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

Demographic Profile, Family-planning Use, and Safe Motherhood Practices-2005

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ACKNOWLEDGEMENTS

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CHAPTER I

Introduction

Chakaria is one of the 465 upazilas (sub-districts) in Bangladesh. It is located in 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 400,000. The highway from Chittagong to Cox's Bazar passes through Chakaria. The east side of Chakaria is hilly, while the west side towards the Bay of Bengal is lowland or flat. A map showing the location of Chakaria is presented in Figure 1.

ICDDR,B started its work in Chakaria in 1994. The focus of the activities of ICDDR,B in Chakaria has been to facilitate local initiatives for the improvement of health of the inhabitants in general, children, women, and 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. 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 further research. This report presents data collected through the Chakaria HDSS during 2005. However, data on safe motherhood practices and family-planning indicators cover the period from April 2004 through December 2005.

Existing health services in the intervention and comparison areas, Chakaria Health Demographic Surveillance System, 2005

Intervention area (Six unions with 106,320 population)		Comparison area (Two unions with 34,418 population)	
Health care facility/provider	No.	Health care facility/provider	No.
Community initiated and ICDDR,B facilitated		Community initiated and ICDDR,B facilitated	
Village health posts	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 Centres (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.

CHAPTER 2
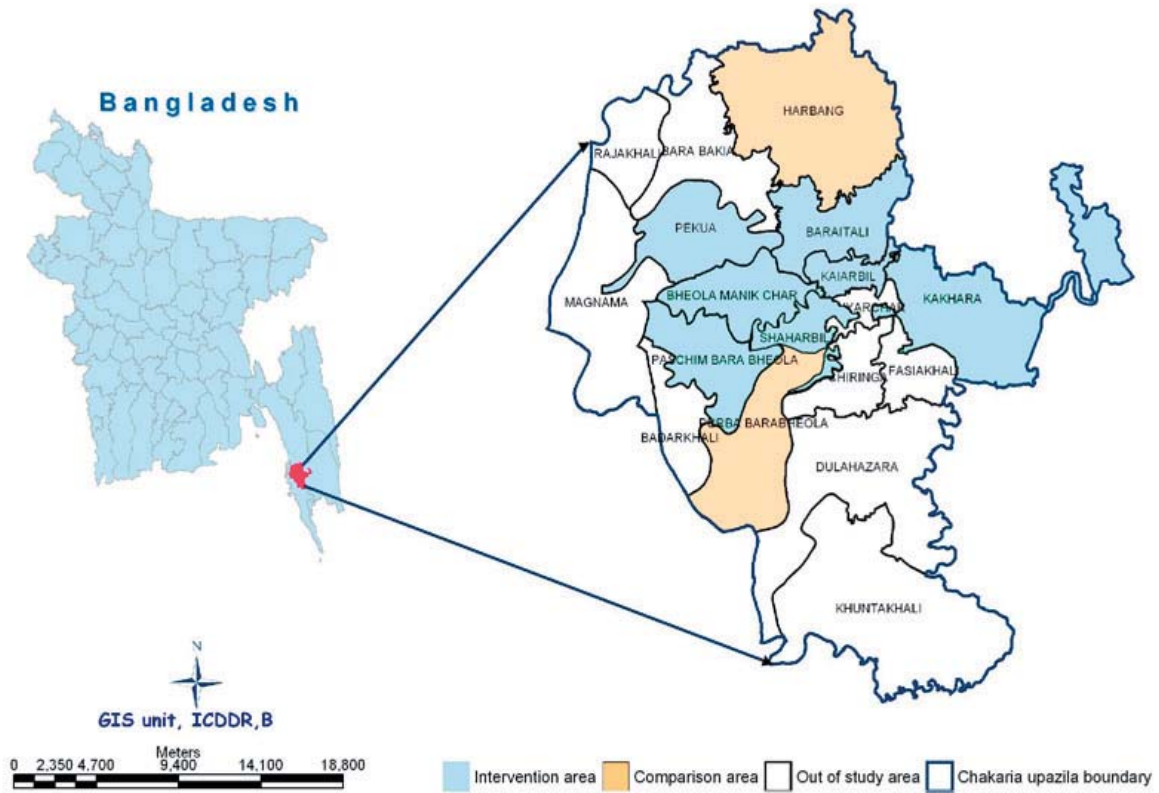
Methods and materials

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 2 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 living in 6,727 households in the comparison area (3). A household was 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 was considered to have migrated out if s/he did not live in the household at least once a month continuously for at least 6 months. A person was considered to have migrated in if s/he was not included in the list of household members before and now started to live in the household regularly for more than once a month for at the least 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. For the 2005 Chakaria HDSS, 24 field-trained workers collected data. 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 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 weight of the assets to derive household asset index. The major demographic indicators and safe motherhood related practices have been tabulated for the various asset quintiles. Concentration indices for some of these indicators have been calculated to assess the extent of inequalities between the various asset quintiles.

It should be mentioned that the number of observations in the tables presented in this report had differed 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 pyramid reflects a high fertility, moderately low mortality, and young population with almost similar sex composition in all age-groups.

Fig. 2.   Male and female population by age and sex, Chakaria HDSS, 2005.

HDSS = Health and Demographic Surveillance System.
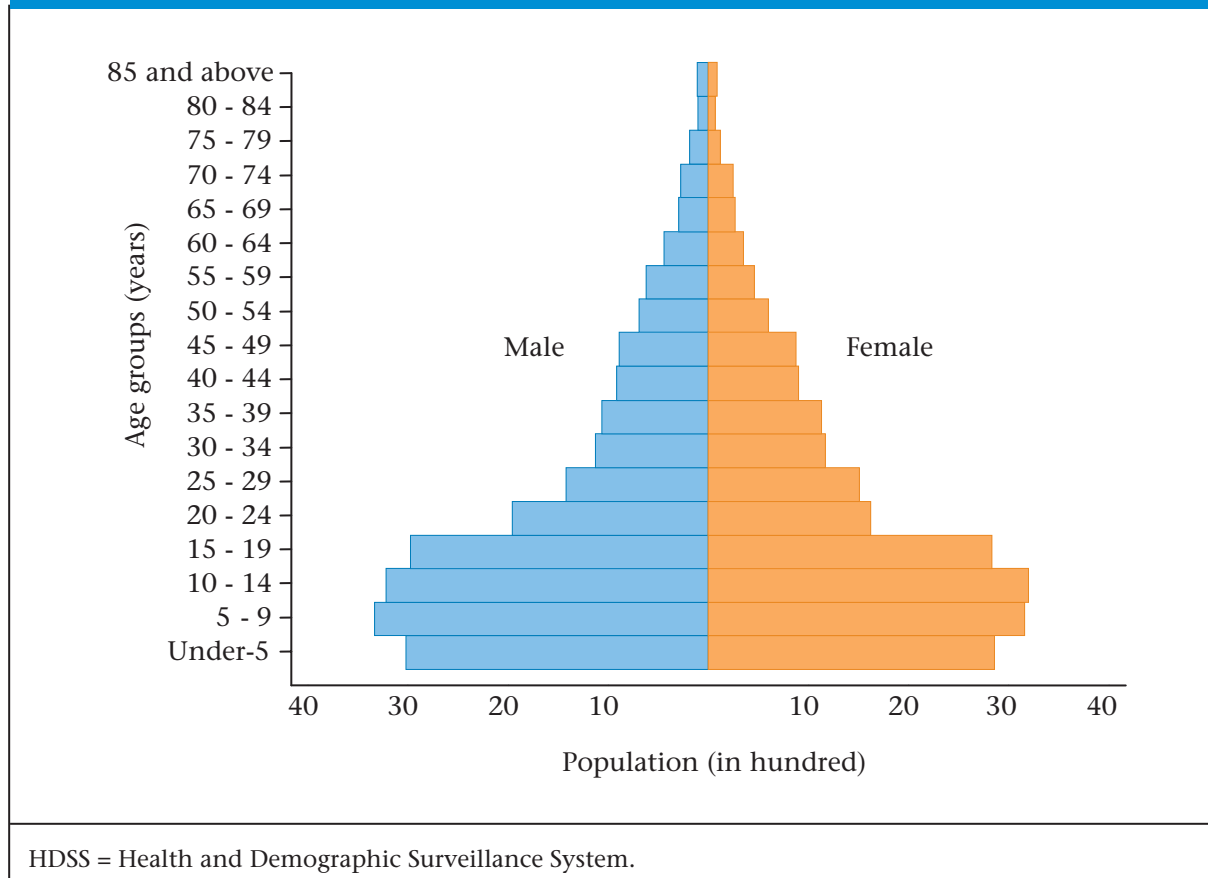
The major demographic indicators in the intervention and comparison areas during 1999, 2004, and 2005 are presented in Table 1. A declining trend in the mortality and fertility indicators and natural rate of increase has been observed during 1999-2005 with an exception in growth rate. All the rates in Chakaria HDSS area are much higher than those in the government-served area in Matlab, another rural field site of ICDDR,B (4).

Table 1. Demographic indicators, Chakaria HDSS, 1999-2005.				
Vital rates (per 1,000)	Chakaria			Government-served
	1999	2004	2005	area in Matlab, 2004
Crude birth rate				
Intervention area	33.8	30.6	29.8	
Comparison area	33.9	28.8	27.4	24.8
Both areas	33.9	29.7	28.7	
Total fertility rate*				
Intervention area	5.1	4.6	4.4	
Comparison area	4.9	4.4	4.0	3.1
Both areas	5.1	4.5	4.2	
Contraceptive-use rate				
Intervention area	24.8	-	36.0	
Comparison area	24.2	-	37.5	48.1
Both areas	24.7	-	36.7	
Infant mortality rate**				
Intervention area	61.2	40.3	39.3	
Comparison area	69.7	60.5	61.0	48.5
Both areas	63.2	49.3	48.9	
Child mortality rate (1-4 years)				
Intervention area	9.0	8.1	7.5	
Comparison area	10.6	5.5	5.3	2.7
Both areas	9.4	6.9	6.5	
Crude death rate				
Intervention area	6.7	5.9	5.8	
Comparison area	7.9	7.0	6.5	7.4
Both areas	7.0	6.3	6.1	
Rate of natural increase				
Intervention area	27.1	24.7	24.0	
Comparison area	26.0	21.8	20.8	17.5
Both areas	26.9	23.4	22.5	
In-migration rate				
Intervention area	-	17.1	24.5	
Comparison area	-	16.6	23.7	42.1
Both areas	-	16.9	24.1	
Out-migration rate				
Intervention area	-	22.2	23.8	
Comparison area	-	19.5	25.9	57.9
Both areas	-	21.0	24.8	
Growth rate (%)				
Intervention area	-	2.0	2.5	
Comparison area	-	1.9	2.0	0.2
Both areas	-	1.9	2.1	
*Per woman; ** Per 1,000 livebirths.				

Mortality

The crude death rate for the intervention and comparison areas in Chakaria, when considered together, was 6.1 per 1,000 population in 2005. The rate was higher in the comparison area than in the intervention area. Infant mortality rate for all the villages in the intervention and comparison areas was 48.9 per 1,000 livebirths with a lower rate in the intervention area than in the comparison area. Child mortality rate was 6.6 per 1,000 children aged 1-4 years. The rate was higher in the intervention area than in the comparison area (Table 2). The rate of mortality of children aged less than 5 years (under-five mortality) was 69 per 1,000 live births in Chakaria in 2005 (Table 4). Life expectancy at birth was 68.5 years for males and 70.9 years for females (Table 3). Age-specific mortality rates by area and sex are presented in Table 2. Abridged life-tables for male and female are presented in Table 3. Females had higher life expectancy at birth compared to males, lower mortality than male during infancy, and higher mortality than male during childhood. Figure 3 shows the cumulative probability of survival by sex during the whole life span. The striking fact is that the cumulative probability of survival of females remained the same as that of males up to age 60 years, but after the age of 60 years, females had a higher cumulative probability of survival compared to males.

Table 2. Age-specific death rate (per 1,000 people) by sex, Chakaria HDSS, 2005.

Age (years)	Intervention area			Comparison area			Both areas		
	Male	Female	Both	Male	Female	Both	Male	Female	Both
<1*	38.2	40.4	39.4	66.4	55.4	61.0	51.1	46.7	48.9
1-4	6.8	8.4	7.6	5.6	5.0	5.3	6.3	6.9	6.6
5-9	2.8	1.2	2.0	0.0	2.0	1.0	1.5	1.6	1.5
10-14	0.6	0.6	0.6	1.3	2.0	1.7	0.9	1.2	1.1
15-19	0.0	2.6	1.3	0.7	2.3	1.5	0.3	2.5	1.4
20-24	1.9	0.0	1.0	1.1	1.4	1.2	1.5	0.6	1.1
25-29	3.9	0.0	1.9	0.0	0.0	0.0	2.1	0.0	1.0
30-34	0.0	1.6	0.8	3.9	1.8	2.9	1.8	1.7	1.7
35-39	1.7	0.0	0.8	2.2	1.9	2.0	1.9	0.9	1.4
40-44	2.0	4.3	3.1	0.0	6.8	3.5	1.1	5.5	3.3
45-49	0.0	2.3	1.1	7.0	0.0	3.4	3.4	1.1	2.3
50-54	11.3	9.9	10.7	2.9	6.7	4.7	7.2	8.3	7.7
55-59	6.2	4.1	5.3	13.2	4.7	9.7	9.6	4.4	7.4
60-64	30.0	15.6	23.5	18.8	18.6	18.7	24.7	17.0	21.3
65-69	12.8	27.2	19.8	21.1	8.2	15.2	16.8	18.6	17.6
70-74	38.0	30.1	34.4	76.3	61.9	69.3	54.3	44.7	49.8
75-79	38.1	58.8	46.2	125.0	17.5	80.3	75.7	40.0	61.3
80-84	47.6	23.8	38.1	125.0	85.7	106.7	77.7	51.9	66.7
85+	149.3	181.8	162.2	108.7	83.3	95.7	132.7	130.4	131.7
All	5.9	5.6	5.8	7.3	5.7	6.5	6.6	5.7	6.1

*per 1,000 livebirths;
HDSS= Health and Demographic Surveillance System.

Table 3.   Abridged life-table, Chakaria HDSS, 2005.

Age (years)	Male					Female				
	$_nm_x$	$_nq_x$	$_nl_x$	$_nL_x$	e_x	$_nm_x$	$_nq_x$	$_nl_x$	$_nL_x$	e_x
0	0.0511	0.0511	100,000	95,912	68.5	0.0467	0.0467	100,000	96,264	70.9
1-4	0.0063	0.0249	94,890	375,113	71.1	0.0069	0.0272	95,330	376,430	73.4
5-9	0.0016	0.0080	92,527	460,934	68.9	0.0016	0.0080	92,733	461,959	71.4
10-14	0.0009	0.0045	91,789	457,997	64.4	0.0012	0.0060	91,993	458,699	66.9
15-19	0.0004	0.0020	91,377	456,465	59.7	0.0025	0.0125	91,443	454,583	62.3
20-24	0.0015	0.0075	91,195	454,401	54.8	0.0006	0.0030	90,302	450,877	58.1
25-29	0.0021	0.0104	90,513	450,383	50.2	0.0000	0.0000	90,027	450,135	53.2
30-34	0.0018	0.0090	89,567	445,984	45.7	0.0017	0.0085	90,027	448,377	48.2
35-39	0.0019	0.0095	88,764	441,886	41.1	0.0009	0.0045	89,265	445,390	43.6
40-44	0.0011	0.0055	87,925	438,502	36.5	0.0055	0.0272	88,859	438,715	38.8
45-49	0.0034	0.0169	87,438	433,784	31.7	0.0011	0.0055	86,446	431,130	34.8
50-54	0.0072	0.0354	85,963	422,763	27.2	0.0083	0.0408	85,968	421,712	30.0
55-59	0.0096	0.0470	82,919	405,556	23.1	0.0044	0.0218	82,464	408,167	26.2
60-64	0.0247	0.1167	79,026	373,422	19.1	0.0170	0.0818	80,668	387,923	21.7
65-69	0.0168	0.0808	69,802	335,826	16.2	0.0186	0.0891	74,073	354,912	18.4
70-74	0.0543	0.2400	64,161	283,609	12.4	0.0447	0.2019	67,472	304,731	14.9
75-79	0.0757	0.3191	48,761	205,532	10.5	0.0400	0.1826	53,850	245,797	13.0
80-84	0.0777	0.3261	33,202	139,334	9.3	0.0519	0.2306	44,018	195,621	10.3
85+	0.1327	1.0000	22,376	168,618	7.5	0.1304	1.0000	33,865	259,704	7.7

The Abridged life-table is constructed applying the Greville's method illustrated in "The methods and materials of demography", edited by Jacob S. Shryock and David A. Swanson. 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
$_nl_x$ = Survivors to exact age x
$_nL_x$ = Numbers of years lived by the total of the cohort of 100,000 births in the interval
e_x = Life expectancy at age x

Fig. 3.   Probability of survival by age and sex, Chakaria HDSS, 2005.
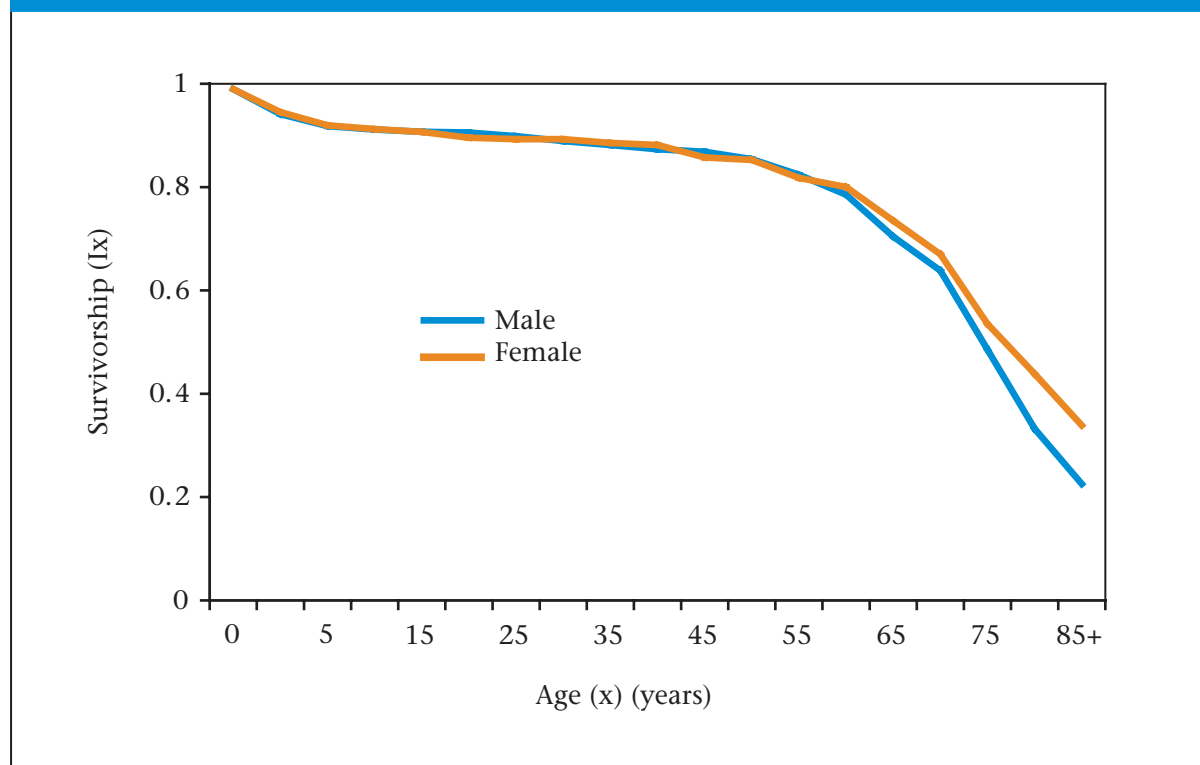
Table 4. Under-5 mortality rates per 1,000 livebirths, Chakaria HDSS, 2005.

Asset quintile	Number of livebirth	Number of under-5 deaths	Under-5 mortality rate
Lowest	280	29	103.6
Second	276	14	50.7
Medium	231	17	73.6
Fourth	249	15	60.2
Highest	222	12	54.1
All	1,258	87	69.2
HDSS= Health and Demographic Surveillance System.			

CHAPTER 5

Fertility

The crude birth rate in 2005 was 28.7 per 1,000 people in Chakaria, which was lower than the rates for the previous years (Table 1). Total fertility rates also showed a downward trend during 1999-2005 with a value of 4.2 in 2005 (Table 1). The fertility rate was highest among women of age-group of 20-30 years (Fig. 4 and Table 6).

Table 5. Crude birth rates per 1,000 people by asset quintile, Chakaria HDSS, 2005.			
Asset quintile	Mid-year population	Number of births	Birth rate
Lowest	7,789	280	35.9
Second	8,334	276	33.1
Medium	8,564	231	27.0
Fourth	9,204	249	27.1
Highest	9,771	222	22.7
All	43,662	1,258	28.8
HDSS = Health and Demographic Surveillance System.			

Table 6. Age-specific fertility rates per 1,000 women, Chakaria HDSS, 2005.									
Age	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	1,513	97	64.1	1,320	111	84.1	2,833	208	73.4
20-24	896	205	228.8	733	144	196.5	1,629	349	214.2
25-29	831	194	233.5	678	131	193.2	1,509	325	215.4
30-34	631	124	196.5	543	101	186.0	1,174	225	191.7
35-39	607	62	102.1	521	49	94.0	1,128	111	98.4
40-44	464	22	47.4	438	18	41.1	902	40	44.3
45-49	428	7	16.4	445	3	6.7	873	10	11.5
Total	5,370	711		4,678	557		10,048	1,268	
TFR		4,444			4,008				4,244
TFR= Total fertility rate per 1,000 women; HDSS= Health and Demographic Surveillance System.									

Fig. 4. Age-specific fertility rate, Chakaria HDSS, 2005.

HDSS= Health and Demographic Surveillance System.
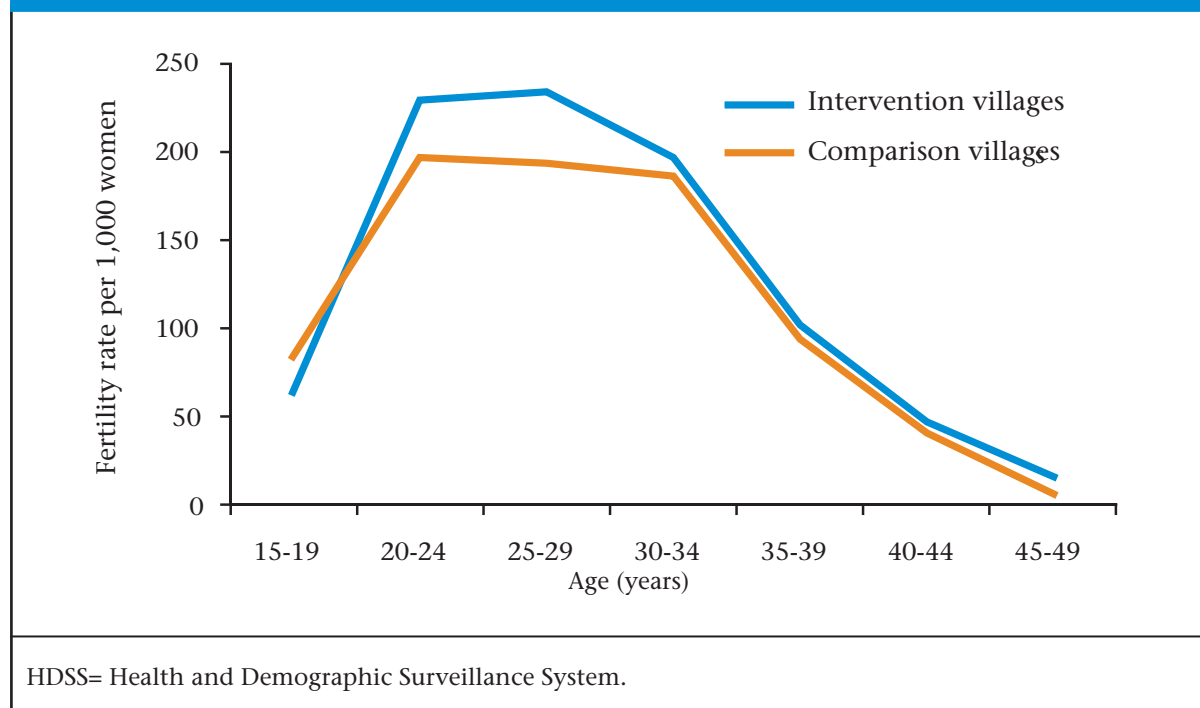
4.6% of 1,366 pregnancies were terminated through induction, 1.8% spontaneously, and 2.1% resulted in stillbirths (Table 7).

Table 7. Pregnancy outcomes, Chakaria HDSS, 2005.

Pregnancy outcomes	Intervention area		Comparison area		Both areas	
	No.	%	No.	%	No.	%
Induced abortion	34	4.5	29	4.8	63	4.6
Spontaneous abortion	11	1.4	14	2.3	25	1.8
Stillbirth	24	3.1	14	2.3	38	2.8
Livebirth*	711	93.1	557	92.5	1,268	92.8
Total number of pregnancies	764		602		1,366	

*Multiple 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 later half of the year. Distribution of deaths by months did not show any distinct seasonal pattern (Fig. 5). The patterns of birth and death were almost similar in the intervention and the comparison area (Fig. 6 and 7).

Fig. 5.   Number of births and deaths by month, Chakaria HDSS, 2005.

HDSS= Health and Demographic Surveillance System.
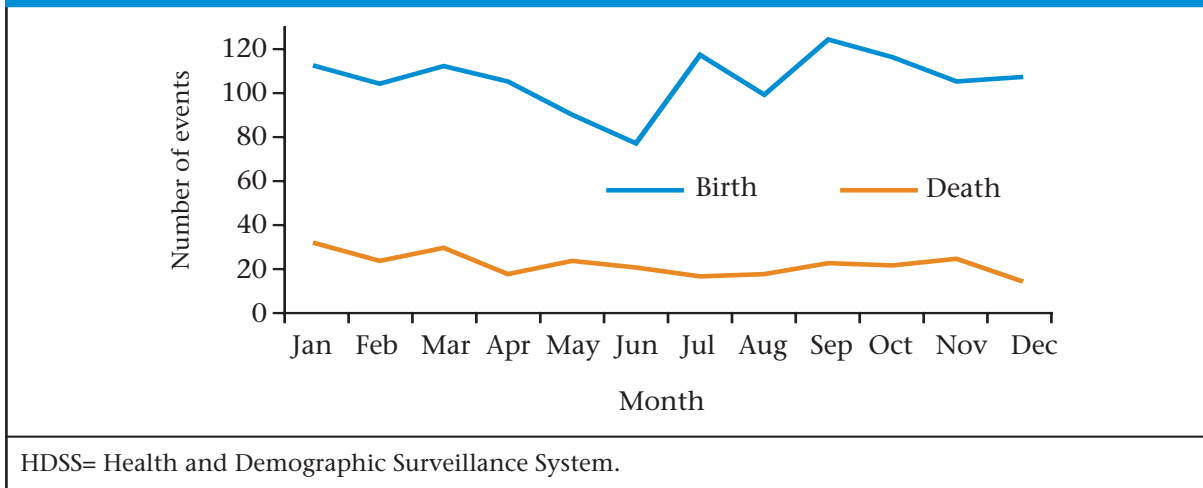
Fig. 6.   Number of births and deaths by month, intervention area, Chakaria HDSS, 2005.

HDSS= Health and Demographic Surveillance System.
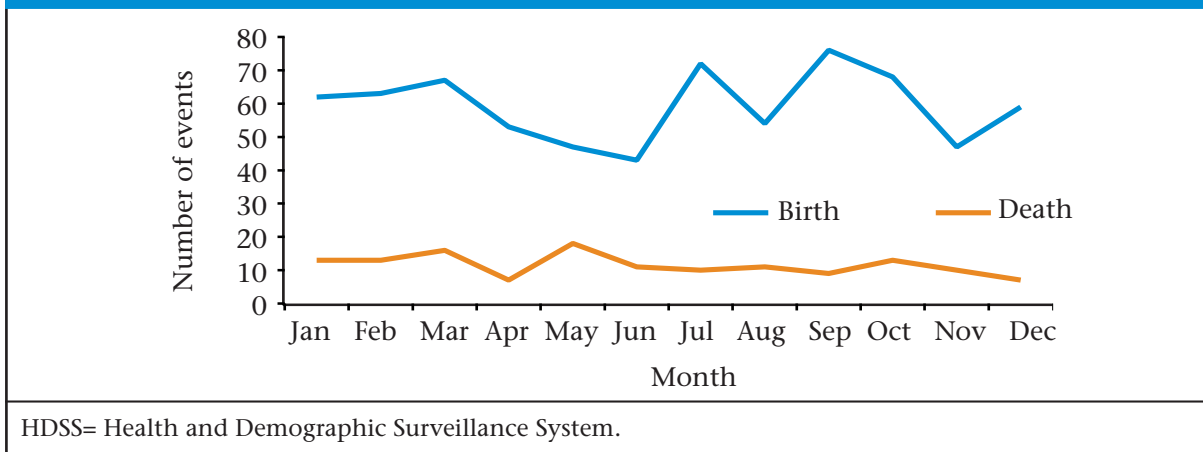
Fig. 7.   Number of births and deaths by month, comparison area, Chakaria HDSS, 2005.

HDSS= Health and Demographic Surveillance System.
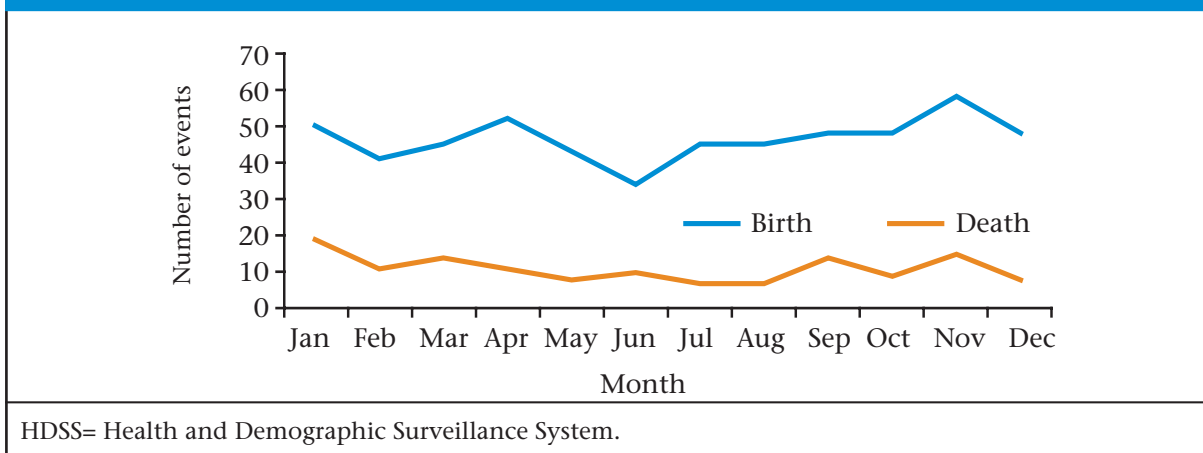
CHAPTER 6

Migration

During 2004, the rate of out-migration was higher than that of in-migration. In 2005, these two rates were similar (Table 1). Monthly data on migration are presented in Tables 8 and 9. Data showed that the number of people migrating in and out during 2005 was almost equal in both the areas. The sex differential in migration was also not prominent. The rate of in-migration among the males was highest in May and November, and the rate was highest among the females in May. The rate of out-migration was highest in January and July for both males and females.

Table 8. In-and out-migration by sex and month, intervention area, Chakaria HDSS, 2005.

Month	In-migration			Out-migration		
	Male	Female	Both sexes	Male	Female	Both sexes
January	13	27	40	29	39	68
February	13	26	39	12	24	36
March	17	31	48	8	22	30
April	17	32	49	19	32	51
May	27	48	75	21	36	57
June	19	32	51	18	37	55
July	18	33	51	28	43	71
August	15	30	45	16	21	37
September	22	25	47	13	27	40
October	22	28	50	16	16	32
November	29	28	57	12	34	46
December	13	19	32	14	30	44
All months	225	359	584	206	361	567

HDSS= Health and Demographic Surveillance System.

Table 9. In-and out-migration by sex and month, comparison area, Chakaria HDSS, 2005.

Month	In-migration			Out-migration		
	Male	Female	Both sexes	Male	Female	Both sexes
January	11	42	53	27	40	67
February	13	28	41	19	19	38
March	15	31	46	20	42	62
April	13	29	42	15	32	47
May	15	33	48	11	45	56
June	9	30	39	15	41	56
July	17	28	45	10	23	33
August	11	21	32	10	18	28
September	14	23	37	14	20	34
October	10	11	21	13	12	25
November	13	19	32	22	29	51
December	16	30	46	13	17	30
All months	157	325	482	189	338	527

HDSS= Health and Demographic Surveillance System.

CHAPTER 7

Marriage

In total, 805 marriages took place in the surveillance households in Chakaria during 2005. The highest number of marriages took place in May (Fig. 8). Forty-three percent of the marriages in 2005 took place among the males and 57% among the females of the area.

The mean and median ages at marriage for females were 20 and 19 years respectively. For males, both mean and median ages at marriage were 26 years (Table 10). The singulate mean age at marriage (SMAM) was 27 years for males and 21 years for females.

Table 10.	Age at marriage by asset quintiles and sex, Chakaria HDSS, 2005.					
Asset quintile	Male			Female		
	SMAM	Mean age	Median age	SMAM	Mean age	Median age
Lowest	24.4	24.4	20.8	20.5	20.2	17.9
Second	25.4	23.3	22.8	20.2	19.0	18.3
Third	27.4	26.7	25.6	21.6	19.5	19.0
Fourth	27.4	26.1	25.6	21.9	19.8	18.8
Highest	28.1	27.2	27.1	21.4	19.2	18.7
All	26.9	26.0	25.7	21.2	19.5	18.7
SMAM= Singulate mean age at marriage; HDSS= Health and Demographic Surveillance System.						

Fig. 8.   Marriages by month, Chakaria HDSS, 2005.

HDSS= Health and Demographic Surveillance System.
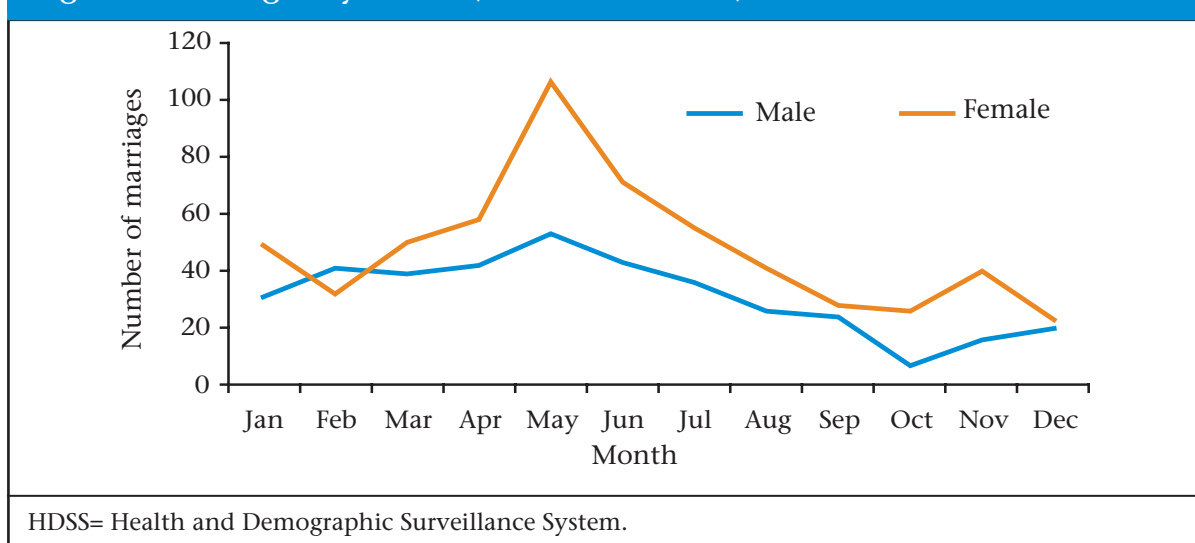
CHAPTER 8

Family planning

In Chakaria, 37% of 4,975 currently married couples of reproductive age used modern family-planning methods in 2005 (Table 12). This was a considerable increase from 25% in 1999 (Table 1) (Bhuiya, Hanifi and Mahmood 2006). ICDDR,B does not provide any family-planning services in Chakaria. In terms of preference for various methods, in 2005, the pill was the most preferred method, followed by injectables and sterilization (Table 11). Figure 9 shows the change in preference for different types of contraceptive methods over time.

Table 11. Use of modern contraceptives, Chakaria HDSS, 2005.			
Contraception method	Intervention Area (%)	Comparison Area (%)	Both Areas (%)
Pill	55.9	46.5	51.0
Injectables	28.8	33.4	31.2
Female sterilization	8.6	7.6	8.1
Condom	3.4	4.6	4.0
Intrauterine device (IUD)	2.8	4.0	3.4
Norplants	0.5	3.4	2.0
Male sterilization	0.0	0.6	0.3
	100.0	100.0	100.0
Total number of contraceptive users	993	1,087	2,080
HDSS= Health and Demographic Surveillance System.			

Fig. 9.   Trend of using modern contraceptive methods among currently-married women, Chakaria HDSS, 1997-2005.

IUD= Intrauterine device; HDSS= Health and Demographic Surveillance System.

Asset quintile	Intervention area		Comparison area		Both areas	
	No.*	%	No.	%	No.	%
Lowest	496	33.7	380	32.1	876	33.0
Second	540	35.0	411	35.5	951	35.2
Third	495	35.0	490	39.8	985	37.4
Fourth	582	37.6	468	36.5	1,050	37.1
Highest	568	38.2	545	41.3	1,113	39.7
Total	2,681	36.0	2,294	37.5	4,975	36.7
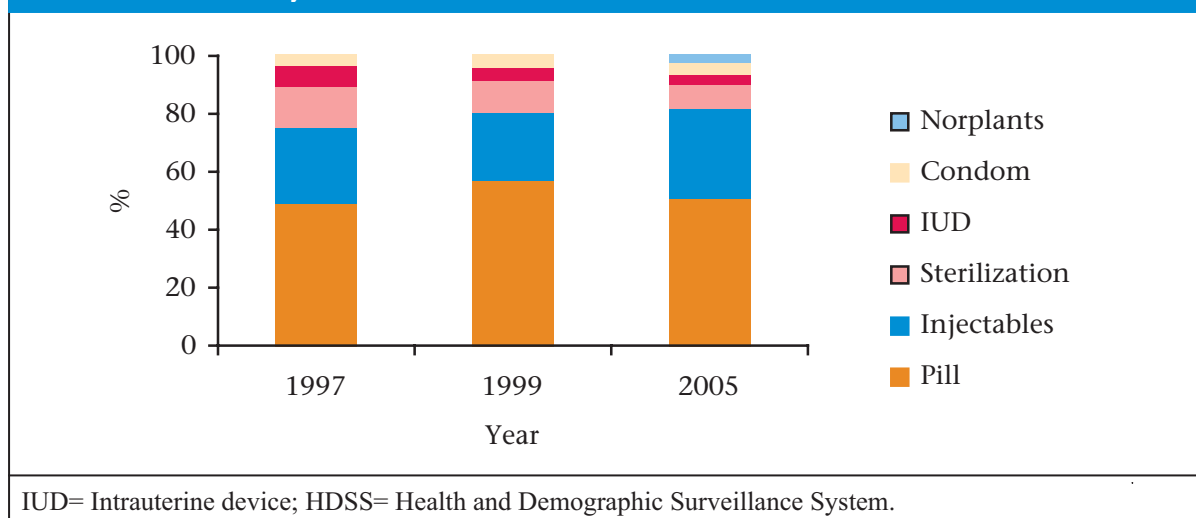
Table 12. Use of modern family-planning methods among currently-married women by asset quintile of households, Chakaria HDSS, 2005.

*Number of currently-married women;
HDSS= Health and Demographic Surveillance System.

CHAPTER 9

Health and health 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 restricted to the intervention area. The households in 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 primary healthcare services once a week to the villagers from these village health posts.

At present, the Upazila Health Complex of the government and one private hospital provide healthcare services at the sub-district level in 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.

9.1 Safe motherhood practices

9.1.1 Use of antenatal care services

During 2005, 59% of 2,349 pregnant women in Chakaria received at least one antenatal check-up (ANC). The percentage of women receiving ANC was higher in the intervention area (65%) than in the comparison area (52%). They received services from various sources. Among these sources, the trained midwives have been consulted by most in the intervention area, followed by the Family Welfare Visitors (FWV) and the nurses/doctors. On the other hand, the dominant source of services in the comparison area was the FWVs, followed by the nurses/doctors (Table 13).

Table 13.	Antenatal care by type of sources and asset quintile, Chakaria HDSS, 2004-2005.						
Area	Asset quintile	Received any ANC (%)	Midwife* (%)	FWV* (%)	Nurse/ doctor* (%)	Others* (%)	None (%)	No. of women
Intervention area	Lowest	52.6	32.7	20.1	12.0	10.4	47.4	309
	Second	59.7	34.4	22.5	10.3	09.9	40.4	302
	Middle	58.4	30.5	22.7	14.3	08.9	41.6	203
	Fourth	71.8	37.6	28.5	21.3	10.8	28.3	277
	Highest	83.6	43.1	25.9	39.7	11.2	16.4	223
	Total	64.5	35.5	23.8	18.6	10.3	35.5	1,314
Comparison area	Lowest	41.0	8.3	22.1	14.3	13.4	59.0	217
	Second	47.8	4.7	23.0	15.2	12.6	52.3	191
	Middle	40.5	8.6	19.9	12.7	9.5	59.5	221
	Fourth	59.7	6.9	30.1	24.2	12.3	40.3	203
	Highest	71.5	6.4	27.1	44.1	11.8	28.5	203
	Total	51.7	7.1	24.4	21.9	11.9	48.3	1,035
Both areas	Lowest	47.8	22.6	20.9	12.9	11.6	52.2	526
	Second	55.1	22.9	22.7	12.2	11.0	44.9	493
	Middle	49.0	19.1	21.2	13.4	9.2	51.0	424
	Fourth	66.7	24.6	29.2	22.5	11.5	33.3	480
	Highest	77.9	25.6	26.5	41.8	11.5	22.1	426
	Total	58.8	23.0	24.0	20.1	11.0	41.2	2,349

*Multiple responses recorded
ANC = Antenatal care; FWV = Family welfare visitor;
HDSS = Health and Demographic Surveillance System.

9.1.2 Use of postnatal care services

For postnatal care services, it was observed that only 19% of the pregnant women received post-natal care (PNC) in Chakaria. This percentage was higher in the intervention area (22%) than in the comparison area (16%). The nurses and doctors were the dominant source for PNC in both the areas (Table 14).

Area	Asset quintile	Received any PNC (%)	Midwife* (%)	FWV* (%)	Nurse/ Doctor* (%)	Others* (%)	None (%)	No. of women
Table 14.	**Postnatal care, Chakaria HDSS, 2004-2005.**							
Intervention area	Lowest	18.3	6.8	6.2	17.5	6.8	81.7	309
	Second	14.7	6.6	5.0	13.3	6.0	85.4	302
	Middle	22.4	7.9	6.4	20.2	6.9	77.7	203
	Fourth	21.5	8.3	6.1	17.7	6.9	78.5	277
	Highest	37.4	12.1	9.8	30.4	7.1	62.6	224
	Total	22.0	8.1	6.5	19.2	6.7	78.0	1,315
Comparison area	Lowest	12.3	5.1	5.5	13.4	5.1	87.8	217
	Second	13.0	0.5	0.5	12.0	1.6	87.0	191
	Middle	12.3	3.6	3.2	10.4	5.0	87.7	221
	Fourth	15.9	3.9	3.9	12.3	2.5	84.1	203
	Highest	27.6	4.4	3.9	26.6	4.9	72.4	203
	Total	16.1	3.6	3.8	14.9	3.9	83.9	1,035
Both areas	Lowest	15.7	6.1	5.9	15.8	6.1	84.3	526
	Second	14.0	4.3	3.3	12.8	4.3	86.0	493
	Middle	17.0	5.7	4.7	15.1	5.9	83.0	424
	Fourth	19.2	6.5	5.2	15.4	5.0	80.9	480
	Highest	32.7	8.4	7.0	28.6	6.1	67.7	427
	Total	19.4	6.1	5.2	17.3	5.5	80.6	2,350

*Multiple responses recorded
PNC= Postnatal care; FWV= Family welfare visitor;
HDSS= Health and Demographic Surveillance System.

9.1.3 Assistance during delivery

In Chakaria, the traditional birth attendants (TBAs) were more popular than the skilled birth attendants (SBAs) for assisting deliveries. Eighty eight percent of 2,191 deliveries in Chakaria were assisted by the TBAs as opposed to 12% of the deliveries assisted by the SBAs (e.g. nurses/doctors, FWVs, midwives). The percentage of deliveries assisted by the TBAs was almost similar in the intervention area (88.5%) and the comparison area (87.6%) (Table 15). 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 (6.1% vs. 4.0%) (Table 15). At the same time, the overall use of SBAs that comprised nurses, doctors, FWVs, and midwives was similar in both comparison (12.4%) and intervention areas (11.5%) (Table 15). This indicates the comparatively higher use of SBAs other than the midwives in the comparison area.

Table 15. Assistance during delivery, Chakaria HDSS, 2004-2005.

Area	Asset quintile	Midwife (%)	FWV (%)	Nurse/ Doctor (%)	TBA (%)	Total (%)	No. of women (%)
Intervention area	Lowest	3.2	0.4	0.0	96.4	100.0	281
	Second	4.6	0.4	1.4	93.6	100.0	281
	Middle	6.8	0.0	3.1	90.1	100.0	192
	Fourth	7.1	0.4	6.0	86.5	100.0	252
	Highest	10.6	1.9	15.9	71.5	100.0	207
	Total	6.1	0.6	4.8	88.5	100.0	1,213
Comparison area	Lowest	2.9	1.0	3.4	92.8	100.0	207
	Second	2.2	1.7	5.0	91.2	100.0	181
	Middle	2.4	1.9	2.4	93.3	100.0	210
	Fourth	4.2	0.5	5.2	90.1	100.0	192
	Highest	8.5	0.5	21.3	69.7	100.0	188
	Total	4.0	1.1	7.3	87.6	100.0	978
Both areas	Lowest	3.1	0.6	1.4	94.9	100.0	488
	Second	3.7	0.9	2.8	92.6	100.0	462
	Middle	4.5	1.0	2.7	91.8	100.0	402
	Fourth	5.9	0.5	5.6	88.1	100.0	444
	Highest	9.6	1.3	18.5	70.6	100.0	395
	Total	5.2	0.8	5.9	88.1	100.0	2,191

FWV = Family welfare visitor; TBA= Traditional birth attendant;
HDSS = Health and Demographic Surveillance System.

9.1.4 Place of delivery

The deliveries were mostly (94.8%) home-based. Only 5.2% of 2,186 deliveries were either at hospitals or at clinics. The percentage of deliveries taking place at the hospitals was higher in the comparison area (6.4%) compared to the intervention area (4.2%) (Table 16).

Table 16. Place of delivery, Chakaria HDSS, 2004-2005.

Area	Asset quintile	Hospital/ clinic (%)	Home (%)	Total (%)	No. of women
Intervention area	Lowest	0.7	99.3	100.0	284
	Second	1.8	98.3	100.0	285
	Middle	2.6	97.4	100.0	193
	Fourth	4.3	95.8	100.0	259
	Highest	14.2	85.8	100.0	205
	Total	4.2	95.8	100.0	1,226
Comparison area	Lowest	2.0	98.0	100.0	203
	Second	2.4	97.6	100.0	169
	Middle	2.4	97.6	100.0	206
	Fourth	6.3	93.8	100.0	192
	Highest	19.0	81.1	100.0	190
	Total	6.4	93.7	100.0	960
Both areas	Lowest	1.3	98.8	100.0	487
	Second	2.0	98.0	100.0	454
	Middle	2.5	97.5	100.0	399
	Fourth	5.1	94.9	100.0	451
	Highest	16.5	83.5	100.0	395
	Total	5.2	94.8	100.0	2,186

HDSS= Health and Demographic Surveillance System.

Socioeconomic inequalities

Socioeconomic variation in many health indicators existed in Chakaria during 2004-2005. This section presents a synopsis of the existing inequalities in health in Chakaria. The extent of inequality was measured using concentration curves and concentration indices.

10.1 Under-5 mortality

A socioeconomic variation was observed in rate of mortality of children, aged less than 5 years (under-5 mortality) in Chakaria. An analysis of rate of under-5 mortality by their socioeconomic status showed that the rate decreased with increasing socioeconomic status and that it was highest among the lowest socioeconomic group (104 per 1,000 livebirths) (Table 4). The concentration curve for under-5 mortality also showed a similar picture where the curve lies above the line of equality, indicating the fact that under-5 mortality was more concentrated in the lower quintiles (Fig. 10). However, the overall magnitude of inequality as reflected by the concentration index (-0.11) was not very high.[1]

Fig. 10. Concentraton curve for under-5 mortality, Chakaria HDSS, 2005.

CI = Concentration index, HDSS= Health and Demographic Surveillance System.

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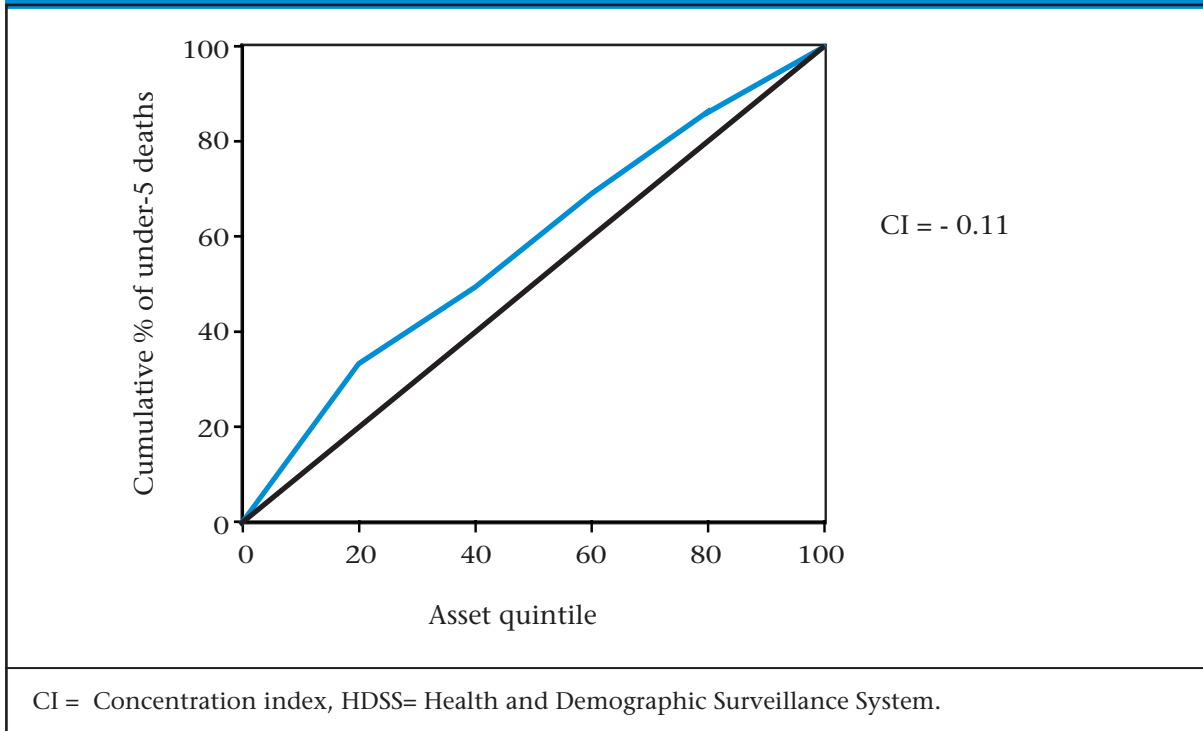
1. Separate concentration curves for the intervention and the comparison area could not be presented here, as the number of under-5 deaths was not sufficient when consisdered spearately for the two areas.

10.2 Fertility

The concentration curve for the number of births taking place in 2005 in Chakaria is presented in Figure 11. The curve lies above the line of equality, reflecting the concentration of births in the lower-socioeconomic quintiles. Table 5 also shows higher fertility among the lower-socioeconomic groups where the crude birth rate decreased with increasing socioeconomic status.[2]

Fig. 11.   Concentration curve for births, Chakaria HDSS, 2005.

CI = Concentration index; HDSS= Health and Demographic Surveillance System.
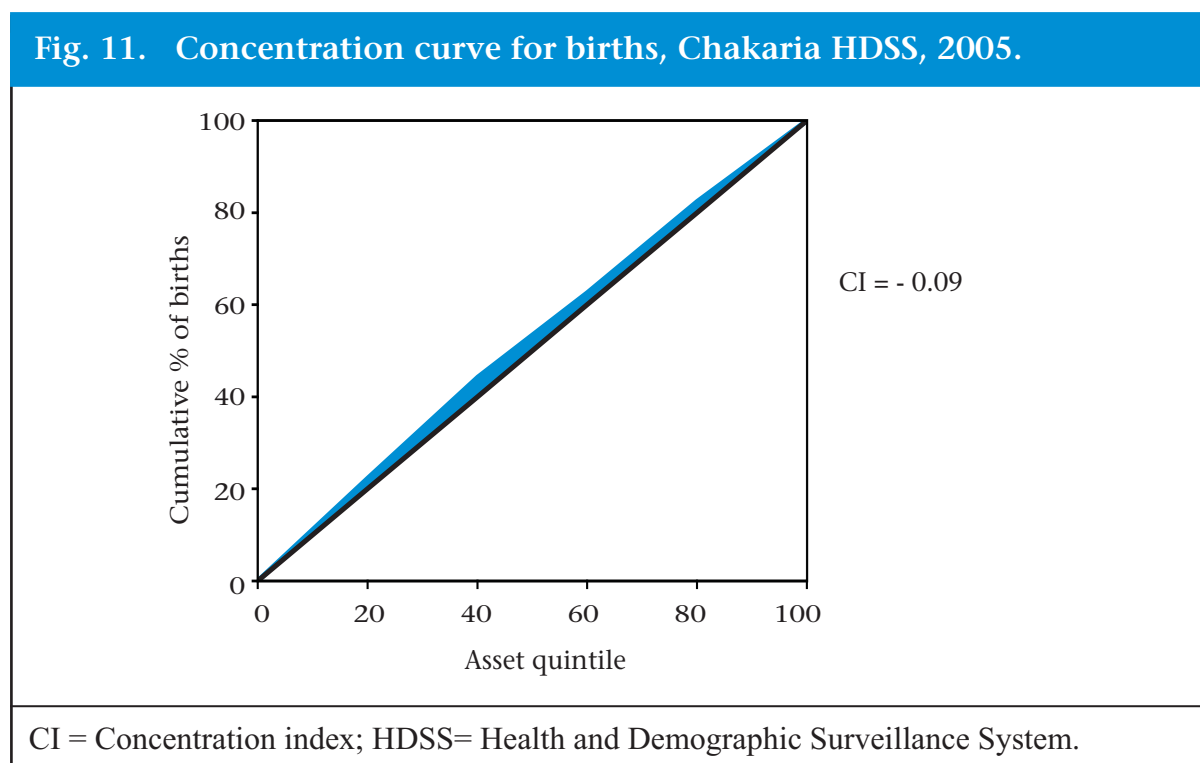
10.3 Marriage

The Singulate mean age at marriage (SMAM) in Chakaria in 2005 varied across different socioeconomic groups. For both males and females, the SMAM increased with increasing socioeconomic status (Table 10).

10.4 Family planning

The use of modern family-planning methods was higher among couples with higher-socioeconomic status. An analysis of the pattern of family-planning method usage by couples belonging to different asset quintiles showed that the use was seven percentage point higher among couples in the highest asset quintile

2. Separate concentration curves for the intervention and the comparison area could not be presented here, as the number of under-5 deaths was not sufficient when consisdered spearately for the two areas.

compared to those in the lowest quintiles (Table 12). The level of inequality was more visible in the comparison area compared to the intervention area. This can be seen from the concentration curves presented in Figure 12 for both the areas. The distance between the concentration curve and the line of equality is greater for the comparison area compared to that of the intervention area. The concentration index for the intervention area (0.03) is also a little smaller than that of the comparison area (0.04).

Fig.12.   Concentration curve for family-planning use, Chakaria HDSS, 2005.

CI = Concentration index, HDSS= Health and Demographic Surveillance System.
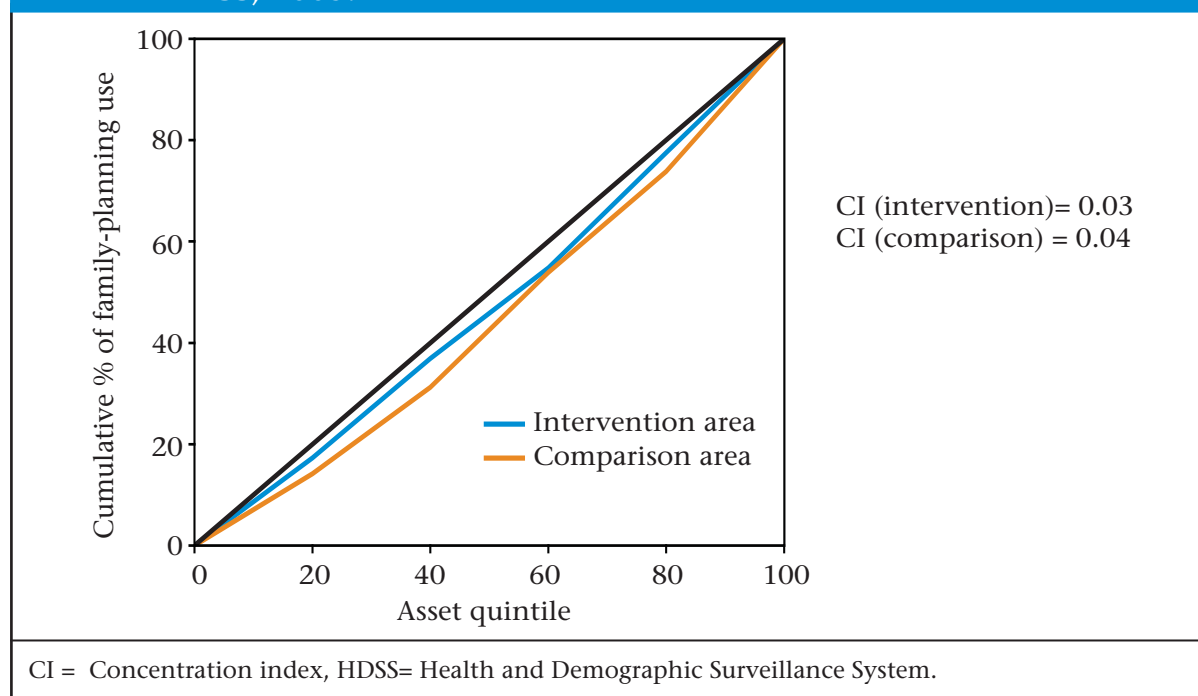
10.5 Use of antenatal care services

The concentration curves for the use of ANC services in the intervention and comparison areas are presented in Figure 13. It shows that the use of ANC services in the intervention area was equitable among the bottom 40% of the population. However, the use was inequitable among the upper 60% of the women in the sense that their share of use was less than what it takes the use of ANC services to be perfectly equitable throughout the whole area. On the other hand, there existed an unequal distribution of use of ANC services in the comparison area where the rich were using more services compared to the poor. This is also reflected in the value of the concentration index for the use of ANC services. The concentration index in the comparison area was 0.11, which was higher than that (0.9) of the intervention area.

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Fig. 13. Concentration curve for use of ANC services, Chakaria HDSS, 2004-2005.

CI (intervention)= 0.09
CI (comparison) = 0.11

CI = Concentration index; ANC = Antenatal care;
HDSS = Health and Demographic Surveillance System.

The extent of inequity in these areas can also be seen from the difference in the proportion of use of ANC service, among the various asset quintiles presented in Table 13. The use of ANC services in both comparison and intervention areas increased with increasing socioeconomic status of pregnant women. In the intervention area, the difference between the lowest and the highest quintile was largest in the use of nurses and doctors for ANC, followed by midwives. In the comparison area, this difference was largest in the use of nurses/doctors followed by the FWVs (Table 13).

10.6 Use of postnatal care services

Figure 14 plots the concentration curves for the use of PNC service in both comparison and intervention areas. Although the curve for the intervention area shows that the distribution of use of PNC service was equal for the bottom 20% of women, the distribution has not been equal for the remaining women. However, between the two curves, the one for the comparison area lies further from the line of equality compared to the curve for the intervention area. This indicates that the degree of inequality in the use of PNC service was higher in the comparison area compared to the intervention area. The concentration index for the comparison area (0.16) is also slightly higher than that for the intervention area (0.15).

Fig. 14. Concentration curve for use of PNC services, Chakaria HDSS, 2004-2005.

CI (intervention)= 0.15
CI (comparison) = 0.16

CI = Concentration index, HDSS= Health and Demographic Surveillance System.
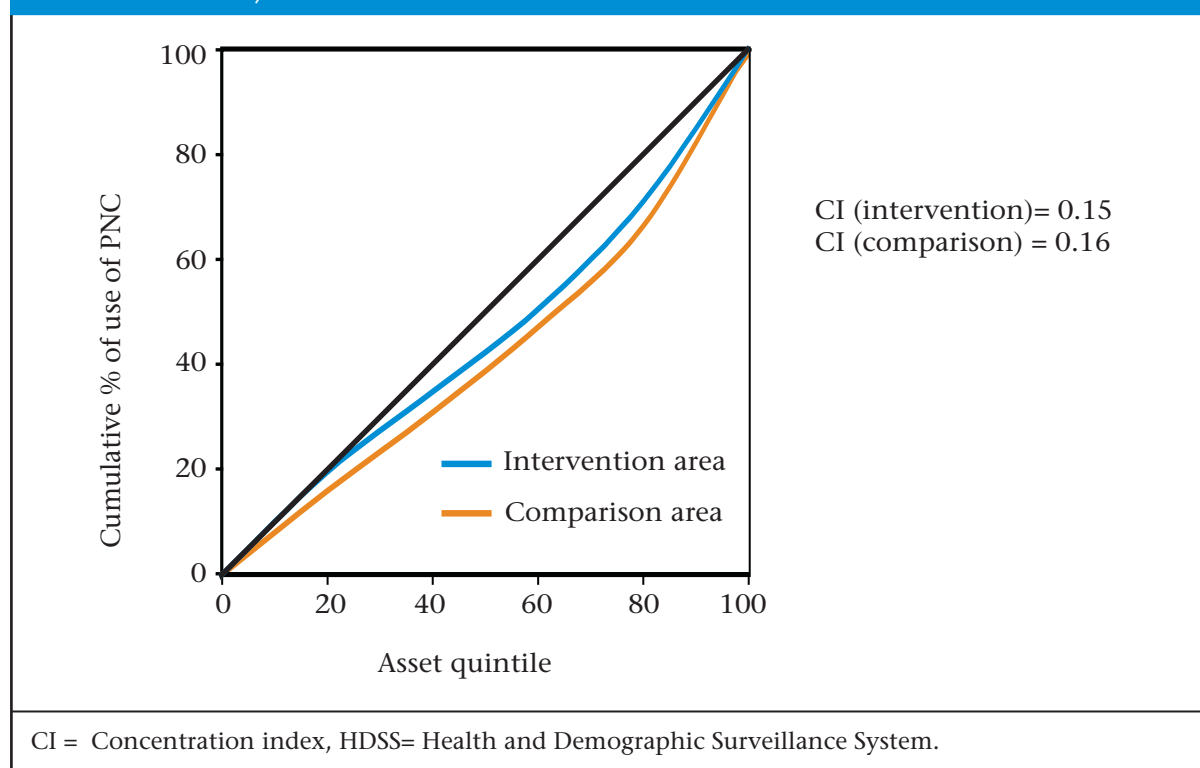
Table 14 also shows that the use of PNC service was higher among the lower quintiles in the intervention area compared to the comparison area. Also, the difference among the various asset quintiles was higher in the comparison area compared to the intervention area (Table 14).

10.7 Assistance during delivery

10.7.1 Traditional birth attendant

The concentration curves for assistance of traditional birth attendants (TBAs) during delivery in the intervention and the comparison areas are presented in Figure 15. Both the curves lie above the line of equality, which indicates that the services of the TBAs were more used by the poor compared to the rich in both the areas. The percentage of poor seeking TBA assistance during delivery was also more in the intervention area compared to that in the comparison area (Fig. 15). The bottom 20% of the people in the intervention area were seeking around 25% of services provided by the TBAs, whereas, in the comparison area the bottom 20% of the people were seeking around 22% of services. However, the value of the concentration index indicates an overall higher degree of inequality in the intervention area (-0.05) compared to the comparison area (-0.04).

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Fig. 15. Concentration curve for the use of the services of TBAs during delivery, Chakaria HDSS, 2004-2005.

CI (intervention)= - 0.05
CI (comparison) = - 0.04

TBA= Traditional birth attendant; HDSS= Health and Demographic Surveillance System.
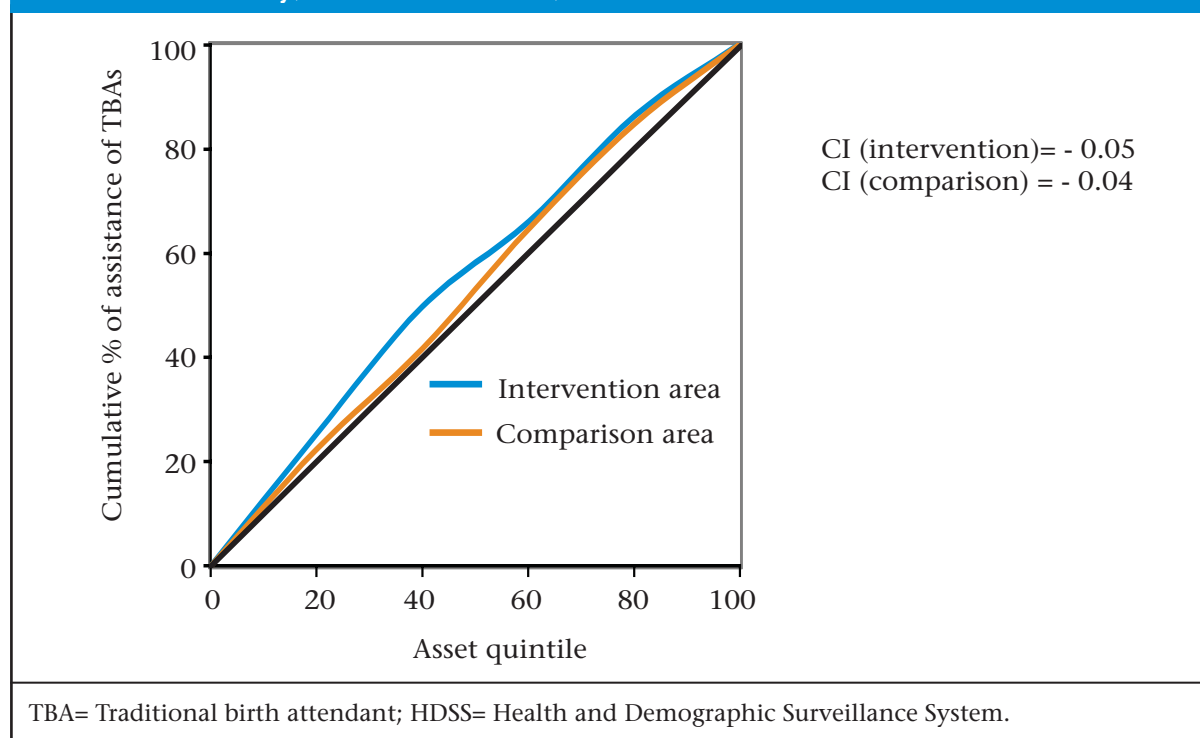
Table 15 also depicts the same picture, where a higher degree of use of TBA service was observed among the poorer quintiles compared to the rich in both the areas. Among the women belonging to the lowest quintile, the use was around 96% in the intervention area and 93% in the comparison area (Table 15).

10.7.2 Skilled birth attendant

The use of the services of skilled birth attendants (SBA) during delivery was not so common in the poorer segment of the population in Chakaria. In the intervention area, only 7% of the services of SBAs was sought by the bottom 20% pregnant women during delivery. In the comparison area, this percentage was a little higher (12%), indicating that the poor in the intervention area were using less of skilled attendance during delivery compared to those in the comparison area (Fig. 16).

Overall, it can be seen from figure 16 that the services of SBAs were more concentrated towards the richer segment of the population in both intervention and comparison areas as the concentration curves lie below the line of equality. This is also visible in Table 15 where we observe an increase in the use of SBAs with increasing socioeconomic status in both comparison and intervention areas. The concentration index for the intervention area (0.38) was greater than that for
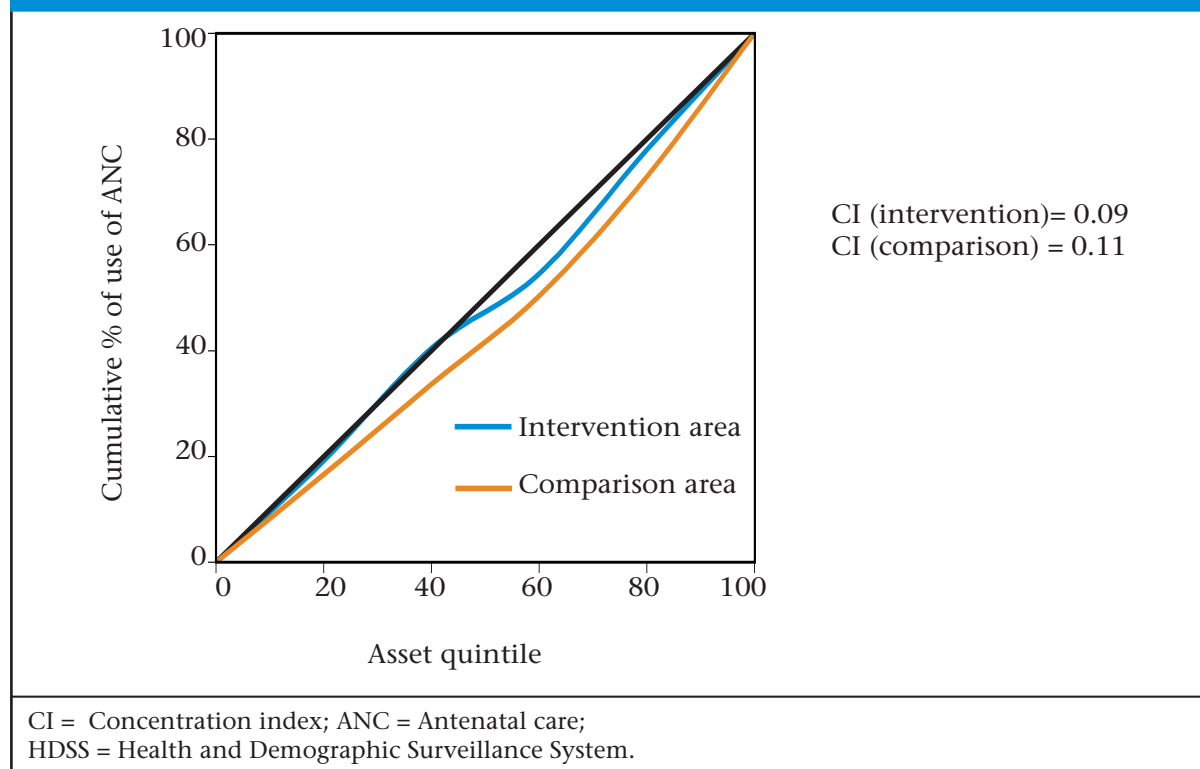
the comparison area (0.30). But the degrees of inequality between these two areas are not comparable due to the fact that the two curves intersect each other at one point (Fig.16).

Fig. 16.   Concentration curve for the use of the services of SBAs during delivery, Chakaria HDSS, 2004-2005.

CI (intervention)= 0.38
CI (comparison) = 0.30

CI = Concentration index; SBA= Skilled birth attendant;
HDSS= Health and Demographic Surveillance System.
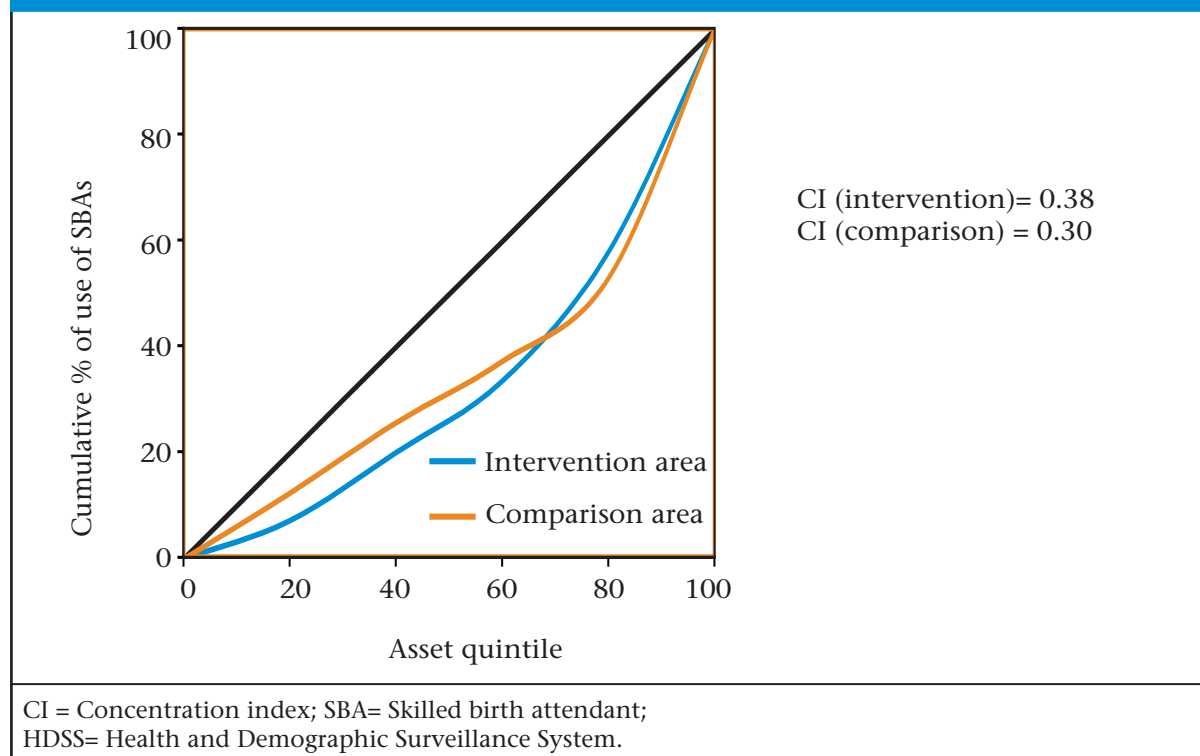
10.8 Place of delivery

10.8.1 Delivery at home

The concentration curves for delivery at home in the comparison and intervention areas are presented in figure 17. The curves lie above the line of equality, and the value of the concentration index for both the areas came out to be negative. These indicate that delivery at home was more concentrated around the poorer segment of the population. Figure 17 also shows that the practice of delivery at home was equally distributed across the various asset quintiles in the comparison area. In the intervention area, although delivery at home was not equally distributed among women from various quintiles, the extent of inequity as indicated by the concentration index (-0.02) was small.

Table 16 shows the percentage of pregnant women in various asset quintiles having deliveries at home. The table shows that more than 99% of women in the

lowest quintile delivered their babies at home. This percentage was a little higher in the intervention area (99.3%) compared to the comparison area (98%).

Fig. 17.   Concentration curve for delivery at home, Chakaria HDSS, 2004-2005.

CI (intervention)= - 0.02
CI (comparison) = - 0.03

CI = Concentration index; HDSS= Health and Demographic Surveillance System.
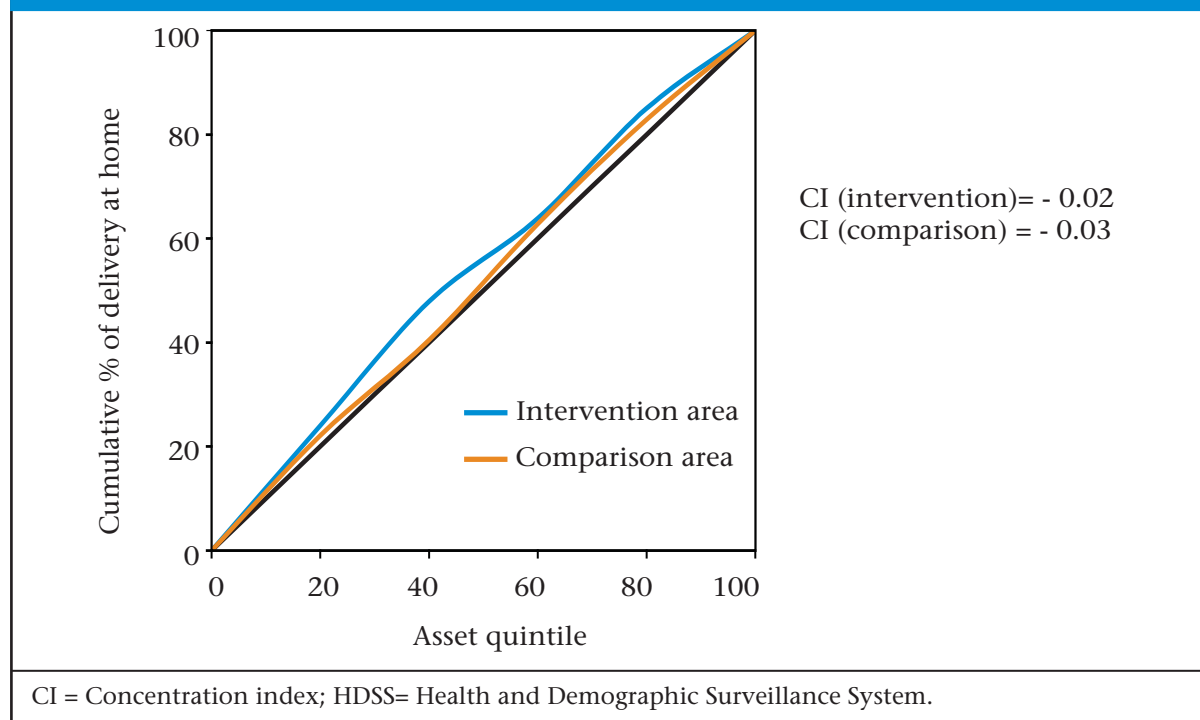
10.8.2 Hospital/clinic-based delivery

Figure 18 presents the concentration curves for hospital/clinic-based deliveries in the intervention and comparison areas. Both the curves lie below the line of equality, which again indicates a concentration of the use of hospital services for delivery among the rich. The concentration index was 0.47 for the comparison area, and for the intervention area, it was 0.51. These high values of the index indicate a higher degree of inequality in both the areas. Data from Table 16 also shows the level of inequality in the use of hospital services among various asset quintiles. It shows that the use of facilities by women from the highest quintile was 20 times the use by women from the lowest quintile in the intervention area and 10 times in the comparison area (Table 16).

Fig. 18.   Concentration curve for hospital/clinic-based deliveries, Chakaria HDSS, 2004-2005.

CI (intervention) = 0.51
CI (comparison) = 0.47
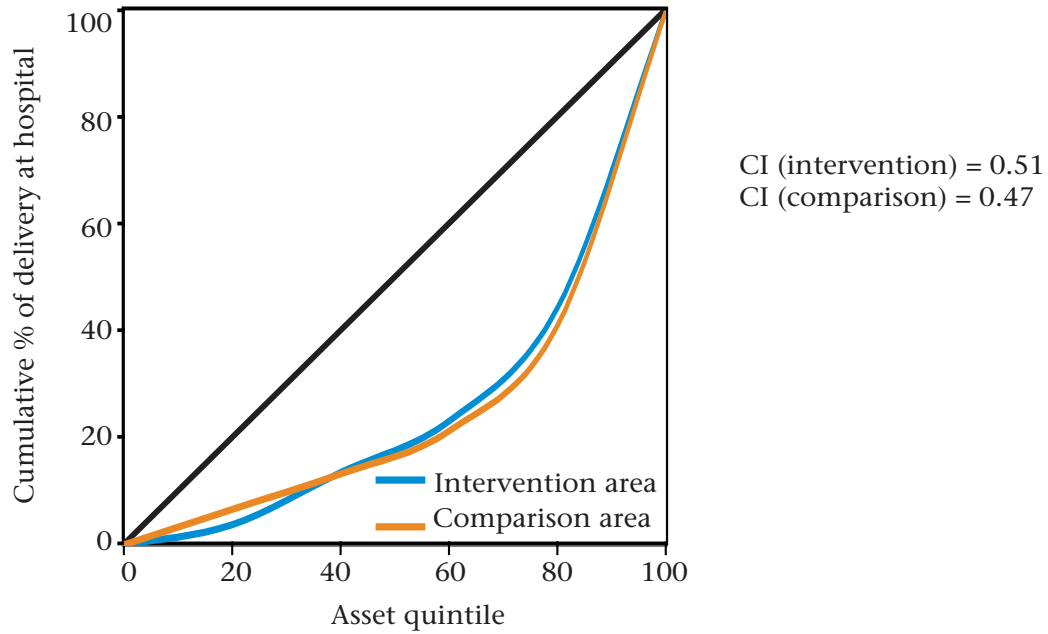
CI = Concentration index; HDSS= Health and Demographic Surveillance System.

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APPENDIX A

Mid-year Population, Chakaria HDSS, 2005

Age (years)	Intervention area			Comparison area			Both areas		
	Male	Female	Both	Male	Female	Both	Male	Female	Both
<1	336	313	649	294	235	529	630	548	1,178
1-4	1,328	1,311	2,639	1,064	998	2,062	2,392	2,309	4,701
5-9	1,806	1,695	3,501	1,530	1,470	3,000	3,336	3,165	6,501
10-14	1,738	1,696	3,434	1,484	1,505	2,989	3,222	3,201	6,423
15-19	1,605	1,513	3,118	1,370	1,320	2,690	2,975	2,833	5,808
20-24	1,054	896	1,950	904	733	1,637	1,958	1,629	3,587
25-29	761	831	1,592	662	678	1,340	1,423	1,509	2,932
30-34	620	631	1,251	508	543	1,051	1,128	1,174	2,302
35-39	606	607	1,213	458	521	979	1,064	1,128	2,192
40-44	499	464	963	417	438	855	916	902	1,818
45-49	459	428	887	430	445	875	889	873	1,762
50-54	354	302	656	340	299	639	694	601	1,295
55-59	321	245	566	304	211	515	625	456	1,081
60-64	233	192	425	213	161	374	446	353	799
65-69	156	147	303	142	122	264	298	269	567
70-74	158	133	291	118	113	231	276	246	522
75-79	105	68	173	80	57	137	185	125	310
80-84	63	42	105	40	35	75	103	77	180
85+	67	44	111	46	48	94	113	92	205
All	12,269	11,558	23,827	10,404	9,932	20,336	22,673	21,490	44,163

Population Distribution, Chakaria HDSS, 2005

Age (years)	Intervention area (%)			Comparison area (%)			Both areas (%)		
	Male	Female	Both	Male	Female	Both	Male	Female	Both
<1	2.7	2.7	2.7	2.8	2.4	2.6	2.8	2.6	2.7
1-4	10.8	11.3	11.1	10.2	10.0	10.1	10.5	10.7	10.6
5-9	14.7	14.7	14.7	14.7	14.8	14.8	14.7	14.7	14.7
10-14	14.2	14.7	14.4	14.3	15.2	14.7	14.2	14.9	14.5
15-19	13.1	13.1	13.1	13.2	13.3	13.2	13.1	13.2	13.2
20-24	8.6	7.8	8.2	8.7	7.4	8.0	8.6	7.6	8.1
25-29	6.2	7.2	6.7	6.4	6.8	6.6	6.3	7.0	6.6
30-34	5.1	5.5	5.3	4.9	5.5	5.2	5.0	5.5	5.2
35-39	4.9	5.3	5.1	4.4	5.2	4.8	4.7	5.2	5.0
40-44	4.1	4.0	4.0	4.0	4.4	4.2	4.0	4.2	4.1
45-49	3.7	3.7	3.7	4.1	4.5	4.3	3.9	4.1	4.0
50-54	2.9	2.6	2.8	3.3	3.0	3.1	3.1	2.8	2.9
55-59	2.6	2.1	2.4	2.9	2.1	2.5	2.8	2.1	2.4
60-64	1.9	1.7	1.8	2.0	1.6	1.8	2.0	1.6	1.8
65-69	1.3	1.3	1.3	1.4	1.2	1.3	1.3	1.3	1.3
70-74	1.3	1.2	1.2	1.1	1.1	1.1	1.2	1.1	1.2
75-79	0.9	0.6	0.7	0.8	0.6	0.7	0.8	0.6	0.7
80-84	0.5	0.4	0.4	0.4	0.4	0.4	0.5	0.4	0.4
85+	0.5	0.4	0.5	0.4	0.5	0.5	0.5	0.4	0.5
All	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Number of Deaths by Age and Sex, Chakaria HDSS, 2005

Age (years)	Intervention area			Comparison area			Both areas		
	Male	Female	Both	Male	Female	Both	Male	Female	Both
<1	13	15	28	19	15	34	32	30	62
1-4	9	11	20	6	5	11	15	16	31
5-9	5	2	7	0	3	3	5	5	10
10-14	1	1	2	2	3	5	3	4	7
15-19	0	4	4	1	3	4	1	7	8
20-24	2	0	2	1	1	2	3	1	4
25-29	3	0	3	0	0	0	3	0	3
30-34	0	1	1	2	1	3	2	2	4
35-39	1	0	1	1	1	2	2	1	3
40-44	1	2	3	0	3	3	1	5	6
45-49	0	1	1	3	0	3	3	1	4
50-54	4	3	7	1	2	3	5	5	10
55-59	2	1	3	4	1	5	6	2	8
60-64	7	3	10	4	3	7	11	6	17
65-69	2	4	6	3	1	4	5	5	10
70-74	6	4	10	9	7	16	15	11	26
75-79	4	4	8	10	1	11	14	5	19
80-84	3	1	4	5	3	8	8	4	12
85+	10	8	18	5	4	9	15	12	27
All	73	65	138	76	57	133	149	122	271

Number of In-migrants by Age and Sex, Chakaria HDSS, 2005

Age (years)	Intervention area			Comparison area			Both areas		
	Male	Female	Both	Male	Female	Both	Male	Female	Both
<1	9	9	18	9	7	16	18	16	34
1-4	18	20	38	12	21	33	30	41	71
5-9	18	22	40	10	12	22	28	34	62
10-14	31	29	60	15	24	39	46	53	99
15-19	35	168	203	24	141	165	59	309	368
20-24	31	54	85	20	60	80	51	114	165
25-29	30	18	48	21	21	42	51	39	90
30-34	21	6	27	19	2	21	40	8	48
35-39	9	5	14	11	4	15	20	9	29
40-44	7	2	9	6	0	6	13	2	15
45-49	3	4	7	2	2	4	5	6	11
50-54	2	3	5	1	4	5	3	7	10
55-59	1	1	2	0	3	3	1	4	5
60-64	4	2	6	2	4	6	6	6	12
65-69	0	2	2	3	5	8	3	7	10
70-74	2	4	6	1	4	5	3	8	11
75-79	2	6	8	0	5	5	2	11	13
80-84	1	2	3	0	2	2	1	4	5
85+	1	2	3	1	4	5	2	6	8
All	225	359	584	157	325	482	382	684	1,066

In-migration Rate Per 1,000 Population by Age and Sex, Chakaria HDSS, 2005

Age (years)	Intervention area			Comparison area			Both areas		
	Male	Female	Both	Male	Female	Both	Male	Female	Both
<1	26.8	28.8	27.7	30.6	38.3	30.2	28.6	29.2	28.9
1-4	13.6	15.3	14.4	16.9	20.0	16.0	12.5	17.8	15.1
5-9	10.0	13.0	11.4	11.8	15.0	7.3	8.4	10.7	9.5
10-14	17.8	17.1	17.5	20.9	19.3	13.0	14.3	16.6	15.4
15-19	21.8	111.0	65.1	25.5	127.3	61.3	19.8	109.1	63.4
20-24	29.4	60.3	43.6	34.3	73.7	48.9	26.0	70.0	46.0
25-29	39.4	21.7	30.2	45.3	26.5	31.3	35.8	25.8	30.7
30-34	33.9	9.5	21.6	41.3	11.0	20.0	35.5	6.8	20.9
35-39	14.9	8.2	11.5	19.7	9.6	15.3	18.8	8.0	13.2
40-44	14.0	4.3	9.3	16.8	4.6	7.0	14.2	2.2	8.3
45-49	6.5	9.3	7.9	7.0	9.0	4.6	5.6	6.9	6.2
50-54	5.6	9.9	7.6	5.9	10.0	7.8	4.3	11.6	7.7
55-59	3.1	4.1	3.5	3.3	4.7	5.8	1.6	8.8	4.6
60-64	17.2	10.4	14.1	18.8	12.4	16.0	13.5	17.0	15.0
65-69	0.0	13.6	6.6	0.0	16.4	30.3	10.1	26.0	17.6
70-74	12.7	30.1	20.6	16.9	35.4	21.6	10.9	32.5	21.1
75-79	19.0	88.2	46.2	25.0	105.3	36.5	10.8	88.0	41.9
80-84	15.9	47.6	28.6	25.0	57.1	26.7	9.7	51.9	27.8
85+	14.9	45.5	27.0	21.7	41.7	53.2	17.7	65.2	39.0
All	18.3	31.1	24.5	15.1	32.7	23.7	16.8	31.8	24.1

Number of Out-migrants by Age and Sex, Chakaria HDSS, 2005

Age (years)	Intervention area			Comparison area			Both areas		
	Male	Female	Both	Male	Female	Both	Male	Female	Both
<1	8	8	16	7	7	14	15	15	30
1-4	10	13	23	10	11	21	20	24	44
5-9	13	13	26	11	13	24	24	26	50
10-14	16	21	37	17	32	49	33	53	86
15-19	27	155	182	29	154	183	56	309	365
20-24	48	86	134	25	57	82	73	143	216
25-29	35	30	65	35	37	72	70	67	137
30-34	27	8	35	22	5	27	49	13	62
35-39	9	2	11	11	7	18	20	9	29
40-44	2	3	5	5	2	7	7	5	12
45-49	3	2	5	5	1	6	8	3	11
50-54	2	2	4	4	1	5	6	3	9
55-59	0	2	2	0	2	2	0	4	4
60-64	0	3	3	3	3	6	3	6	9
65-69	1	4	5	1	1	2	2	5	7
70-74	2	6	8	1	1	2	3	7	10
75-79	1	0	1	2	2	4	3	2	5
80-84	2	3	5	0	2	2	2	5	7
85+	0	0	0	1	0	1	1	0	1
All	206	361	567	189	338	527	395	699	1,094

Out-migration Rate Per 1,000 Population by Age and Sex, Chakaria HDSS, 2005

Age (years)	Intervention area			Comparison area			Both areas		
	Male	Female	Both	Male	Female	Both	Male	Female	Both
<1	23.8	25.6	24.7	27.2	34.0	26.5	23.8	27.4	25.5
1-4	7.5	9.9	8.7	9.4	13.0	10.2	8.4	10.4	9.4
5-9	7.2	7.7	7.4	8.5	8.8	8.0	7.2	8.2	7.7
10-14	9.2	12.4	10.8	10.8	14.0	16.4	10.2	16.6	13.4
15-19	16.8	102.4	58.4	19.7	117.4	68.0	18.8	109.1	62.8
20-24	45.5	96.0	68.7	53.1	117.3	50.1	37.3	87.8	60.2
25-29	46.0	36.1	40.8	52.9	44.2	53.7	49.2	44.4	46.7
30-34	43.5	12.7	28.0	53.1	14.7	25.7	43.4	11.1	26.9
35-39	14.9	3.3	9.1	19.7	3.8	18.4	18.8	8.0	13.2
40-44	4.0	6.5	5.2	4.8	6.8	8.2	7.6	5.5	6.6
45-49	6.5	4.7	5.6	7.0	4.5	6.9	9.0	3.4	6.2
50-54	5.6	6.6	6.1	5.9	6.7	7.8	8.6	5.0	6.9
55-59	0.0	8.2	3.5	0.0	9.5	3.9	0.0	8.8	3.7
60-64	0.0	15.6	7.1	0.0	18.6	16.0	6.7	17.0	11.3
65-69	6.4	27.2	16.5	7.0	32.8	7.6	6.7	18.6	12.3
70-74	12.7	45.1	27.5	16.9	53.1	8.7	10.9	28.5	19.2
75-79	9.5	0.0	5.8	12.5	0.0	29.2	16.2	16.0	16.1
80-84	31.7	71.4	47.6	50.0	85.7	26.7	19.4	64.9	38.9
85+	0.0	0.0	0.0	0.0	0.0	10.6	8.8	0.0	4.9
All	16.8	31.2	23.8	18.2	34.0	25.9	17.4	32.5	24.8

Percentage of Male Population by Age and Marital Status, Intervention Area, Chakaria HDSS, 2005

Age (years)	Married	Divorced	Abandoned	Widowed	Separated	Never married	Population
<1	0.0	0.0	0.0	0.0	0.0	100.0	336
1-4	0.0	0.0	0.0	0.0	0.0	100.0	1,328
5-9	0.0	0.0	0.0	0.0	0.0	100.0	1,806
10-14	0.1	0.0	0.0	0.0	0.0	100.0	1,738
15-19	1.1	0.0	0.0	0.0	0.0	98.9	1,605
20-24	14.8	0.1	0.0	0.1	0.0	85.1	1,054
25-29	50.5	0.3	0.0	0.1	0.3	48.9	761
30-34	84.2	0.1	0.3	0.3	0.3	14.9	620
35-39	95.0	0.2	0.2	0.5	0.2	4.0	606
40-44	98.6	0.2	0.4	0.2	0.2	0.5	499
45-49	98.9	0.0	0.0	0.7	0.0	0.5	459
50-54	98.0	0.0	0.0	1.8	0.3	0.0	354
55-59	96.5	0.4	0.4	2.8	0.0	0.0	321
60-64	95.6	0.4	0.0	3.2	0.8	0.0	233
65-69	98.1	0.0	0.0	1.9	0.0	0.0	156
70-74	90.2	0.0	0.6	9.2	0.0	0.0	158
75-79	84.1	0.0	0.0	15.9	0.0	0.0	105
80-84	83.5	0.0	0.0	15.3	0.0	1.2	63
85+	75.0	0.0	0.0	25.0	0.0	0.0	67
All	31.6	0.1	0.1	0.7	0.1	67.5	12,269

Percentage of Female Population by Age and Marital Status, Intervention Area, Chakaria HDSS, 2005

Age (years)	Married	Divorced	Abandoned	Widowed	Separated	Never married	Population
<1	0.0	0.0	0.0	0.0	0.0	100.0	313
1-4	0.0	0.0	0.0	0.0	0.0	100.0	1,311
5-9	0.0	0.0	0.0	0.0	0.0	100.0	1,695
10-14	0.4	0.0	0.0	0.0	0.0	99.6	1,696
15-19	21.8	0.4	0.1	0.1	0.4	77.2	1,513
20-24	68.8	0.7	0.6	0.5	0.9	28.4	896
25-29	89.6	1.3	0.7	1.5	1.4	5.5	831
30-34	93.2	1.8	0.8	2.5	1.1	0.6	631
35-39	90.5	1.4	1.1	5.4	1.2	0.5	607
40-44	86.7	1.2	0.2	10.1	1.7	0.2	464
45-49	78.3	1.8	1.5	16.5	1.5	0.5	428
50-54	73.1	0.6	0.6	22.8	2.8	0.0	302
55-59	69.9	1.2	0.4	28.5	0.0	0.0	245
60-64	56.9	0.9	0.0	41.2	0.9	0.0	192
65-69	51.1	1.5	0.0	47.4	0.0	0.0	147
70-74	32.0	1.3	0.0	64.7	1.3	0.0	133
75-79	26.7	0.0	0.0	71.1	2.2	0.0	68
80-84	13.6	0.0	0.0	83.1	3.4	0.0	42
85+	8.7	0.0	0.0	89.1	0.0	0.0	44
All	35.6	0.6	0.3	5.7	0.6	57.3	11,558

Percentage of Male Population by Age and Marital Status, Comparison Area, Chakaria HDSS, 2005

Age (years)	Married	Divorced	Abandoned	Separated	Widowed	Never married	Population
<1	0.0	0.0	0.0	0.0	0.0	100.0	294
1-4	0.0	0.0	0.0	0.0	0.0	100.0	1,064
5-9	0.0	0.0	0.0	0.0	0.0	100.0	1,530
10-14	0.0	0.0	0.0	0.0	0.0	100.0	1,484
15-19	0.9	0.0	0.0	0.0	0.0	99.1	1,370
20-24	12.6	0.0	0.0	0.1	0.0	87.3	904
25-29	54.9	0.0	0.2	0.0	0.0	45.0	662
30-34	85.6	0.3	0.0	0.2	0.2	13.8	508
35-39	95.2	0.2	0.0	0.2	0.2	4.1	458
40-44	99.0	0.0	0.0	0.2	0.2	0.7	417
45-49	99.2	0.0	0.3	0.3	0.0	0.3	430
50-54	99.1	0.0	0.0	0.2	0.7	0.0	340
55-59	99.0	0.0	0.0	0.0	1.0	0.0	304
60-64	95.6	0.0	0.0	0.4	4.1	0.0	213
65-69	94.1	0.0	0.0	0.0	5.9	0.0	142
70-74	86.4	0.0	0.0	0.0	12.9	0.7	118
75-79	87.8	0.0	0.0	0.0	12.2	0.0	80
80-84	90.6	0.0	0.0	0.0	9.4	0.0	40
85+	79.5	0.0	0.0	0.0	20.5	0.0	46
All	32.2	0.0	0.0	0.1	0.6	67.2	10,404

Percentage of Female Population by Age and Marital Status, Comparison Area, Chakaria HDSS, 2005

Age (years)	Married	Divorced	Abandoned	Separated	Widowed	Never married	Population
<1	0.0	0.0	0.0	0.0	0.0	100.0	235
1-4	0.0	0.0	0.0	0.0	0.0	100.0	998
5-9	0.0	0.0	0.0	0.0	0.0	100.0	1,470
10-14	0.4	0.0	0.1	0.0	0.1	99.5	1,505
15-19	22.1	0.3	0.4	0.3	0.1	76.9	1,320
20-24	73.3	0.8	1.0	0.6	1.3	23.0	733
25-29	88.7	0.5	0.7	0.9	2.8	6.4	678
30-34	91.5	1.9	0.8	0.6	4.5	0.6	543
35-39	90.5	1.7	0.6	0.9	5.5	0.9	521
40-44	84.3	1.2	0.2	2.5	11.4	0.4	438
45-49	80.7	0.8	0.6	0.8	16.0	1.1	445
50-54	71.7	1.2	0.5	0.5	25.7	0.5	299
55-59	65.3	0.0	0.0	0.7	34.0	0.0	211
60-64	49.3	0.5	0.5	0.5	48.9	0.5	161
65-69	40.0	0.0	1.0	1.9	57.1	0.0	122
70-74	25.2	0.0	1.8	0.0	72.1	0.9	113
75-79	26.3	0.0	0.0	0.0	73.7	0.0	57
80-84	22.5	0.0	0.0	0.0	75.5	2.0	35
85+	8.7	0.0	0.0	0.0	91.3	0.0	48
All	35.9	0.5	0.3	0.4	6.6	56.3	9,932

Chakaria HDSS Project Team, 2005

Name of staff	Designation
Dhaka	
Abbas Bhuiya	Project Director
Mohammad Iqbal	Public Health Physician
S.M. Manzoor Ahmed Hanifi	Statistician
Rawen R. Aziz	Research Investigator
Tania Wahed	Research Investigator
Shehrin Shaila Mahmood	Research Investigator
Tamanna Sharmin	Research Investigator
A.B. Siddiq	Senior Administrative Officer
A.Z. Khan	Field Research Officer
Repon Paul	Research Assistant
Ayesha Begum	Senior Data Management Assistant
Chakaria	
Nazma Begum	Project Physician
Ariful Moula	Field Research Officer
Shahidul Hoque	Field Research Officer
Mosammat Mobashara	Field Research Officer
Sujaul Islam Mondol	Community Health Educator
Hosnera Rina	Community Health Educator
Ashish Paul	Data Management Assistant
Snahashis	Data Management Assistant
Hasan Ahmed Forkan	Administrative Assistant
Imran Al-Habib	Administrative Assistant