192.3
25-29	790	129	163.3	633	111	175.4	1,423	240	168.7
30-34	666	92	138.1	561	59	105.2	1,227	151	123.1
35-39	593	51	86.0	505	35	69.3	1,098	86	78.3
40-44	480	12	25.0	459	10	21.8	939	22	23.4
45-49	438	2	4.6	427	1	2.3	865	3	3.5
Total	5,600	623		4,910	520		10,510	1,143	
TFR	3,492			3,327			3,415		

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

Fig. 4. Age-specific fertility rate, Chakaria HDSS, 2006

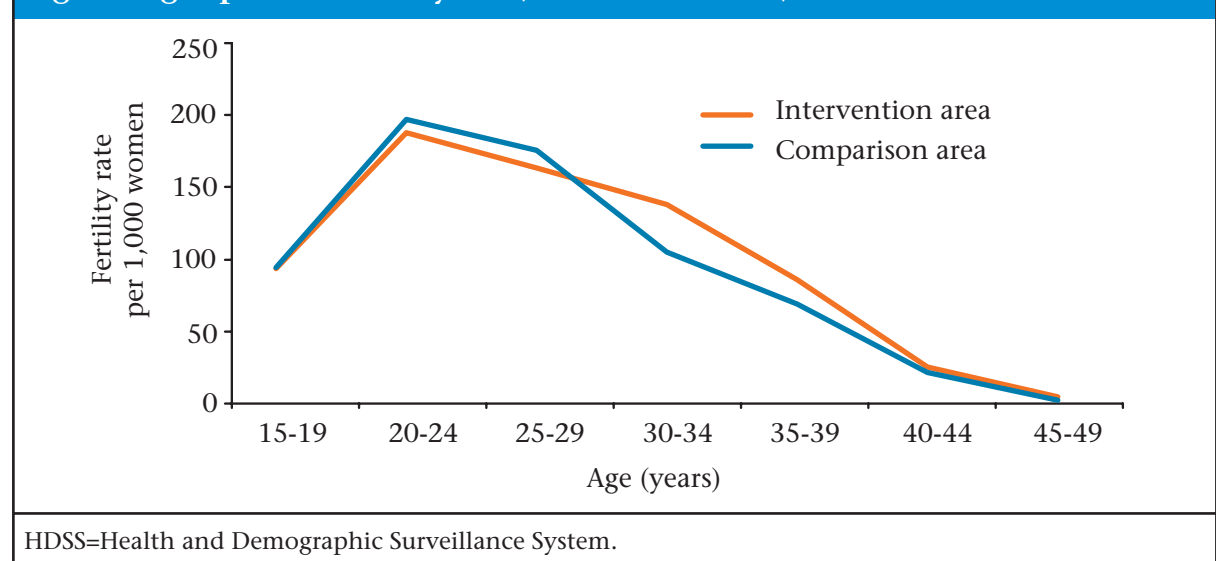


Table 7. Crude birth rate per 1,000 population by asset quintile, Chakaria HDSS, 2006			
Asset quintile	Midyear population	Number of births	Birthrate
Lowest	9,380	282	30.1
Second	6,937	151	21.8
Medium	9,051	225	24.9
Fourth	9,167	209	22.8
Highest	10,180	276	27.1
All	44,715	1,143	25.6
HDSS=Health and Demographic Surveillance System.			

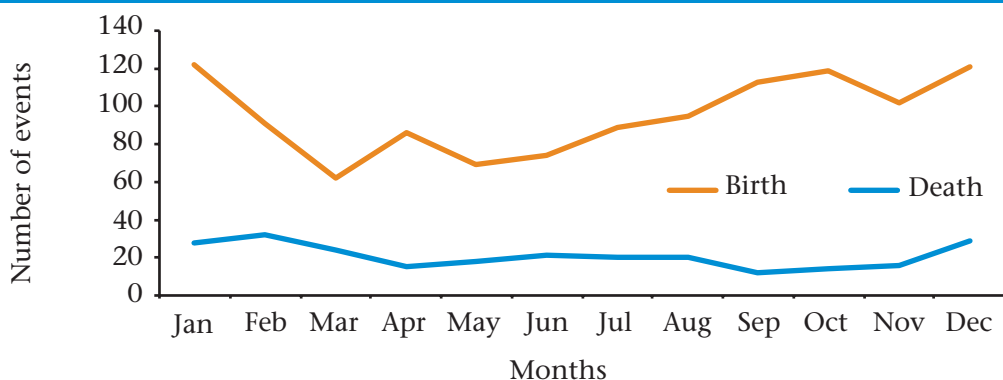
Table 7 presents the crude birth rates by household asset quintile. The crude birth rate showed a 'U' shaped relationship with household socioeconomic status measured by asset quintiles.

Of the pregnancies in Chakaria in 2006, 8.2% of 1,292 were terminated prematurely and spontaneously, 1.9% were terminated through induction, and 2.2% resulted in stillbirths (Table 8).

Table 8. Pregnancy outcome, Chakaria HDSS, 2006						
Pregnancy outcome	Intervention area		Comparison area		Both areas	
	No.	%	No.	%	No.	%
Spontaneous abortion	47	8.0	59	8.4	106	8.2
Induced abortion	12	2.0	12	1.7	24	1.9
Stillbirth	13	2.2	16	2.3	29	2.2
Live birth*	516	87.8	617	87.6	1,133	87.7
Total number of pregnancies	588	100.0	704	100.0	1,292	100.0
*Multiple live births included HDSS=Health and Demographic Surveillance System.						

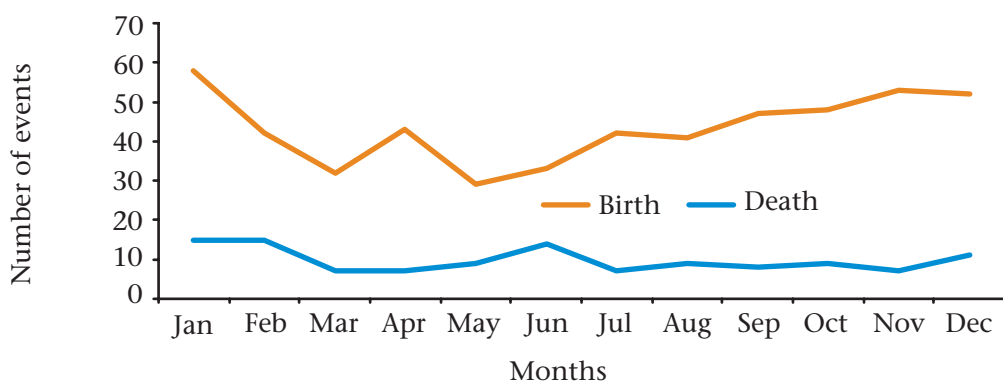
The total number of births in the area showed seasonality with 2 peaks, one during the first quarter of the year and another during the last quarter of the year. Distribution of deaths by month did not show any distinct seasonal pattern (Fig. 5). The patterns of birth and death were almost similar in the intervention and comparison areas (Fig. 6 and 7).

Fig. 5. Number of births and deaths by month, Chakaria HDSS, 2006



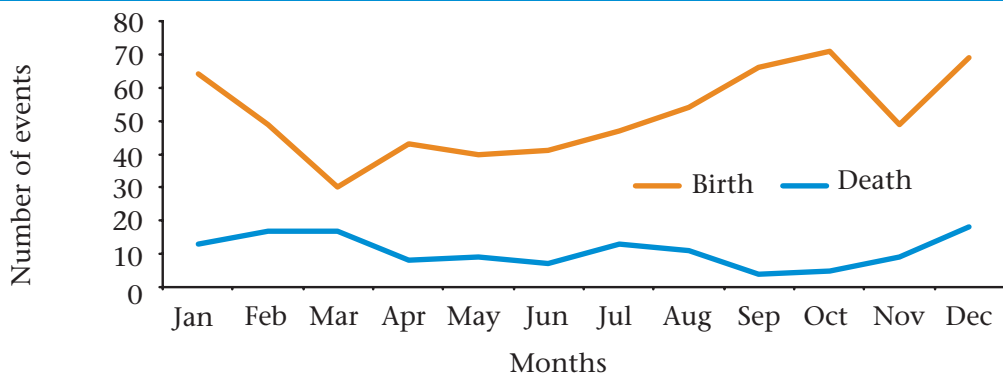
HDSS=Health and Demographic Surveillance System.

Fig. 6. Number of births and deaths by month, Intervention area, Chakaria HDSS, 2006



HDSS=Health and Demographic Surveillance System.

Fig. 7. Number of births and deaths by month, Comparison area, Chakaria HDSS, 2006



HDSS=Health and Demographic Surveillance System.

CHAPTER 6

Migration

In 2006, the rate of out-migration was higher (34.0) than that of in-migration (29.9) (Table 9). The rates were similar in 2005. Both in-migration and out-migration rates have showed an increasing trend during 2004-2006 (Table 1). 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 2006 in both the areas. The sex differential in migration was also not prominent. The rate of in-migration among the males was highest in January, and the rate was highest among females in May. The rate of out-migration was highest in January for both males and females.

Table 9. Migration rate per 1,000 population by asset quintile, Chakaria HDSS, 2006

Asset quintile	Midyear population	In-migration rate	Out-migration rate
Lowest	9,380	18.9	25.1
Second	6,937	18.6	28.3
Medium	9,051	24.4	26.1
Fourth	9,167	31.6	33.8
Highest	10,180	50.9	53.8
All	44,715	29.9	34.0

HDSS=Health and Demographic Surveillance System.

Table 10. In-and out-migration by sex and month, Chakaria HDSS, 2006

Month	In-migration			Out-migration		
	Male	Female	Both	Male	Female	Both
January	80	83	163	85	117	202
February	54	65	119	48	66	114
March	56	61	117	55	86	141
April	40	73	113	57	83	140
May	64	104	168	64	99	163
June	46	83	129	38	73	111
July	47	67	114	40	65	105
August	45	60	105	40	58	98
September	37	50	87	55	57	112
October	27	25	52	63	46	109
November	29	47	76	36	56	92
December	38	54	92	64	73	137
All	563	772	1,335	645	879	1,524

HDSS=Health and Demographic Surveillance System.

Table 11. In-and out-migration by sex and month, intervention area, Chakaria HDSS, 2006

Month	In-migration			Out-migration		
	Male	Female	Both	Male	Female	Both
January	45	43	88	46	56	102
February	32	42	74	27	37	64
March	29	32	61	25	37	62
April	27	39	66	26	39	65
May	32	51	83	39	48	87
June	34	49	83	19	32	51
July	21	31	52	20	30	50
August	19	30	49	20	28	48
September	20	28	48	35	35	70
October	9	14	23	44	31	75
November	15	24	39	22	28	50
December	24	27	51	46	47	93
All	307	410	717	369	448	817

HDSS=Health and Demographic Surveillance System.

Table 12. In-and out-migration by sex and month, comparison area, Chakaria HDSS, 2006

Month	In-migration			Out-migration		
	Male	Female	Both	Male	Female	Both
January	35	40	75	39	61	100
February	22	23	45	21	29	50
March	27	29	56	30	49	79
April	13	34	47	31	44	75
May	32	53	85	25	51	76
June	12	34	46	19	41	60
July	26	36	62	20	35	55
August	26	30	56	20	30	50
September	17	22	39	20	22	42
October	18	11	29	19	15	34
November	14	23	37	14	28	42
December	14	27	41	18	26	44
All	256	362	618	276	431	707

HDSS=Health and Demographic Surveillance System.

Origin and destination of migrants

During 2006, 6% of 1,306 in-migrants moved into Chakaria HDSS households from outside of Bangladesh whereas 9% of 1,497 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, 2006						
Origin or destination	In-migration			Out-migration		
	Male	Female	Both	Male	Female	Both
Inside Bangladesh	87.8	99.3	94.5	79.7	99.1	91.0
Outside Bangladesh	12.2	0.7	5.5	20.3	0.9	9.0
Total	100.0	100.0	100.0	100.0	100.0	100.0
Total number of migrants	549	757	1,306	627	870	1,497
Inside Chakaria	66.6	73.0	70.5	64.0	71.3	68.6
Outside Chakaria	33.4	27.0	29.5	36.0	28.7	31.4
Total	100.0	100.0	100.0	100.0	100.0	100.0
Total number of migrants	482	752	1,234	500	862	1,362
Inside HDSS area	85.9	80.3	82.4	84.1	82.3	82.9
Outside HDSS area	14.1	19.7	17.6	15.9	17.7	17.1
Total	100.0	100.0	100.0	100.0	100.0	100.0
Total number of migrants	320	549	869	320	615	935
HDSS=Health and Demographic Surveillance System.						

Reasons for migration

Table 14 presents the reasons of migration by sex. 44.4% of the migrants moved due to family-related issues - mostly marriage, followed by work (25.4%), housing (19.2%), and education (11.0%). Reasons for moving for males were different from those of females. 51.6% of male in-migrants moved due to work related issues whereas only 7.4% of the females moved due to that reason. On the other hand, 65.8% of female in-migrants moved due to family related issues - mostly marriage, while only 21.4% of males moved due to family related reasons (Table 14). The reasons of movement for out-migration were similar to the reasons for in-migration.

Table 14. Reasons for migration, Chakaria HDSS, 2006

Reasons for migration	In-migration			Out-migration		
	Male	Female	Both	Male	Female	Both
Family-related	21.4	65.8	47.3	17.7	67.5	44.4
Work-related	51.6	7.4	25.8	41.8	11.3	25.4
Housing-related	21.8	22.1	22.0	19.2	19.2	19.2
Education	5.2	4.7	4.9	21.3	2.0	11.0
Total	100.0	100.0	100.0	100.0	100.0	100.0
Total number of migrants	426	597	1,023	684	791	1,475

HDSS=Health and Demographic Surveillance System.

CHAPTER 7

Marriage

In total, 831 marriages took place in the surveillance households in Chakaria during 2006. The highest number of marriages took place in May and the lowest in October. The number of marriages showed a downward trend from January to October (Fig. 8).

The singulate mean age at marriage (SMAM) was 27 years for males and 21 years for females. The SMAM remained same as of 2005 for both males and females. The median ages at first marriage was 24 for males and 18 years for females (Table 15).

Table 15 presents singulate and median ages at marriage in 2006. Both the indicators were positively associated with household socioeconomic status.

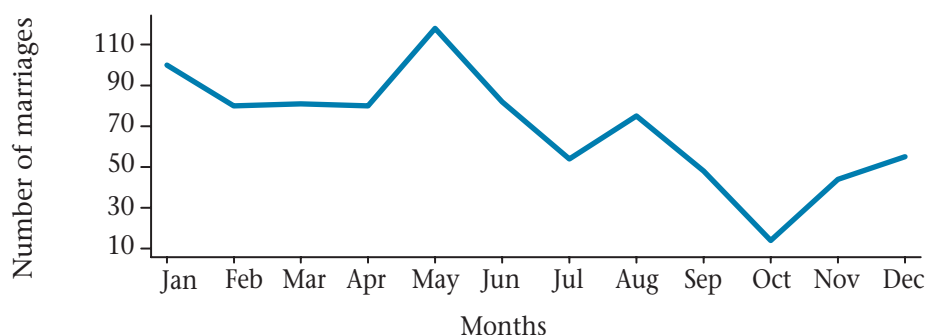
Table 15. Age at marriage by sex, Chakaria HDSS, 2006

Asset quintile	Male		Female	
	SMAM*	Median age at first marriage*	SMAM*	Median age at first marriage
Lowest	24.5	22.9	19.8	17.9
Second	26.6	23.2	20.8	18.1
Medium	27.0	23.4	20.7	18.1
Fourth	27.6	23.5	20.6	18.0
Highest	29.3	27.9	21.9	18.2
All	27.2	23.5	20.8	18.1

HDSS=Health and Demographic Surveillance System.
SMAM= Singulate mean age at marriage

* The SMAM and median age at marriage are calculated 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. Marriages by month, Chakaria HDSS, 2006



HDSS=Health and Demographic Surveillance System.

Health and family planning 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.

At present, the Upazila Health Complex of the government and two private hospitals provide healthcare services at the sub-district headquarters level in Chakaria. At the union level, 7 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.

8.1 Safe motherhood practices

8.1.1 Use of antenatal care services

During 2006, 54.0% of 1,143 pregnant women in Chakaria received at least one antenatal check-up (ANC). The percentage of women receiving ANC was higher in the intervention area (56.3%) than in the comparison area (51.2%). The women in the intervention area received services from various sources. Among these sources, the trained midwives have been consulted by most in the intervention area, followed by the nurses/doctors and the Family Welfare Visitors (FWVs). On the other hand, the dominant source of services in the comparison area was the nurses/doctors, followed by the FWVs (Table 18).

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

Table 16. Antenatal care by type of sources and asset quintile, Chakaria HDSS, 2006								
Area	Asset quintile	Received any ANC (%)	Midwife* (%)	FWV* (%)	Nurse/doctor* (%)	FDSR* (%)	None (%)	No. of women
Intervention area	Lowest	48.2	33.8	13.6	7.8	3.9	51.8	164
	Second	47.5	31.9	16.7	13.9	2.8	52.5	80
	Middle	51.7	39.4	12.8	11.0	4.6	48.3	120
	Fourth	60.6	33.3	16.7	25.0	4.2	39.4	104
	Highest	70.3	39.8	18.0	49.6	1.5	29.7	155
	Total	56.3	36.0	15.4	22.0	3.4	43.7	623
Comparison area	Lowest	31.4	12.2	11.3	10.4	3.5	68.6	118
	Second	38.0	10.4	25.4	10.4	4.5	62.0	71
	Middle	48.6	11.8	19.6	18.6	5.9	51.4	105
	Fourth	63.8	18.4	30.6	28.6	11.2	36.2	105
	Highest	69.4	15.2	11.4	60.0	3.8	30.6	121
	Total	51.2	13.8	18.9	26.5	5.7	48.9	520
Both areas	Lowest	41.1	24.5	12.6	8.9	3.7	58.9	282
	Second	43.1	21.6	20.9	12.2	3.6	57.0	151
	Middle	50.2	26.1	16.1	14.7	5.2	49.8	225
	Fourth	62.2	25.8	23.7	26.8	7.7	37.8	209
	Highest	69.9	29.0	15.1	54.2	2.5	30.1	276
	Total	54.0	25.7	17.0	24.1	4.5	46.0	1,143
*Multiple responses recorded ANC=Antenatal care FWV=Family welfare visitor FDSR= Family Development Services and Research HDSS=Health and Demographic Surveillance System								

8.1.2 Use of postnatal care services

It was observed that only 30.2% of the pregnant women received post-natal care (PNC) in Chakaria. This percentage was similar in the intervention area (30.8%) and the comparison area (29.4%). The nurses and doctors 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, 2006

Area	Asset quintile	Received any PNC (%)	Midwife* (%)	FWV* (%)	Nurse/doctor* (%)	FDSR* (%)	None (%)	No. of women
Intervention area	Lowest	26.2	9.1	1.3	18.8	0.6	73.8	164
	Second	25.0	8.5	1.4	19.7	1.4	75.0	80
	Middle	24.2	15.6	0.0	13.8	0.0	75.8	120
	Fourth	23.1	3.2	1.1	22.1	0.0	76.9	104
	Highest	49.0	14.5	3.1	42.0	0.0	51.0	155
	Total	30.8	10.5	1.4	23.9	0.4	69.2	623
Comparison area	Lowest	17.8	4.3	0.9	14.8	0.0	82.2	118
	Second	25.4	2.9	0.0	25.0	0.0	74.7	71
	Middle	32.4	5.9	1.0	27.5	0.0	67.6	105
	Fourth	28.6	8.2	1.0	22.7	0.0	71.4	105
	Highest	41.3	7.6	1.9	40.0	0.0	58.7	121
	Total	29.4	6.0	1.0	25.9	0.0	70.6	520
Both areas	Lowest	22.7	7.1	1.1	17.1	0.4	77.3	282
	Second	25.2	5.8	0.7	22.3	0.7	74.8	151
	Middle	28.0	10.9	0.5	20.4	0.0	72.0	225
	Fourth	25.8	5.7	1.0	22.4	0.0	74.2	209
	Highest	45.7	11.4	2.5	41.1	0.0	54.4	276
	Total	30.2	8.4	1.2	24.8	0.2	69.8	1,143

*Multiple responses recorded
PNC=Postnatal care
FWV=Family welfare visitor
FDSR= Family Development Services and Research
HDSS=Health and Demographic Surveillance System.

8.1.3 Assistance during delivery

In Chakaria, the traditional birth attendants (TBAs) were more popular than the skilled birth attendants (SBAs) for assisting deliveries. Eighty five percent of 1,143 deliveries in Chakaria were assisted by the TBAs as opposed to 15% 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 (86.2%) than the intervention area (83.5%) (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 higher in the intervention area compared to the comparison area (10.3% vs. 5.0%) (Table 18). At the same time, the

overall use of SBAs that comprised nurses, doctors, FWVs, and midwives was similar in both intervention (16.5%) and comparison (14.8%) areas (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, 2006						
Area	Asset quintile	Midwife (%)	FWV (%)	Nurse/doctor (%)	TBA (%)	No. of women
Intervention area	Lowest	10.4	0.6	0.6	88.4	164
	Second	7.5	0.0	5.0	87.5	80
	Middle	10.8	0.8	0.8	87.5	120
	Fourth	6.7	0.0	4.8	88.5	104
	Highest	13.6	0.7	16.1	69.7	155
	Total	10.3	0.5	5.8	83.5	623
Comparison area	Lowest	3.4	0.0	0.9	95.8	118
	Second	2.8	0.0	2.8	94.4	71
	Middle	5.7	1.0	6.7	86.7	105
	Fourth	7.6	0.0	8.6	83.8	105
	Highest	5.0	0.8	20.7	73.6	121
	Total	5.0	0.4	8.5	86.2	520
Both areas	Lowest	7.5	0.4	0.7	91.5	282
	Second	5.3	0.0	4.0	90.7	151
	Middle	8.4	0.9	3.6	87.1	225
	Fourth	7.2	0.0	6.7	86.1	209
	Highest	9.8	0.7	18.1	71.4	276
	Total	7.9	0.4	7.0	84.7	1,143
FWV=Family welfare visitor HDSS=Health and Demographic Surveillance System.						

8.1.4 Place of delivery

The deliveries were mostly (94.6%) home-based. Only 5.4% of 1,143 deliveries were either at hospitals or at clinics. The percentage of deliveries taking place at the hospitals was slightly higher in the intervention area (6.2%) compared to the comparison area (4.5%) (Table 19). The women from the households in the highest asset quintiles had a much higher rate of facility based delivery than those from the lowest quintiles.

Table 19. Place of delivery by asset quintile, Chakaria HDSS, 2006

Area	Asset quintile	Hospital/Clinic (%)	Home (%)	No. of women (%)
Intervention area	Lowest	0.0	100.0	164
	Second	6.1	93.9	80
	Middle	0.0	100.0	120
	Fourth	6.7	93.3	104
	Highest	16.2	83.8	155
	Total	6.2	93.8	623
Comparison area	Lowest	0.0	100.0	118
	Second	4.9	95.1	71
	Middle	2.7	97.3	105
	Fourth	4.8	95.2	105
	Highest	11.0	89.0	121
	Total	4.5	95.5	520
Both areas	Lowest	0.0	100.0	282
	Second	5.6	94.4	151
	Middle	1.5	98.5	225
	Fourth	5.7	94.3	209
	Highest	14.0	86.1	276
	Total	5.4	94.6	1,143

HDSS=Health and Demographic Surveillance System.

The Chakaria HDSS has been collecting information on caesarean-section deliveries since September 2006. Caesarean-section delivery accounted for 4.3% of the deliveries in the Chakaria HDSS area in 2006 (Table 20). Although the number of caesarean sections was small, the number of women with caesarean sections from the highest quintiles was 11 times the number of women from the lowest quintiles.

Table 20. Proportion of caesarean-section delivery by asset quintile, Chakaria HDSS, 2006

Asset quintile	No. of caesarean-section delivery	Caesarean-section delivery (%)	Total number of deliveries
Lowest	1	1.0	96
Second	1	1.6	62
Middle	2	2.2	93
Fourth	4	4.8	84
Highest	11	10.4	106
Total	19	4.3	441

HDSS=Health and Demographic Surveillance System.

8.2 Family planning practices

Table 21 presents use of family planning methods by household socioeconomic status. It shows that socioeconomic inequities in the use of family planning was not very prominent.

Table 21. Use of modern family-planning methods among currently-married women aged less than 49 years by asset quintile, Chakaria HDSS, 2006						
Asset quintile	Intervention area		Comparison area		Both areas	
	No.*	%	No.	%	No.	%
Lowest	647	36.3	514	41.8	1,161	38.8
Second	405	41.0	351	41.0	756	41.0
Medium	512	42.4	453	41.9	965	42.2
Fourth	531	39.5	456	44.7	987	41.9
Highest	574	41.6	541	44.7	1,115	43.1
Total	2,669	40.0	2,315	43.0	4,984	41.4

HDSS=Health and Demographic Surveillance System.
*Number of currently-married women aged less than 49 years

Table 22 presents the distribution of family planning methods by the couples. Pill was the most popular, followed by injectables and sterilization. 95.7% of 2,062 couples were using female methods. In case of sterilization which was available for both male and female, a higher proportion of female sterilization was observed in Chakaria in 2006 (female 6.5% vs male 0.3%).

Table 22. Percentage distribution of family planning methods used, Chakaria HDSS, 2006			
Family planning methods	Intervention area (%)	Comparison area (%)	Both areas (%)
Pill	45.6	56.3	50.8
Injection	37.8	30.1	34.1
Female sterilization	6.8	6.3	6.5
Condom	3.7	4.2	4.0
IUD	2.9	2.3	2.6
Norplants	2.7	0.5	1.7
Male sterilization	0.5	0.3	0.3
Total	100.0	100.0	100.0
Total number of contraceptive users	1,067	995	2,062

HDSS=Health and Demographic Surveillance System.

Inequities in utilization of facility-based health services

Data on socioeconomic indicators were collected from the users at the Upazila Health Complex, Union Health and Family Welfare Centres, *ZamZam* Private Hospital, and Christian Memorial Hospital during March-May 2006. Table 23 presents information on the coverage of the survey in the various facilities.

Table 23. Sampling methods used and duration of data collection for health facility monitoring, Chakaria, 2006

Facilities	Scope	Duration of data collection	No. of clients observed
Upazila Health Complex	Covered all units	One week	2,433
Union Health and Family Welfare Centre (UHFWC)	3 UHFWCs of Chakaria HDSS area	One week	848
ZamZam Private Hospital	Covered all units	One week	1,035
Christian Memorial Hospital	Covered all units	One week	933

Data were analyzed to assess the performance of the facilities in terms of reaching the poor. The poor were identified on the basis of weighted asset scores where the weights were obtained from principal component analysis of the assets owned by the households in the community. Scores were divided into quintiles and households from the lowest quintile were considered the poorest. The asset index for a household was calculated by summing the score based on assets owned weighted by weighing factors derived from principal component analysis. The resulting index was standardized to have a mean of zero and a standard deviation of one (5;6). The households in the community were divided into quintiles based on asset scores implying that the households in the lowest quintile are the poorest and those in the highest quintiles are the richest in the community. Details of the methods can be found elsewhere (7;8).

A facility level index for the users' households was calculated from the asset data obtained from the users, using the weights associated with various assets derived from the Chakaria HDSS household data collected in 2006. The households of the users of the facilities were also divided into five groups on the basis of asset index scores using the cut off points of quintiles for the community. Proportions of users in the facilities in various asset quintiles were compared with those of the communities. If the proportion of households of the attendees in each of the five quintiles were 20%, then the populations from the various asset quintiles in the community can be thought to have equally used the facilities. Any deviation from 20% would indicate under or over use by the population from that quintile.

Fig. 9 shows the proportion of users at the outdoor services at the Chakaria Upazila Health Complex by asset quintiles. It can be seen that the proportion of users from the lowest quintile in the community exceeded 40%. The proportions in the second to highest quintiles were lower than 20%. These data imply that the users from the lowest quintile were over represented among the users of the facility compared to their proportion in the community.

Fig. 9. Proportion of users in Upazila Health Complex by asset quintile, Chakaria, March-May 2006

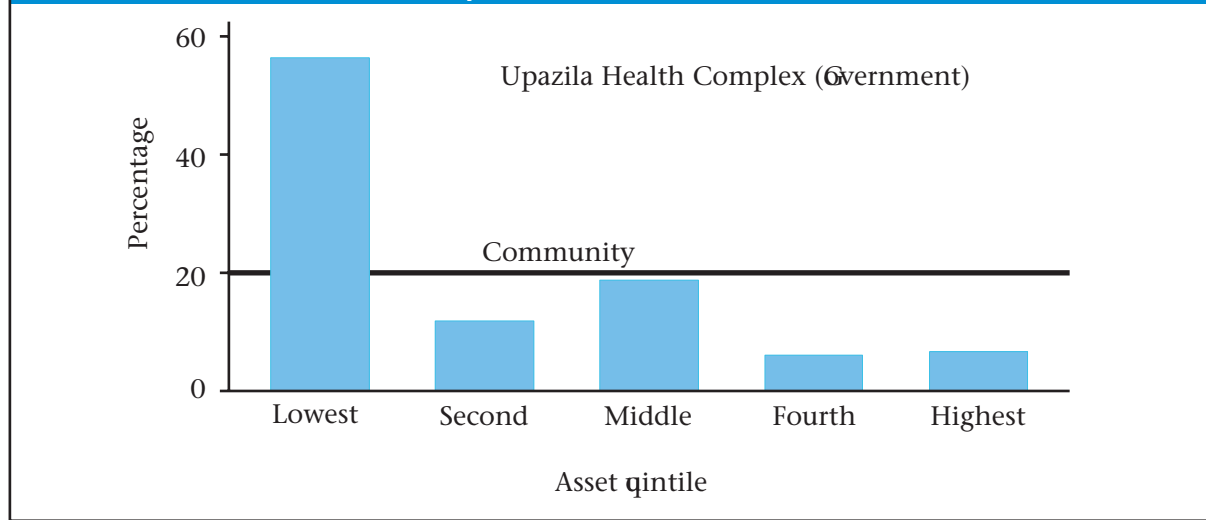


Fig. 10 presents the utilization of the UHFWCs in Chakaria HDSS area. People from the poorest and middle quintiles were over represented among the users compared to their proportions in the community.

Fig. 10. Proportion of users in UHFWCs in Chakaria HDSS area by asset quintile, Chakaria, March-May 2006

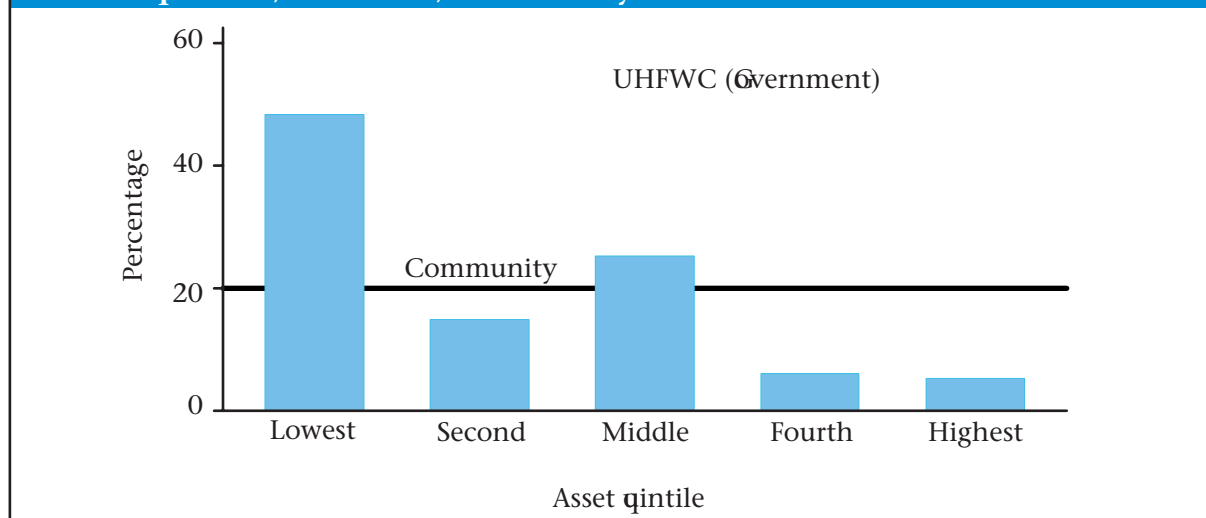


Figure 11 presents the distribution of users of a private clinic in Chakaria by asset quintile. It can be seen that the pattern is just the opposite of the public facilities. The users from the highest quintiles were over represented in the private clinic and those from the lowest three quintiles were under represented.

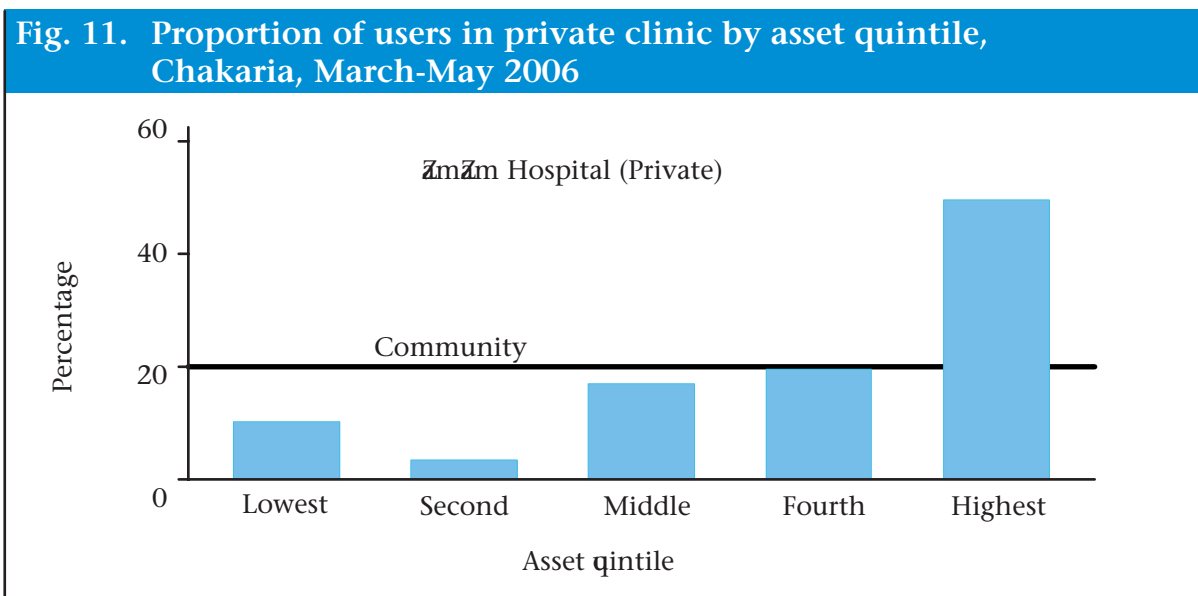
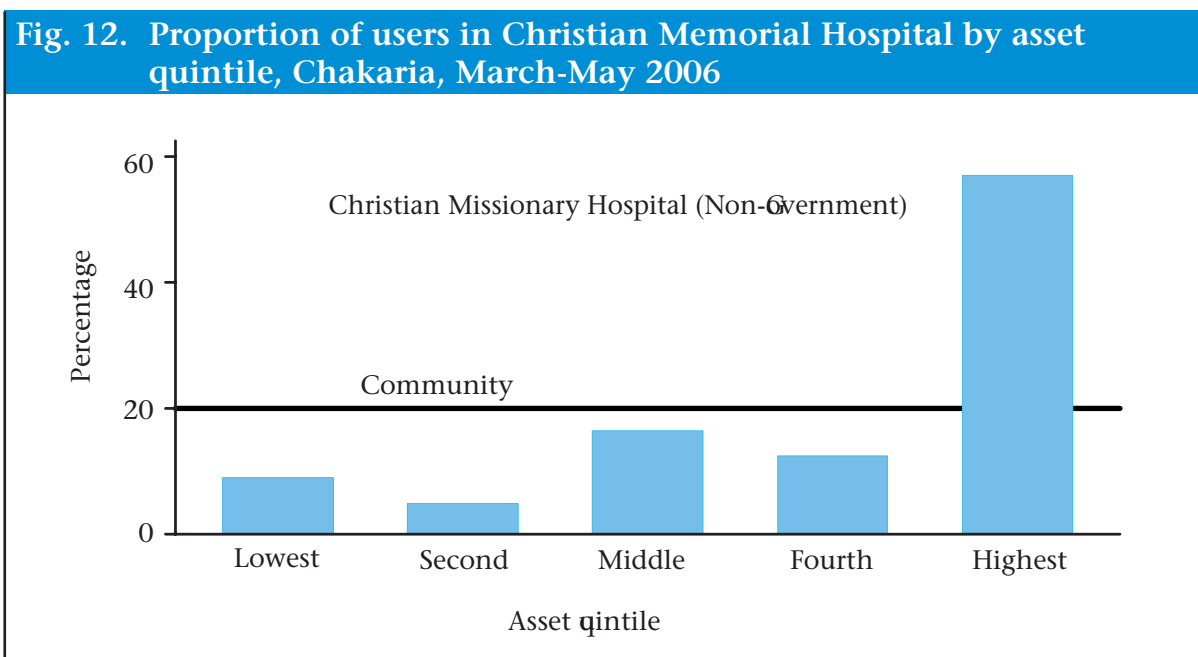


Fig.12 presents the distribution of users in a missionary hospital in Chakaria by asset quintile. The utilization pattern by people from various asset quintiles was similar to that of the private hospital.



REFERENCES

1. Bhuiya A, Ribaux C, and Eppler P. Community-led primary healthcare initiatives: Lessons learned from a project in rural Bangladesh. In J Rohde and J Wyon (eds.) *Community-Based Health Care: Lessons from Bangladesh to Boston*. Boston: Management Sciences for Health. 2002. pp 87-111.
2. Eppler P, Bhuiya A, and Hossain M. *A Process-oriented approach to the establishment of Community-based Village Health Posts*. Dhaka: International Centre for Diarrhoeal Disease Research, Bangladesh, 1996. 37 p.
3. Bhuiya A, Hanifi SMA, and Mahmood SS. *Chakaria Health and Demographic Surveillance System: focusing on the poor and vulnerable. Socioeconomic, Health and Demographic Profile, 1999-2000*. Dhaka: International Centre for Diarrhoeal Disease Research, Bangladesh, 2006. 56 p. (Scientific report no. 94).
4. International Centre for Diarrhoeal Disease Research, Bangladesh. *Health and Demographic Surveillance System-Matlab: Registration of health and demographic events 2005*. Dhaka: International Centre for Diarrhoeal Disease Research, Bangladesh, 2007. 119 p. (Scientific report no. 97).
5. Filmer D, and Pritchett L. (2001). Estimating wealth effect without expenditure data- or tears: An application to educational enrollments in states of India. *Demography*, 38, 115-132.
6. Gatkin DR., Rustein S, Johnson K, Suliman EA, and Wagstaff A. (2003). *Socio-economic differences in health, nutrition, and population*. Technical report, World Bank. Vol 1 (p. 400)
7. Hotelling H. (1933). Analysis of a complex of statistical variables into principal components. *Journal of Educational Psychology*, 24, 417-441, 498-520.
8. Bhuiya A, Hanifi SMA, Chowdhury M, Jahangir M, and Gatkin DR. Rapid methods for monitoring the utilization of healthcare facilities by the poor: Findings from a pilot project in rural Bangladesh. FHS Working paper 2, Bangladesh series, October 2007. <http://www.futurehealthsystems.org/publications/WP20220final.pdf>, 46 p.

ADDITIONAL READINGS

Bhuiya A, Aziz A, Hanifi SMA. Reproductive and sexual health problems as perceived by women and men in a rural area of Bangladesh. Dhaka: International Centre for Diarrhoeal Disease Research, Bangladesh; 1997. 24 p.

Bhuiya A, Hanifi SMA, Hossain M, Aziz A. Effects of an AIDS awareness campaign about AIDS in a remote rural area of Bangladesh. *Int Q Community Health Educ* 2000; 19(1): 51-63.

Bhuiya A, Ribaux C, Eppler P. Community-led primary healthcare initiatives: lessons learned from a project in rural Bangladesh. In: Rohde J, Wyon J, editors. *Community-based health care: Lessons from Bangladesh to Boston*. Boston: Management Sciences for Health, 2002: 87-111.

Bhuiya A, Ribaux CA. Rethinking community participation: prospects of health initiatives by indigenous self-help organizations in rural Bangladesh. Dhaka: International Centre for Diarrhoeal Disease Research Bangladesh, 1997. (Special publication no. 65). 31 p.

Bhuiya A, Sharmin T, Hanifi SMA. Nature of domestic violence against women in a rural area of Bangladesh: Implication for preventive interventions. *J Health Popul Nutr* 2003; 21(1): 48-54.

Bhuiya A, Yasmin F, Begum F, Rob U. Community participation in health, family planning and development programmes. Dhaka: International Centre for Diarrhoeal Disease Research, Bangladesh, 1997. 53 p.

Bhuiya A. Health knowledge and behaviour in five unions of Chakaria. Dhaka: International Centre for Diarrhoeal Disease Research, Bangladesh, 1996. (Special publication no. 52). 38 p.

Bhuiya A., Hanifi SMA, Mahmood SS. Chakaria Health and Demographic Surveillance System: focusing on the poor and vulnerable. Demographic profile, family-planning use, and safe motherhood practices, 2005. Dhaka: International Centre for Diarrhoeal Disease Research, Bangladesh, 2007. 50 p. (Scientific report no. 100).

Choudhury KK, Hanifi SMA, Mahmood SS, Bhuiya A. Sociodemographic Characteristics of Tobacco Consumers in a Rural Area of Bangladesh . *J Health Popul Nutr* 2007;25(4):456-64.

Bhuiya A., Mahmood SS., Rana AKMM, Ahmed SM, Chowdhury AMR. A multidimensional Approach to Measure Poverty in Rural Bangladesh. *J Health Popul Nutr* 2007;25(2):134-145.

Choudhury KK, Hanifi SMA, Rasheed S, Bhuiya A. Gender inequality and severe malnutrition among children in a remote rural area of Bangladesh. *J Health Popul Nutr* 2000;18(3):123-30.

Eppler P, Bhuiya A, Hossain M. A Process-oriented approach to the establishment of community-based village health posts. Dhaka: International Centre for Diarrhoeal Disease Research, Bangladesh, 1998. 37 p.

Hanifi SMA, Bhuiya A. Family-planning services in a low-performing rural area of Bangladesh: insights from field observations. *J Health Popl Nutr* 2001;19(3):209-14.

Hossain SMM, Bhuiya A, Khan AR, Uhaa I. Community development and its impact on health: South Asian experience. *BMJ* 2004; 328:830-3.

Hossain SMM, Bhuiya A, Rasheed S. Correlates of perceived malarial episodes and treatment-seeking behavior in a malarial-endemic rural area in Bangladesh. *Southeast Asian J Trop Med Public Health* 2001;32(4):707-19.

Jacob S. Siegel and David A. Swanson. *The Methods and Materials of Demography*, Second edition. Elsevier Academic Press, 2004. pp 196-340.

Rasheed S, Hanifi SMA, Iqbal M, NN, Bhuiya A. Policy of universal salt iodization in Bangladesh: do coastal people benefit? *J Health Popul Nutr* 2001;19(2):66-72.

APPENDIX A

Midyear population by age and sex in the intervention and comparison areas, Chakaria HDSS, 2006

Age (years)	Intervention area			Comparison area			Both areas		
	Male	Female	Both	Male	Female	Both	Male	Female	Both
<1	317	312	629	259	263	522	576	575	1,151
1-4	1,284	1,294	2,578	1,088	986	2,074	2,372	2,280	4,652
5-9	1,766	1,660	3,426	1,463	1,386	2,849	3,229	3,046	6,275
10-14	1,719	1,678	3,397	1,471	1,449	2,920	3,190	3,127	6,317
15-19	1,706	1,670	3,376	1,416	1,499	2,915	3,122	3,169	6,291
20-24	1,166	963	2,129	1,027	826	1,853	2,193	1,789	3,982
25-29	779	790	1,569	643	633	1,276	1,422	1,423	2,845
30-34	629	666	1,295	506	561	1,067	1,135	1,227	2,362
35-39	619	593	1,212	484	505	989	1,103	1,098	2,201
40-44	521	480	1,001	430	459	889	951	939	1,890
45-49	433	438	871	429	427	856	862	865	1,727
50-54	371	326	697	347	325	672	718	651	1,369
55-59	325	260	585	295	236	531	620	496	1,116
60-64	243	174	417	223	152	375	466	326	792
65-69	161	144	305	135	118	253	296	262	558
70-74	152	122	274	133	118	251	285	240	525
75-79	102	62	164	72	52	124	174	114	288
80-84	57	48	105	46	38	84	103	86	189
85+	58	40	98	39	48	87	97	88	185
All	12,408	11,720	24,128	10,506	10,081	20,587	22,914	21,801	44,715

APPENDIX B

Percentage distribution of midyear population by age and sex in the intervention and comparison areas, Chakaria HDSS, 2006

Age (years)	Intervention area			Comparison area			Both areas		
	Male	Female	Both	Male	Female	Both	Male	Female	Both
<1	2.6	2.7	2.6	2.5	2.6	2.5	2.5	2.6	2.6
1-4	10.3	11.0	10.7	10.4	9.8	10.1	10.4	10.5	10.4
5-9	14.2	14.2	14.2	13.9	13.7	13.8	14.1	14.0	14.0
10-14	13.9	14.3	14.1	14.0	14.4	14.2	13.9	14.3	14.1
15-19	13.7	14.2	14.0	13.5	14.9	14.2	13.6	14.5	14.1
20-24	9.4	8.2	8.8	9.8	8.2	9.0	9.6	8.2	8.9
25-29	6.3	6.7	6.5	6.1	6.3	6.2	6.2	6.5	6.4
30-34	5.1	5.7	5.4	4.8	5.6	5.2	5.0	5.6	5.3
35-39	5.0	5.1	5.0	4.6	5.0	4.8	4.8	5.0	4.9
40-44	4.2	4.1	4.1	4.1	4.6	4.3	4.2	4.3	4.2
45-49	3.5	3.7	3.6	4.1	4.2	4.2	3.8	4.0	3.9
50-54	3.0	2.8	2.9	3.3	3.2	3.3	3.1	3.0	3.1
55-59	2.6	2.2	2.4	2.8	2.3	2.6	2.7	2.3	2.5
60-64	2.0	1.5	1.7	2.1	1.5	1.8	2.0	1.5	1.8
65-69	1.3	1.2	1.3	1.3	1.2	1.2	1.3	1.2	1.2
70-74	1.2	1.0	1.1	1.3	1.2	1.2	1.2	1.1	1.2
75-79	0.8	0.5	0.7	0.7	0.5	0.6	0.8	0.5	0.6
80-84	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
85+	0.5	0.3	0.4	0.4	0.5	0.4	0.4	0.4	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, 2006

Age (years)	Intervention area			Comparison area			Both areas		
	Male	Female	Both	Male	Female	Both	Male	Female	Both
Birth									
<1	0	0	0	0	0	0	0	0	0
1-4	0	0	0	0	0	0	0	0	0
5-9	0	0	0	0	0	0	0	0	0
10-14	3	1	4	0	1	1	3	2	5
15-19	80	72	152	69	71	140	149	143	292
20-24	93	88	181	94	69	163	187	157	344
25-29	65	64	129	64	47	111	129	111	240
30-34	49	43	92	33	26	59	82	69	151
35-39	33	18	51	17	18	35	50	36	86
40-44	3	9	12	5	5	10	8	14	22
45-49	0	2	2	0	1	1	0	3	3
50-54	0	0	0	0	0	0	0	0	0
55-59	0	0	0	0	0	0	0	0	0
60-64	0	0	0	0	0	0	0	0	0
65-69	0	0	0	0	0	0	0	0	0
70-74	0	0	0	0	0	0	0	0	0
75-79	0	0	0	0	0	0	0	0	0
80-84	0	0	0	0	0	0	0	0	0
85+	0	0	0	0	0	0	0	0	0
All	326	297	623	282	238	520	608	535	1,143

APPENDIX D

Number of deaths by age and sex, Chakaria HDSS, 2006

Age (years)	Intervention area			Comparison area			Both areas		
	Male	Female	Both	Male	Female	Both	Male	Female	Both
Death									
<1	15	17	32	18	12	30	33	29	62
1-4	13	3	16	2	3	5	15	6	21
5-9	3	2	5	3	1	4	6	3	9
10-14	0	0	0	0	2	2	0	2	2
15-19	1	0	1	3	1	4	4	1	5
20-24	0	0	0	1	0	1	1	0	1
25-29	1	1	2	0	2	2	1	3	4
30-34	1	0	1	1	1	2	2	1	3
35-39	1	1	2	2	0	2	3	1	4
40-44	2	0	2	1	1	2	3	1	4
45-49	0	1	1	1	2	3	1	3	4
50-54	4	2	6	3	1	4	7	3	10
55-59	2	3	5	10	0	10	12	3	15
60-64	3	5	8	5	2	7	8	7	15
65-69	4	5	9	1	2	3	5	7	12
70-74	5	5	10	6	6	12	11	11	22
75-79	7	5	12	5	1	6	12	6	18
80-84	6	2	8	2	7	9	8	9	17
85+	5	6	11	4	6	10	9	12	21
All	73	58	131	68	50	118	141	108	249

APPENDIX E

Causes of death by age and sex, Chakaria HDSS, 2006

Cause	All age	Age (years)					
		<1	1-4	5-14	15-49	50-59	60+
Male							
Communicable diseases							
Diarrheal	4	0	3	1	0	0	0
Tuberculosis	1	0	0	0	0	0	1
Hepatitis	6	0	0	0	4	1	1
Respiratory infections	10	6	3	1	0	0	0
Malaria	1	0	0	1	0	0	0
Rabies	3	0	0	2	0	1	0
Leprosy	1	0	0	0	0	1	0
Tetanus	1	1	0	0	0	0	0
Maternal and neonatal condition							
Neonatal	11	11	0	0	0	0	0
Congenital anomalies	1	1	0	0	0	0	0
Nutritional	1	1	0	0	0	0	0
Non-communicable diseases							
Malignant neoplasm	8	0	0	0	2	2	4
Neoplasm	4	0	0	0	0	3	1
Diabetes	3	0	0	0	1	0	2
Stroke	16	0	0	0	3	5	8
Other cardiovascular	3	0	0	0	0	1	2
Asthma	15	0	0	0	0	2	13
Digestive disease	1	0	0	0	0	1	0
Other urinary	2	0	0	0	0	1	1
Accident	3	0	0	0	3	0	0
Drowning	6	1	5	0	0	0	0
Senility	15	0	0	0	0	2	13
Unknown	25	11	3	1	2	1	7
All	141	33	14	6	15	20	53
Female							
Communicable disease							
Diarrheal	2	0	2	0	0	0	0
Tuberculosis	2	0	0	0	0	0	2
Hepatitis	1	0	0	0	1	0	0
Respiratory infections	16	16	0	0	0	0	0
Malaria	2	0	0	0	1	0	1
Maternal and neonatal condition							
Neonatal	4	4	0	0	0	0	0
Nutritional	1	0	0	0	0	0	1
Non-communicable diseases							
Malignant neoplasm	4	0	0	0	0	1	3
Neoplasm	5	2	0	0	2	1	0
Hypertension disease	3	0	0	0	1	0	2
Stroke	15	0	0	0	1	2	12
Asthma	11	0	0	0	1	1	9
Digestive disease	1	1	0	0	0	0	0
Other urinary	1	0	0	0	1	0	0
Accident	3	0	0	2	0	1	0
Drowning	5	0	3	2	0	0	0
Burn	2	0	0	1	0	0	1
Senility	13	0	0	0	0	0	13
Unknown	17	6	1	0	2	0	8
All	108	29	6	5	10	6	52

APPENDIX F

Number of migrants by age and sex, Chakaria HDSS, 2006

Age (years)	Intervention area			Comparison area			Both areas		
	Male	Female	Both	Male	Female	Both	Male	Female	Both
In-migrants									
<1	4	12	16	11	7	18	15	19	34
1-4	24	22	46	18	25	43	42	47	89
5-9	27	38	65	19	21	40	46	59	105
10-14	63	47	110	45	51	96	108	98	206
15-19	63	179	242	47	132	179	110	311	421
20-24	25	54	79	22	58	80	47	112	159
25-29	36	20	56	26	21	47	62	41	103
30-34	22	5	27	17	6	23	39	11	50
35-39	10	2	12	16	3	19	26	5	31
40-44	10	0	10	9	4	13	19	4	23
45-49	4	4	8	4	3	7	8	7	15
50-54	2	2	4	4	4	8	6	6	12
55-59	2	7	9	4	4	8	6	11	17
60-64	1	3	4	2	3	5	3	6	9
65-69	2	5	7	3	7	10	5	12	17
70-74	3	3	6	0	5	5	3	8	11
75-79	3	4	7	5	4	9	8	8	16
80-84	2	0	2	1	3	4	3	3	6
85+	4	3	7	3	1	4	7	4	11
All	307	410	717	256	362	618	563	772	1,335
Out-migrants									
<1	9	6	15	4	9	13	13	15	28
1-4	19	32	51	17	23	40	36	55	91
5-9	20	23	43	13	17	30	33	40	73
10-14	58	59	117	35	49	84	93	108	201
15-19	90	173	263	65	171	236	155	344	499
20-24	62	89	151	51	76	127	113	165	278
25-29	41	21	62	32	24	56	73	45	118
30-34	27	6	33	20	12	32	47	18	65
35-39	11	6	17	19	6	25	30	12	42
40-44	11	0	11	6	4	10	17	4	21
45-49	6	1	7	3	2	5	9	3	12
50-54	3	3	6	1	4	5	4	7	11
55-59	1	8	9	0	2	2	1	10	11
60-64	1	6	7	1	10	11	2	16	18
65-69	1	2	3	2	6	8	3	8	11
70-74	4	5	9	3	8	11	7	13	20
75-79	3	3	6	1	5	6	4	8	12
80-84	1	2	3	1	1	2	2	3	5
85+	0	3	3	1	2	3	1	5	6
All	368	448	816	275	431	706	643	879	1,522

APPENDIX G

Migration rate per 1,000 population by age and sex, Chakaria HDSS, 2006

Age (years)	Intervention area			Comparison area			Both areas		
	Male	Female	Both	Male	Female	Both	Male	Female	Both
In-migration									
<1	12.6	38.5	25.4	42.5	26.6	34.5	26.0	33.0	29.5
1-4	18.7	17.0	17.8	16.5	25.4	20.7	17.7	20.6	19.1
5-9	15.3	22.9	19.0	13.0	15.2	14.0	14.2	19.4	16.7
10-14	36.6	28.0	32.4	30.6	35.2	32.9	33.9	31.3	32.6
15-19	36.9	107.2	71.7	33.2	88.1	61.4	35.2	98.1	66.9
20-24	21.4	56.1	37.1	21.4	70.2	43.2	21.4	62.6	39.9
25-29	46.2	25.3	35.7	40.4	33.2	36.8	43.6	28.8	36.2
30-34	35.0	7.5	20.8	33.6	10.7	21.6	34.4	9.0	21.2
35-39	16.2	3.4	9.9	33.1	5.9	19.2	23.6	4.6	14.1
40-44	19.2	0.0	10.0	20.9	8.7	14.6	20.0	4.3	12.2
45-49	9.2	9.1	9.2	9.3	7.0	8.2	9.3	8.1	8.7
50-54	5.4	6.1	5.7	11.5	12.3	11.9	8.4	9.2	8.8
55-59	6.2	26.9	15.4	13.6	16.9	15.1	9.7	22.2	15.2
60-64	4.1	17.2	9.6	9.0	19.7	13.3	6.4	18.4	11.4
65-69	12.4	34.7	23.0	22.2	59.3	39.5	16.9	45.8	30.5
70-74	19.7	24.6	21.9	0.0	42.4	19.9	10.5	33.3	21.0
75-79	29.4	64.5	42.7	69.4	76.9	72.6	46.0	70.2	55.6
80-84	35.1	0.0	19.0	21.7	78.9	47.6	29.1	34.9	31.7
85+	69.0	75.0	71.4	76.9	20.8	46.0	72.2	45.5	59.5
All	24.7	35.0	29.7	24.4	35.9	30.0	24.6	35.4	29.9
Out-migration									
<1	28.4	19.2	23.8	15.4	34.2	24.9	22.6	26.1	24.3
1-4	14.8	24.7	19.8	15.6	23.3	19.3	15.2	24.1	19.6
5-9	11.3	13.9	12.6	8.9	12.3	10.5	10.2	13.1	11.6
10-14	33.7	35.2	34.4	23.8	33.8	28.8	29.2	34.5	31.8
15-19	52.8	103.6	77.9	45.9	114.1	81.0	49.6	108.6	79.3
20-24	53.2	92.4	70.9	49.7	92.0	68.5	51.5	92.2	69.8
25-29	52.6	26.6	39.5	49.8	37.9	43.9	51.3	31.6	41.5
30-34	42.9	9.0	25.5	39.5	21.4	30.0	41.4	14.7	27.5
35-39	17.8	10.1	14.0	39.3	11.9	25.3	27.2	10.9	19.1
40-44	21.1	0.0	11.0	14.0	8.7	11.2	17.9	4.3	11.1
45-49	13.9	2.3	8.0	7.0	4.7	5.8	10.4	3.5	6.9
50-54	8.1	9.2	8.6	2.9	12.3	7.4	5.6	10.8	8.0
55-59	3.1	30.8	15.4	0.0	8.5	3.8	1.6	20.2	9.9
60-64	4.1	34.5	16.8	4.5	65.8	29.3	4.3	49.1	22.7
65-69	6.2	13.9	9.8	14.8	50.8	31.6	10.1	30.5	19.7
70-74	26.3	41.0	32.8	22.6	67.8	43.8	24.6	54.2	38.1
75-79	29.4	48.4	36.6	13.9	96.2	48.4	23.0	70.2	41.7
80-84	17.5	41.7	28.6	21.7	26.3	23.8	19.4	34.9	26.5
85+	0.0	75.0	30.6	25.6	41.7	34.5	10.3	56.8	32.4
All	29.7	38.2	33.8	26.2	42.8	34.3	28.1	40.3	34.0

APPENDIX H

Number of migrants by origin or destination, Chakaria HDSS, 2006

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													
<i>Male</i>													
Inside Bangladesh	482	57	44	105	103	36	51	20	14		9	5	38
Outside Bangladesh	67		0	0	0	3	10	11	18	11	9	3	2
Inside Chakaria	321	37	36	85	62	21	26	10		5	5	0	34
Outside Chakaria	161	20		8	20	41	15	25	10	9	4	5	4
Inside HSS area	275	30	31	77	53	16	24		4	5	4	0	31
Outside HSS area	45		7	5	8	9	5	2	5	0	1	0	3
<i>Female</i>													
Inside Bangladesh	752	63	56	95	305	111	39	11		5	3	7	57
Outside Bangladesh		5	0	1	2	0	1	0	0	0	0	0	1
Inside Chakaria	549	41	42	71	219	71	31	10		4	3	6	51
Outside Chakaria	203	22	14	24	86	40		8	1	1	0	1	6
Inside HSS area	441	35	30	58	168	54	25	10		3	3	6	49
Outside HSS area	108		6	12	13	51	17	6	0	1	0	0	2
Out-migration													
<i>Male</i>													
Inside Bangladesh	500	47	33	91	129	69	53	26	16		7	8	21
Outside Bangladesh	127		0	0	1	23	40	20	19	13	9	0	2
Inside Chakaria	320	28	23	72	87	36	27	16		7	3	3	18
Outside Chakaria	180	19	10	19	42	33	26	10		9	4	5	3
Inside HSS area	269	23	19	58	74	29	25	14		5	2	2	18
Outside HSS area	51		5	4	14	13	7	2	2	2	1	1	0
<i>Female</i>													
Inside Bangladesh	862	69	39	108	334	164	44	17	11		4	3	69
Outside Bangladesh		8	1	1	0	3	1	0	0	1	0	0	1
Inside Chakaria	615	52	31	74	243	104	28	10		8	1	2	62
Outside Chakaria	247	17		8	34	91	60	16	7	3	3	1	7
Inside HSS area	506	41	26	60	201	84	20		7	5	1	2	59
Outside HSS area	109	11		5	14	42	20	8	3	3	0	0	3

APPENDIX I

Number of in-migrants by reasons for migration, Chakaria HDSS, 2006

Reasons 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												
<i>Family-related</i>												
Widow in spouse	22	1	0	1	3	8	1	3	4	0	0	1
Family fiction/breakdown	69	15	9	5	7	3	6	1	2	1	1	19
<i>Work-related</i>												
New job/job transfer	133	3	8	54	44	7	9	2	2	2	0	2
Widow for work/lost job	14	0	0	0	8	3	1	1	1	0	0	0
Other job related reasons	73	0	0	3	7	8	15	15	11	8	5	1
<i>Housing-related</i>												
Wanted to own home/new house	93	23	10	8	12	8	12	5	1	4	2	7
<i>Education</i>												
Wanted to acquire education	22	1	6	8	6	0	0	0	0	0	0	1
Reasons not reported	136	14	13	28	23	9	18	12	5	4	0	10
All	563	57	46	108	110	47	62	39	26	19	8	41
Female												
<i>Family related</i>												
Change in marital status	339	0	0	28	229	63	12	4	1	1	0	1
Family fiction/breakdown	54	19	9	5	8	4	5	3	1	1	4	25
<i>Work-related</i>												
New job/job transfer	41	1	15	12	7	2	2	1	0	1	0	0
Widow for work/lost job	3	0	0	0	1	2	0	0	0	0	0	0
<i>Housing-related</i>												
Wanted to own home/new house	132	28	6	14	24	21	13	2	3	1	3	17
<i>Education</i>												
Wanted to acquire education	24	2	10	11	1	0	0	0	0	0	0	0
Education completed/interrupted	4	0	1	1	2	0	0	0	0	0	0	0
Reasons not reported	145	16	18	27	39	20	9	1	0	0	0	15
All	772	66	59	98	311	112	41	11	5	4	7	58

APPENDIX J

Number of out-migrants by reasons for migration, Chakaria HDSS, 2006

Reasons 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												
<i>Family-related</i>												
To join spouse	13	0	0	0	3	5	0	0	0	0	2	3
Family friction/ breakdown	108	22	7	5	20	13	15	6	6	3	2	9
<i>Work-related</i>												
New job/job transfer	109	1	1	32	34	14	12	4	6	3	1	1
To look for work	26	0	0	5	11	5	1	3	1	0	0	0
Retired	1	0	0	0	0	0	0	0	0	0	0	1
Other work-related	150	1	2	3	28	47	23	22	13	9	1	1
<i>Housing-related</i>												
Wanted to own home/new house	131	20	17	25	30	15	11	9	1	0	0	3
<i>Education</i>												
To acquire education	11	1	2	4	2	2	0	0	0	0	0	0
Education completed/ interrupted	4	0	0	3	1	0	0	0	0	0	0	0
Reasons not reported	90	4	4	16	26	12	11	3	3	2	3	6
All	643	49	33	93	155	113	73	47	30	17	9	24
Female												
<i>Family-related</i>												
To join spouse	370	1	0	26	224	95	16	6	1	1	0	0
Family friction/breakdown	164	29	8	9	34	21	11	7	4	1	2	38
<i>Work-related</i>												
New job/job transfer	66	4	4	27	17	8	2	0	1	0	0	3
To look for work/lost job	2	0	0	0	2	0	0	0	0	0	0	0
Retired	1	0	0	0	0	0	0	0	0	0	0	1
Other job-related reasons	20	4	0	1	6	5	1	0	1	1	0	1
<i>Housing-related</i>												
Wanted to own home/new house	152	23	19	27	21	27	12	4	3	1	1	14
<i>Education</i>												
To acquire education	14	0	1	6	6	1	0	0	0	0	0	0
Education completed/interrupted	2	0	1	1	0	0	0	0	0	0	0	0
Reasons not reported	88	9	7	11	34	8	3	1	2	0	0	13
All	879	70	40	108	344	165	45	18	12	4	3	70

APPENDIX K

Percentage of population by age and marital status, Chakaria HDSS, 2006

Age (years)	Married	Divorced	Abandoned	Widower/ Widow	Separated	Never married	Population
Male							
<1	0.0	0.0	0.0	0.0	0.0	100.0	576
1-4	0.0	0.0	0.0	0.0	0.0	100.0	2,372
5-9	0.0	0.0	0.0	0.0	0.0	100.0	3,229
10-14	0.0	0.0	0.0	0.0	0.0	100.0	3,190
15-19	2.8	0.0	0.0	0.0	0.0	97.1	3,122
20-24	18.7	0.2	0.2	0.0	0.0	80.9	2,193
25-29	51.8	0.3	0.0	0.0	0.1	47.8	1,422
30-34	82.9	0.2	0.1	0.1	0.1	16.7	1,135
35-39	96.1	0.2	0.2	0.1	0.0	3.5	1,103
40-44	98.4	0.0	0.2	0.1	0.0	1.3	951
45-49	98.8	0.3	0.2	0.3	0.1	0.2	862
50-54	98.6	0.3	0.0	0.8	0.0	0.3	718
55-59	97.8	0.0	0.3	1.4	0.2	0.3	620
60-64	96.8	0.0	0.0	2.7	0.0	0.4	466
65-69	96.2	0.3	0.0	3.5	0.0	0.0	296
70-74	91.3	0.0	0.4	8.3	0.0	0.0	285
75-79	88.8	0.0	0.0	10.6	0.0	0.6	174
80-84	73.2	0.9	0.9	24.1	0.0	0.9	103
85+	76.3	0.0	0.0	22.7	0.0	1.0	97
All	34.3	0.1	0.1	0.6	0.0	65.0	22,914
Female							
<1	0.0	0.0	0.0	0.0	0.0	100.0	575
1-4	0.0	0.0	0.0	0.0	0.0	100.0	2,280
5-9	0.0	0.0	0.0	0.0	0.0	100.0	3,046
10-14	0.8	0.0	0.0	0.0	0.0	99.2	3,127
15-19	24.0	0.4	0.3	0.1	0.0	75.3	3,169
20-24	64.7	1.1	1.8	0.4	0.2	31.9	1,789
25-29	87.2	1.0	2.3	1.6	0.1	7.9	1,423
30-34	91.9	1.5	2.4	2.5	0.2	1.6	1,227
35-39	90.7	1.4	2.1	4.8	0.3	0.7	1,098
40-44	86.9	0.9	1.8	9.4	0.4	0.6	939
45-49	80.9	0.3	2.9	15.6	0.1	0.1	865
50-54	69.9	1.2	2.2	26.3	0.2	0.3	651
55-59	62.0	0.4	0.8	35.9	0.2	0.8	496
60-64	51.1	0.6	1.5	45.3	0.3	1.2	326
65-69	43.9	0.4	0.4	54.5	0.0	0.8	262
70-74	26.2	0.8	1.6	68.9	0.8	1.6	240
75-79	13.8	0.0	0.0	81.0	3.5	1.7	114
80-84	12.2	0.0	0.0	86.7	1.1	0.0	86
85+	6.0	0.0	1.2	86.9	6.0	0.0	88
All	37.7	0.5	0.9	6.5	0.1	54.2	21,801

APPENDIX L

Percentage of population by age and marital status, intervention area, Chakaria HDSS, 2006

Age (years)	Married	Divorced	Abandoned	Widower/ Widow	Separated	Never married	Population
Male							
<1	0.0	0.0	0.0	0.0	0.0	100.0	317
1-4	0.0	0.0	0.0	0.0	0.0	100.0	1,284
5-9	0.0	0.0	0.0	0.0	0.0	100.0	1,766
10-14	0.0	0.0	0.0	0.0	0.0	100.0	1,719
15-19	2.2	0.0	0.0	0.1	0.1	97.6	1,706
20-24	17.6	0.0	0.2	0.0	0.0	82.3	1,166
25-29	51.4	0.2	0.0	0.0	0.0	48.4	779
30-34	84.0	0.3	0.0	0.2	0.2	15.4	629
35-39	95.4	0.3	0.3	0.2	0.0	3.9	619
40-44	98.6	0.0	0.2	0.0	0.0	1.2	521
45-49	98.9	0.7	0.2	0.0	0.0	0.2	433
50-54	98.7	0.5	0.0	0.8	0.0	0.0	371
55-59	97.0	0.0	0.3	1.8	0.3	0.6	325
60-64	96.1	0.0	0.0	3.9	0.0	0.0	243
65-69	95.8	0.0	0.0	4.2	0.0	0.0	161
70-74	94.5	0.0	0.7	4.8	0.0	0.0	152
75-79	88.7	0.0	0.0	10.4	0.0	0.9	102
80-84	61.7	1.7	0.0	35.0	0.0	1.7	57
85+	74.1	0.0	0.0	25.9	0.0	0.0	58
All	33.9	0.1	0.1	0.7	0.0	65.3	12,408
Female							
<1	0.0	0.0	0.0	0.0	0.0	100.0	312
1-4	0.0	0.0	0.0	0.0	0.0	100.0	1,294
5-9	0.0	0.0	0.0	0.0	0.0	100.0	1,660
10-14	0.5	0.0	0.0	0.0	0.0	99.5	1,678
15-19	23.6	0.2	0.3	0.1	0.0	75.8	1,670
20-24	64.0	1.1	1.6	0.4	0.1	32.8	963
25-29	87.0	1.1	2.2	1.6	0.1	7.9	790
30-34	91.7	1.6	2.5	2.2	0.2	1.9	666
35-39	90.8	1.9	2.2	4.2	0.3	0.6	593
40-44	89.2	0.8	1.8	7.4	0.2	0.6	480
45-49	80.8	0.5	2.8	15.8	0.2	0.0	438
50-54	70.4	1.8	2.4	25.2	0.0	0.3	326
55-59	64.2	0.4	1.5	33.6	0.0	0.4	260
60-64	53.3	1.1	2.2	42.3	0.0	1.1	174
65-69	43.3	0.8	0.8	53.7	0.0	1.5	144
70-74	26.2	1.5	1.5	68.5	0.0	2.3	122
75-79	15.6	0.0	0.0	81.3	1.6	1.6	62
80-84	10.2	0.0	0.0	87.8	2.0	0.0	48
85+	0.0	0.0	0.0	94.9	5.1	0.0	40
All	37.5	0.6	1.0	6.1	0.1	54.8	11,720

APPENDIX M

Percentage of population by age and marital status, comparison area, Chakaria HDSS, 2006

Age (years)	Married	Divorced	Abandoned	Widower/ Widow	Separated	Never married	Population
Male							
<1	0.0	0.0	0.0	0.0	0.0	100.0	259
1-4	0.0	0.0	0.0	0.0	0.0	100.0	1,088
5-9	0.0	0.0	0.0	0.0	0.0	100.0	1,463
10-14	0.0	0.0	0.0	0.0	0.0	100.0	1,471
15-19	3.4	0.1	0.0	0.0	0.0	96.5	1,416
20-24	20.0	0.5	0.3	0.0	0.0	79.3	1,027
25-29	52.4	0.3	0.0	0.0	0.1	47.2	643
30-34	81.5	0.0	0.2	0.0	0.0	18.3	506
35-39	97.0	0.0	0.0	0.0	0.0	3.0	484
40-44	98.1	0.0	0.2	0.2	0.0	1.4	430
45-49	98.6	0.0	0.2	0.7	0.2	0.2	429
50-54	98.6	0.0	0.0	0.9	0.0	0.6	347
55-59	98.7	0.0	0.3	1.0	0.0	0.0	295
60-64	97.7	0.0	0.0	1.4	0.0	0.9	223
65-69	96.6	0.7	0.0	2.7	0.0	0.0	135
70-74	87.7	0.0	0.0	12.3	0.0	0.0	133
75-79	89.0	0.0	0.0	11.0	0.0	0.0	72
80-84	87.5	0.0	2.1	10.4	0.0	0.0	46
85+	79.1	0.0	0.0	18.6	0.0	2.3	39
All	34.7	0.1	0.1	0.5	0.0	64.6	10,506
Female							
<1	0.0	0.0	0.0	0.0	0.0	100.0	263
1-4	0.0	0.0	0.0	0.0	0.0	100.0	986
5-9	0.0	0.0	0.0	0.0	0.0	100.0	1,386
10-14	1.0	0.0	0.0	0.1	0.0	98.9	1,449
15-19	24.5	0.5	0.3	0.1	0.0	74.6	1,499
20-24	65.5	1.1	1.9	0.5	0.2	30.8	826
25-29	87.4	0.8	2.4	1.5	0.0	7.9	633
30-34	92.0	1.5	2.2	2.8	0.2	1.3	561
35-39	90.6	0.7	2.0	5.6	0.4	0.7	505
40-44	84.3	0.9	1.8	11.6	0.7	0.7	459
45-49	81.0	0.2	3.1	15.4	0.0	0.2	427
50-54	69.3	0.6	2.1	27.4	0.3	0.3	325
55-59	59.7	0.4	0.0	38.3	0.4	1.2	236
60-64	48.3	0.0	0.7	49.0	0.7	1.4	152
65-69	44.6	0.0	0.0	55.4	0.0	0.0	118
70-74	26.3	0.0	1.8	69.3	1.8	0.9	118
75-79	11.5	0.0	0.0	80.8	5.8	1.9	52
80-84	14.6	0.0	0.0	85.4	0.0	0.0	38
85+	11.1	0.0	2.2	80.0	6.7	0.0	48
All	38.0	0.4	0.9	7.0	0.2	53.4	10,081

APPENDIX N

Chakaria HDSS project team, 2006

Name of Staff	Designation
Dhaka	
Abbas Bhuiya	Project Director
Mohammad Iqbal	Project Research Manager
SMA Hanifi	Statistician
Rumesa R Aziz	Research Investigator
Tania Wahed	Research Investigator
Shehrin Shaila Mahmood	Research Investigator
Tamanna Sharmin	Research Investigator
AB Siddiq	Senior Administrative Officer
AZ Khan	Field Research Officer
Repon C. Paul	Research Assistant
Ayesha Begum	Senior Data Management Assistant
Chakaria	
Nazma Begum	Project Health Physician
Ariful Moula	Field Research Officer
Shahidul Hoque	Field Research Officer
Sharif Al Hasan	Field Research Supervisor
Sujaul Islam Mondol	Community Health Educator
Hosnera Rina	Community Health Educator
Ashish Paul	Senior Data Management Assistant
Hasan Ahmed Forkan	Administrative Assistant
Snahashis Dutta	Field Research Assistant
Rehmat Ali	Field Assistant