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Report- Health and Demographic Surveillance System:
Slums of Dhaka (North and South) and Gazipur City
Corporations-

Registration of Health and Demographic Events, 2016

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List of abbreviations:

ADB	Asian Development Bank
BBS	Bangladesh Bureau of Statistics
BMMS	Bangladesh Maternal Mortality Survey
COPD	Chronic Obstructive Pulmonary Disease
C/S	Cesarean Section
FWV	Family Welfare Visitor
HDSS	Health and Demographic Surveillance System
icddr,b	International Centre for Diarrhoeal Disease Research, Bangladesh
INDEPTH	International Network for the Demographic Evaluation of Populations and Their Health in Developing Countries
MBBS	Bachelor of Medicine and Bachelor of Surgery
NIPORT	National Institute of Population Research and Training
NGO	Non-Government Organization
PMU	Project Management Unit
TRC	Technical Review Committee
TBA	Traditional Birth Attendant
TTBA	Train Traditional Birth Attendant
UPHCSDP	Urban Primary Health Care Services Delivery Project
UN	United Nations
UHS	Urban Health Survey
UNFPA	United Nations Population Fund

Summary of Key Findings and Implications

The population of Bangladesh will increase by about 30 million to roughly 185 million by 2030 (UN 2014); almost all of that growth will occur in urban areas. It has also been estimated that Bangladesh will be more urban than rural by the middle of this century; more than a third of these urban residents will dwell in slum settlements.

To address the urban health challenge, the Government of Bangladesh with assistance from donors (ADB, Embassy of Sweden, and UNFPA) has been implementing the Urban Primary Health Care Services Delivery Project (UPHCSDP). The ultimate aim of the UPHCSDP is to improve the health status of the urban poor, especially women and children.

The overall objective of the project is to set up a Health and Demographic Surveillance System (HDSS) in the selected slums of Dhaka (North and South) and Gazipur City Corporations. The specific objective of the HDSS is to collect data (every three months) on the following:

- Pregnancy outcome: Livebirth, stillbirth, miscarriage induced and miscarriage spontaneous
- Death: All ages and causes of death
- Migrations: in-migration, and out-migration, and internal-movement, and their causes
- Age at marriage and divorce
- Safe motherhood: Antenatal and postnatal care (number of visits, source of service, service provider, types of delivery, who attended delivery, and mode of delivery).

Main findings of the surveillance data for 2016 (January to December) are reported below:

- Out of total pregnancies, 82.6% was livebirth, 5.4% induced miscarriage, 9.2% spontaneous miscarriage, and 2.8% stillbirth.
- The crude birth rate recorded in the slums was 14.6 (per 1000 population), while the total fertility rate was 1.3 (per women).
- Twenty-five per cent births were for mothers age under 20 years, 35.1% births were for mothers aged 20-24, while 4.8% births were for mothers of age 35 or more.
- The crude death rate recorded in the slums was 3.9 (per 1000 population); crude death rate for male was higher than female (4.5 vs 3.3).
- Infant mortality rate was 52.6 (per 1000 livebirths) and under-five mortality rate was 60.3 (per 1000 livebirths); more boys died during infancy (61.3 vs 43.9) and during under-five years of age (69.0 vs 51.6) than girls.
- Expectation of life at birth was higher for females than males (72.5 vs 70.4), however expectation of life in most age-groups below 55 years were higher for female than male, then reversed. Probability of dying for age 15-59 years (45q15) was 161.2 for male and 126.4 for female (per 1000 population).
- Non-communicable disease was the leading cause of death (51.6%); followed by communicable disease (12.5%), accident/injury (10.0%), maternal and neonatal (9.6%), while 11.7% deaths were either old age or unspecified.

- Among non-communicable diseases, the most prevalent cause was stroke (17.2%), followed by cancer (10.5%) and heart disease (9.2%), while among communicable diseases, the most prominent cause was pneumonia/respiratory infection (9.2%). For maternal and neonatal condition, the most prevalent was unspecified neonatal cause (6.4%), followed by delivery complications (2.3%), while among accident/injury/murder, the most prevalent was accident (4.5%).
- The mean age of marriage for brides was 17.5; forty-five per cent marriage took place before age 18 years. For grooms, the mean age of marriage was 22.6; eighteen per cent marriage took place before age 20 years.
- The mean age of divorce for brides was 21.4; fifty-two per cent divorces took place before age 20 years. For grooms, the mean age of marriage was 22.6; fourteen per cent divorces took place before age 20 years.
- In-migration rate in the slums was 132.8, out-migration rate was 127.9, while internal-movement rate was 94.0 (per 1000 population).
- Forty-four per cent in-migrations were due to joining family, followed by looking for work (41.1%). For out-migration, 46.7% was due to joining family, followed by looking for work (25.5%). For internal movement, 55.6% was due to marriage/joining family followed by household split (36.2%).
- The height rate (per 1000 population) of in-migration (191.7) and out-migration (163.9) occurred in age 20-24, while internal-movement occurred in age 0-4 (123.7).
- Twenty-five per cent women did not go for any antenatal check-up, while only 34% had four or more antenatal check-ups. Forty-eight per cent women had antenatal check-ups in between 3-4 months followed by 32.0% in between 5-6 months. Slightly over 75% women reported that they had antenatal check-ups at NGO sector followed by the private sector (10.9%), while only 6.4% had antenatal check-ups at the public sector.
- Fifty-six per cent women did not have any post-natal visit, while 24% had one post-natal visit, and 21% mothers had two or more post-natal visits. Sixty per cent mothers had post-natal visits within two days of delivery. Sixty-nine per cent mothers had post-natal visits at NGO sector followed by the public sector (13.7%), while visit to the private sector was only 12.3%.
- Forty-seven per cent deliveries took place at home, followed by private sector (22.4%), NGO sector (21.7%), and public sector (8.3%). Thirty-three per cent deliveries were attended by MBBS doctor, followed by TTBA (29.4%), TBA (19.6%), and nurse (14.5%). Seventy-two per cent were normal deliveries followed by C-section (27.6%).

As HDSS is a continuous data collection system (here, visiting each household every three months) usually maintains to monitor demographic and health indicators, and to measure impacts of intervention, so the HDSS data can be used to monitor the health-care services those are being provided by partner NGOs of the UPHCSDP.

Chapter 1

Introduction

The population of Bangladesh will increase by about 30 million to roughly 185 million by 2030 (UN 2014), while urban population will increase from 50 million to roughly 83 million. Bangladesh will be more urban than rural by the middle of this century; more than a third of these urban residents will dwell in slum¹ settlements.

The growth of urban population in Bangladesh has mainly occurred through migration of the rural poor. Such rapid urban growth has made a heavy demand on urban utilities and services² and made the task difficult for the government to provide employment, services, and social benefits.

Bangladesh, although has witnessed remarkable progress over the last few decades in health and population indicators; significant disparities exist within the urban areas, between slum and non-slum dwellers with respect to health, nutrition, housing, water and sanitation.

To improve the health status of the urban people, especially the poor, the Local Government Division has been implementing Urban Primary Health Care project to deliver primary health-care services through urban local bodies and NGOs³. The goal of the project is to improve the health status through improved access to and utilisation of efficient, effective, and sustainable primary health-care services.

For understanding population, health, and socioeconomic conditions of slum dwellers and to monitor services of the Urban Primary Health Care Project, icddr,b; with financial support from the Government of Bangladesh/donor communities; has established the Health and Demographic Surveillance System⁴ in the selected slums of Dhaka (North and South) and Gazipur City Corporations covering over 30,000 households (Figure 1: Location of Slums).

The information collected by the Health and Demographic Surveillance System are: types of pregnancy (livebirth, stillbirth, miscarriage induced and miscarriage spontaneous), death (all

¹A slum is a cluster of compact settlements of 5 or more households that generally grow very unsystematically and haphazardly in an unhealthy condition and atmosphere on government and private vacant lands; slums also exist on the owner based household premise (for detail, see BBS 2015).

² For example, electricity, gas, water, sanitation, sewerage, garbage disposal, transport and social services.

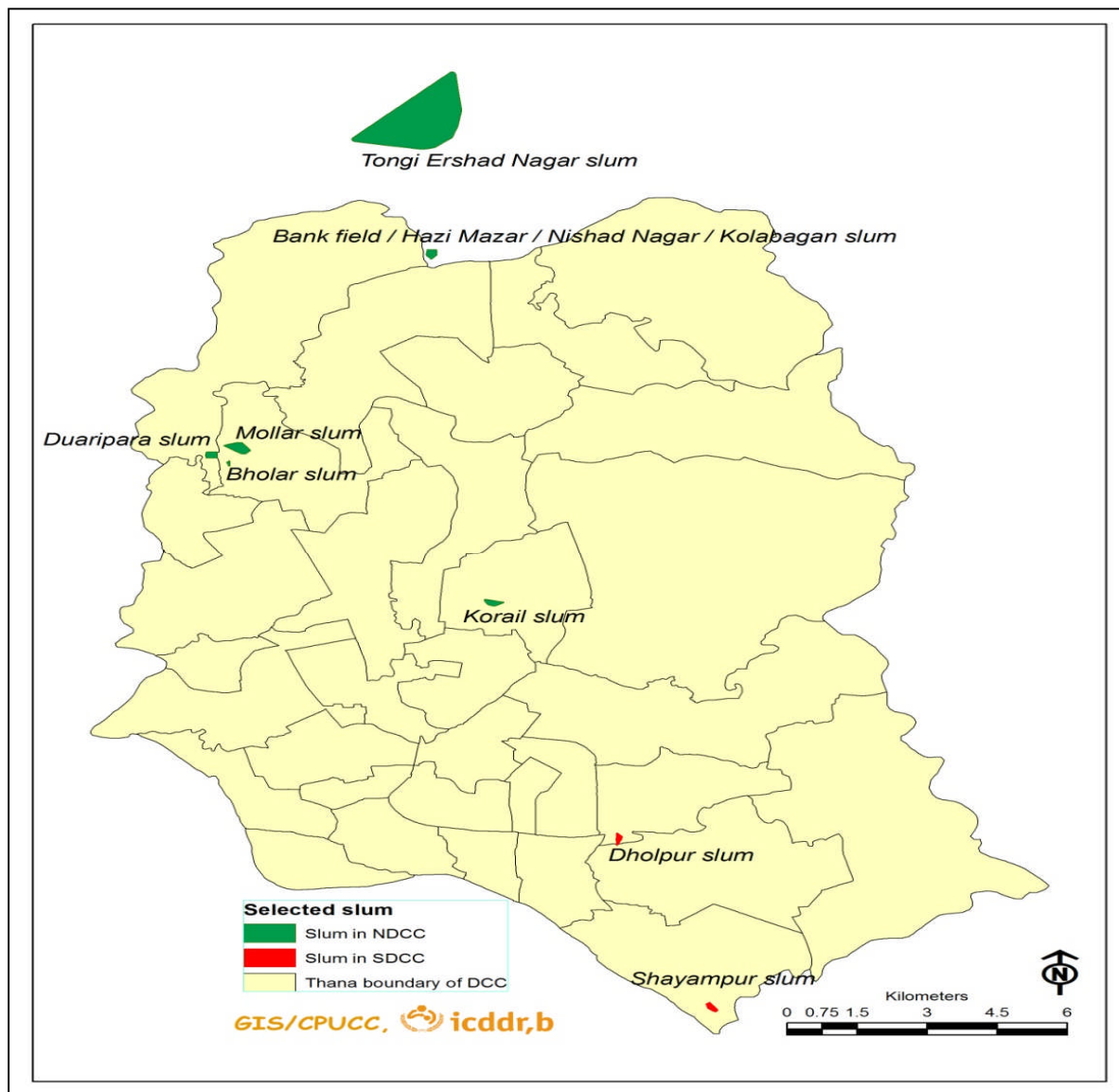
³ The surveillance system has been established in the selected slums, where the partner NGOs of UPHCSDP are delivering services to improve access to and use of urban primary health-care with a particular focus on service provisions for the poor. The project delivers essential services delivery package through 25 comprehensive reproductive health-care centres, 113 primary health-care centres, and 226 satellite clinics in ten city corporations and four district municipalities of the country.

⁴ The Health and Demographic Surveillance System is a methodological approach to monitoring the demographic and health outcomes in a registered and defined population living in a confined geographic area (INDEPTH Network 2002). The information collected at a minimum include vital events (births and deaths) and in- and out-migration. The HDSS starts with an initial census of the population living in a defined geographical area, followed by regular household visits by Field Workers to update information on births, deaths, and migrations.

ages including, infant and under-five death, causes of death), age at marriage and divorce, migrations and their causes, household split and head change, and safe motherhood practice (antenatal and postnatal care: number of visits, source of service, service provider, types of delivery, who attended delivery, and mode of delivery).

This is the first volume of the urban HDSS produced by icddr,b. The report presents data collected through the urban HDSS during 2016 along with brief notes and explanation of tables.

Figure 1: Location of Slums: Dhaka (North and South) and Gazipur City Corporations



Chapter 2

Methods and Materials

The Urban Health and Demographic Surveillance System operates in the selected slums of Dhaka (North and South) and Gazipur City Corporations. In the baseline population and socioeconomic census of 2015-16, 121,912 people were counted living in 31,577 households⁵. From Dhaka North City Corporation, slums were selected from Banani (10,297 households from Korail slum), and from Mirpur (6,278 households from Bhola, Molla and Duaripara slums). In Dhaka South City Corporation, slums were selected from Dhalpur (2,082 households from Pura, Driver, Nubur, City Palli, Power House, and Mannan slums), and from Shayampur (2,398 households from Dhaka Mach Colony, Monsur Beel>Nama Para, and Rail Line slums). In case of Gazipur City Corporation, slums were selected from Tongi (3,190 households from Bank Field, Hazi Mazar, Nishad Nagar and Kalabagan slums), and from Ershad Nagar (7,332 households from Ershad Nagar slums).

The HDSS started with an initial census of the resident⁶ population living in a defined geographical area, followed by regular household visits by the Field Workers to update information on births, deaths, and migrations. For collecting data on the Health and Demographic Surveillance System, 16 female Field Workers, with at least 12 years of schooling, were selected among 21 who performed well during the data collection of the baseline population census. One of the criteria for selecting a Field Worker in a particular area was the proximity of the worker's residence to the field site. This was to help the Field Workers visit the households beyond office hours, if the respondents were not available during daytime. The Field Research Coordinator and three Field Research Assistants were responsible for the field operations, and for maintaining the day-to-day data quality. Before the data collection started, the Field Workers were trained by the Field Research Coordinator and Field Research Assistants under the guidance of the Principal Investigator. The duration of training was two weeks and the Field Workers were trained on data collection instrument, data collection device, and interviewing skills.

The HDSS data collection started just after the completion of the baseline population and socioeconomic census⁷. After the baseline population census, the female Field Workers started visiting each of the 31,577 households (along with new migrant households) quarterly for collecting the data. Field Research Coordinator, in consultation with the three Field Research Assistants, prepared daily schedules and monthly work plans for household visits. Each female Field Worker was assigned to visit about 40 households every day and to cover her assigned area within three months; fifteen female Field Workers were assigned to 15 working areas and one Field Worker was dedicated for leave coverage.

⁵ A *household* consists of one or more people who live together and share meals from a common cooking pot, and can identify one member as the head of the household.

⁶ A person residing in the surveillance area permanently or continuously for at least six months is considered to be a resident. A person who resides outside the study area, but returns to his/her home in the HDSS area at least once a month and stays overnight, is also considered a resident.

⁷ In fact, the baseline population and socioeconomic census is a pre-requisite where a HDSS is to be set up.

The data were collected by using portable devices, and data collection programs were developed accordingly. The master database was a relational one and was managed by MySQL server. Most of the consistency checks were incorporated into the data collection program (range checks, consistency/logical checks); however, some logical checks were done at the office after loading/merging the data files. The computer programmer was responsible for providing technical support with respect to the concerns raised during fieldwork and troubleshooting any issues for the Tab.

Every day, the female Field Workers visited their assigned households guided by the database earlier loaded to the portable devices (selected information from the baseline census). For collecting the HDSS events, the Field Workers at first selected the respondents and a respondent could either be the head of the household or spouse, or any adult household member of age 18 years or more⁸; for pregnancy-related data, eligible women were interviewed. After getting their consent, the Field Worker first performed the roll-call using the database; this was to identify events. If any event had occurred in the household (not for in-migrant), the interviewer entered the identification number into the portable device to select basic information from the database.

For pregnancy outcome, the mother's information came from the database and a new identification number was assigned to the new-born (no identification number for non-live-birth). For an in-migrant, a new identification number was also assigned and additional data were collected accordingly. If death or out-migration occurred, the data were updated through the identification number. For marriage or divorce, one of the partners should be a resident of the surveillance area; however, relevant data were updated accordingly. In case of family split, a new household head was identified for the split part along with assigning new household identification number; while for death or out-migration of the household head, a new household head was determined and the data were updated accordingly. In fact, the database was updated through the following events: a) Birth, b) Death, c) Marriage/divorce, d) Out-migration, e) In-migration, f) Internal movement, and g) Head change/ household split.

Since January 2016, the surveillance system has been collecting the following data: a) Types of pregnancy: Livebirth, stillbirth, miscarriage induced, and miscarriage spontaneous, last menstrual period, mode of delivery, place of delivery, who attended birth, litter size, ante-natal care, and post-natal care; b) Death: All ages including infant and under-five, and cause of death; c) Migration-out: Migrated to birth place or elsewhere, and cause of migration; d) Migration-in: Migrated from, cause of migration, marital status, education, and occupation; e) Internal movement: Relation to head, and cause of movement; f) Marriage: Age at marriage, and previous marital status; e) Divorce: Age at divorce, and duration of marriage; g) Head change/family split: Cause of head change and family split.

Field Research Assistants and the Field Research Coordinator were responsible for assessing the day-to-day data quality. In fact, Field Research Assistants were responsible for monitoring the data

⁸ As written consent was taken earlier during the baseline population census that includes consent of subsequent visit for HDSS data collection (every three months).

collection by the female Field Workers as well as to enter few records independently into his/her Tab (listening to Field Workers interview). The Field Research Assistants were also responsible to re-interview 2% households per day. After receiving the data from the field, the Computer Programmer edited the data and updated the master database.

To maintain security and confidentiality of the data, the data server was restricted by a security password and access was given only to a selected person. In addition, a backup of the data file was kept in different locations and were updated periodically.

Chapter 3

Population Changes

The vital statistics and migration data of the urban HDSS area are shown in Table 3.1. The crude death rate in the urban HDSS area was 3.9 (per 1000 population), which was 42% lower than the crude death rate in the Matlab HDSS area (3.9 vs 6.7) (Table 3.1). This difference in crude death rate could be due to the difference in age distribution; there were more active populations, but fewer elderly populations in the urban HDSS area than those in the Matlab HDSS area (Table 3.2 and Table 3.3). However, this crude death rate was close to the crude death rate recorded in the Kamalapur HDSS area (unpublished report).

The infant mortality rate in the urban HDSS area was 52.6 (per 1000 livebirths), which was 85.8% higher than the infant mortality rate in the Matlab HDSS area (52.6 vs 28.3) (Table 3.1). However, the infant mortality rate in the urban HDSS area was 7.4% higher than the rate recorded in the slum by the Urban Health Survey 2013 (52.6 vs 49).

The under-five mortality rate in the urban HDSS area was 60.3 (per 1000 livebirths), which was 76.3% higher than the under-five mortality rate in the Matlab HDSS area (60.3 vs 34.2) (Table 3.1). However, the under-five mortality rate in the urban HDSS area was 5.8% higher than the rate recorded in the slum by the Urban Health Survey 2013 (60.3 vs 57.0).

The crude birth rate in the urban HDSS area was 14.6 (per 1000 population), which was 32% lower than the crude birth rate in the Matlab HDSS area (14.6 vs 21.6) (Table 3.1).

The marriage rate of the urban HDSS area was 11.9% (per 1000 population), which was 18.5% lower (11.9 vs 14.6), while the divorce rate was 0.6 (per 1000 population), which was 64.7% lower (0.6 vs 1.7) compared to comparable rates in the Matlab HDSS area (Table 3.1).

The number of in-migration and out-migrations registered in the HDSS area was 16,582 and 15,976 respectively, giving an in-migration rate of 132.8, out-migration rate of 127.9 and net migration rate of 4.9 (per 1000 population). On the other hand, internal movement rate was 94.0 (per 1000 population), which was 209% higher (94.0 vs 30.4) compared to the comparable rates in the Matlab HDSS area (Table 3.1).

Table 3.2 shows the mid-year of the urban HDSS population by age groups as well as Matlab HDSS population on the right side for comparison. The distribution of urban HDSS population by age groups differed from those of the Matlab HDSS population. In the urban HDSS area, there were more active population (15-59 years) than the Matlab HDSS area (63.6% vs 57.7%), but similar populations of under 15 years (32.2% vs 32.1%) and appreciably fewer populations of 60 or more years (4.2% vs 10.2%) (Table 3.3). This has implication on the rates, particularly on the crude death rate.

Table 3.1: Population, events registered, and population changes, urban HDSS 2016

Demographic indicator	Number			Rate per 1,000			Matlab HDSS-2012
	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes
Population (June 30, 2016)	124784	61569	63215	-	-	-	-
Events registered (Jan-Dec)							
Births**	1824	913	911	14.6	14.8	14.5	21.6
Deaths**	488	279	209	3.9	4.5	3.3	6.7
Infants death	96	56	40	52.6*(49 ⁺)	61.3*	43.9*	28.3**
Under-five death	110	63	47	60.3*(57 ⁺)	69.0*	51.6*	34.2**
In-migration**	16582	7948	8634	132.9	129.1	136.5	47.4
Out-migration**	15976	7571	8405	128.0	123.0	132.9	54.2
Internal movement**	11738	5705	6033	94.0	92.7	95.4	30.4
Marriage**	1484			11.9			14.6
Divorce**	79			0.6			1.7
Population change (Jan-Dec)							
Net migration**	606	377	229	4.9	6.1	3.6	-8.9
Natural increase**	1336	634	702	10.7	10.3	11.1	14.9
Net increase**	730	257	473	5.9	4.2	7.5	6.0
* Per 1000 livebirths							
** Per 1000 population							
*Urban Health Survey, 2013							

Table 3.1: Distribution of population by age group and sex, urban HDSS 2016

Age (years)	Urban HDSS						Matlab HDSS-2014
	Number			Percent			Percent
	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes
<1 year	3672	1837	1835	2.9	3.0	2.9	2.1
1	2402	1227	1175	1.9	2.0	1.9	2.1
2	2397	1241	1156	1.9	2.0	1.8	2.2
3	2428	1245	1183	1.9	2.0	1.9	2.1
4	2206	1109	1097	1.8	1.8	1.7	2.0
1-4	9433	4822	4611	7.6	7.8	7.3	8.3
5-9	14076	7095	6981	11.3	11.5	11.0	10.7
10-14	12988	6572	6416	10.4	10.7	10.1	11.0
15-19	14675	6449	8226	11.8	10.5	13.0	9.0
20-24	12748	5196	7552	10.2	8.4	11.9	7.3
25-29	14383	6985	7398	11.5	11.3	11.7	6.9
30-34	9740	5036	4704	7.8	8.2	7.4	6.4
35-39	9527	4855	4672	7.6	7.9	7.4	5.7
40-44	6360	3469	2891	5.1	5.6	4.6	5.9
45-49	5650	2902	2748	4.5	4.7	4.3	5.9
50-54	3899	2070	1829	3.1	3.4	2.9	6.0
55-59	2421	1337	1084	1.9	2.2	1.7	4.5
60-64	2198	1202	996	1.8	2.0	1.6	3.2
65-69	1172	685	487	0.9	1.1	0.8	2.6
70-74	1052	620	432	0.8	1.0	0.7	2.0
75-79	308	187	121	0.2	0.3	0.2	1.3
80-84	294	159	135	0.2	0.3	0.2	0.7
85+	188	91	97	0.2	0.1	0.2	0.4
Total	124784	61569	63215	100.0	100.0	100.0	100.0

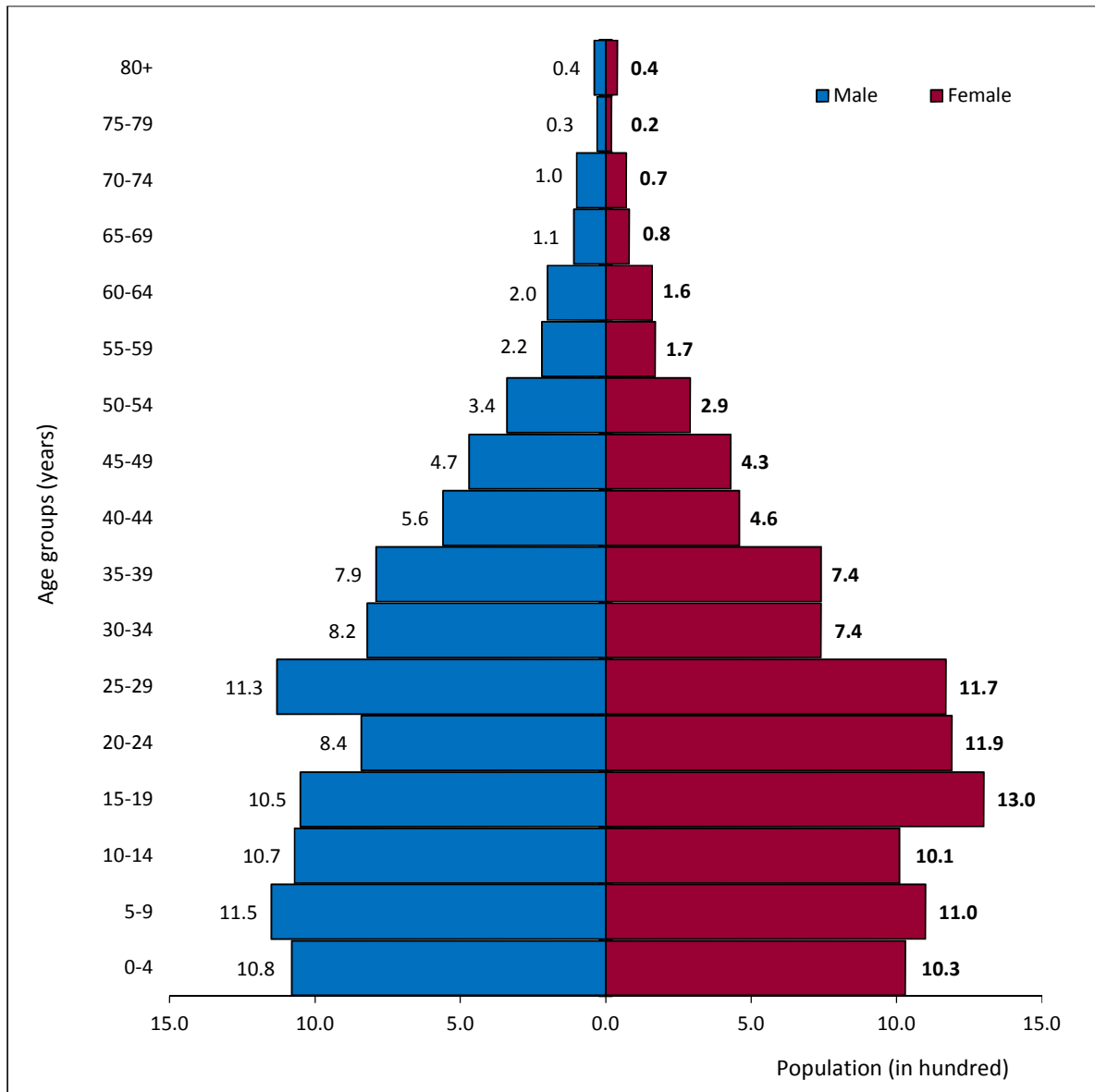
Note: Population as of June 30, 2016; Transgendered people were excluded (19); Matlab HDSS, a rural field site of icddr, b.

Table 3.2: Distribution of population by broad age group and sex, urban HDSS 2016

Age (years)	Urban HDSS						Matlab HDSS-2014
	Number			Percent			Percent
	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes
<15	40169	20326	19843	32.2	33.0	31.4	32.1
15-59	79403	38299	41104	63.6	62.2	65.0	57.7
60-64	2198	1202	996	1.8	2.0	1.6	3.2
65+	3014	1742	1272	2.4	2.8	2.	7.0
Total	124784	61569	63215	100.0	100.0	100.0	100.0

Note: Population as of June 30, 2016

Figure 3.1: Age pyramid of the 2016 mid-year population



Chapter 4

Mortality

The data on causes of death were collected from the informed household member and then asked the member whether the cause was ascertained by a medical person or family member. The interviewer then wrote down a brief description of the cause of death (verbatim). A total of 488 deaths was registered during January to December 2016 and was coded by a non-medical person under the guidance of a physician.

Table 4.1 shows the distribution of death by age and sex in the urban HDSS area as well as death in the Matlab HDSS area on the right side for comparison. Out of 488 total deaths, 19.7% were infants, 2.9% were in children aged 1-4 years, 35.7% were aged 5-59 years and 49.0% were aged 60 years or more, while comparable figures from the Matlab HDSS area were 8.8%, 2.9%, 24.9% and 63.4% respectively.

Table 4.2 shows mortality rates (per 1000 population). The overall death rate was 3.9 (per 1000 population) and death rates for males and females were 4.5 and 3.3 respectively. The infant mortality rate was 52.6 (per 1000 livebirths), while infant mortality rates were 61.3 and 43.9 for boys and girls respectively. The crude death rate although higher in the Matlab HDSS area, but age-specific death rates at age below 70 were usually higher in the urban HDSS than the Matlab HDSS area, but for age categories 70 or more, death rates were higher in the Matlab HDSS area.

Table 4.3 shows the abridge life table for males and females derived for age-sex specific death rates. The survival (l_x) times are plotted in Figure 4.1 (for life table equations see Appendix A). Expectation of life at birth was higher for females than males (72.5 vs 70.4), however expectation of life in most age-groups below 55 years were higher for female than male, then reversed. Probability of dying ($45q_{15}$) for age 15-59 years was 161.2 for male and 126.4 for female (per 1000 population).

Figure 4.1 shows that the probability of survival was higher for females than males up to age 79 years and then the survival was higher for males than females.

Deaths by underlying causes are shown in Table 4.4 and Table 4.5. Non-communicable diseases were the leading cause of death (51.6%), followed by communicable diseases (12.5%), accident/injury (10%), maternal and neo-natal (9.6%); twelve per cent deaths were due to either old age or unspecified (Table 4.4).

Among non-communicable diseases, the most prevalent was stroke (17.2%), following by cancer (10.5%), heart diseases (9.2%) and liver problem (3.5%) (Table 4.4); stroke, cancer and heart diseases were higher for male than female, but liver problem was higher for female than male (Table 4.5). Of communicable diseases, the most prevalent was pneumonia/respiratory

infection (9.2%), followed by tuberculosis (1.4%); these diseases were higher for female than male. For maternal and neo-natal condition, most prevalent was unspecified neonatal cause (6.3%), followed by delivery complication (2.3%); unspecified neo-natal cause was higher for male than female. Among accident/injury/murder, most prevalent was accident (4.5%), followed by drowning (2.3%); these were higher for male than female.

Table 4.1: Distribution of deaths (per cent) by age and sex, urban HDSS 2016

Age (Years)	Both sexes		Male		Female		Matlab HDSS-2014
	Number	Percent	Number	Percent	Number	Percent	Both sexes
All ages	488	100.0	279	100.0	209	100.0	100.0
<1 year	96	19.7	56	20.1	40	19.1	8.8
<7 days	60	12.3	38	13.6	22	10.5	5.6
7-29 days	9	1.8	5	1.8	4	1.9	1.5
1-5 months	16	3.3	8	2.9	8	3.8	1.5
6-11 months	11	2.3	5	1.8	6	2.9	0.1
1-4	14	2.9	7	2.5	7	3.3	2.9
5-9	12	2.5	6	2.2	6	2.9	0.8
10-14	15	3.1	7	2.5	8	3.8	0.4
15-19	16	3.3	7	2.5	9	4.3	1.2
20-24	19	3.9	6	2.2	13	6.2	0.6
25-29	20	4.1	12	4.3	8	3.8	1.5
30-34	22	4.5	14	5.0	8	3.8	1.4
35-39	16	3.3	13	4.7	3	1.4	1.0
40-44	23	4.7	12	4.3	11	5.3	1.3
45-49	31	6.4	15	5.4	16	7.7	3.4
50-54	37	7.6	25	9.0	12	5.7	6.1
55-59	28	5.7	16	5.7	12	5.7	7.2
60-64	38	7.8	28	10.0	10	4.8	5.9
65-69	31	6.4	18	6.5	13	6.2	8.6
70-74	19	3.9	13	4.7	6	2.9	12.4
75-79	22	4.5	10	3.6	12	5.7	16.5
80-84	10	2.0	5	1.8	5	2.4	10.7
85+	19	3.9	9	3.2	10	4.8	9.1

Table 4.2: Death rates (per 1,000 population), urban HDSS 2016

All Ages				Matlab HDSS 2014
	Both sexes	Male	Female	Both sexes
	3.9	4.5	3.3	6.7
<1 year	52.6*	61.3*	43.9*	27.4*
1-4	1.5	1.5	1.5	2.4
5-9	0.9	0.8	0.9	0.5
10-14	1.2	1.1	1.2	0.2
15-19	1.1	1.1	1.1	0.9
20-24	1.5	1.2	1.7	0.6
25-29	1.4	1.7	1.1	1.5
30-34	2.3	2.8	1.7	1.4
35-39	1.7	2.7	0.6	1.2
40-44	3.6	3.5	3.8	1.5
45-49	5.5	5.2	5.8	3.9
50-54	9.5	12.1	6.6	6.8
55-59	11.6	12.0	11.1	10.7
60-64	17.3	23.3	10.0	12.6
65-69	26.5	26.3	26.7	22.2
70-74	18.1	21.0	13.9	40.9
75-79	71.4	53.5	99.2	83.7
80-84	34.0	31.4	37.0	108
85 +	101.1	98.9	103.1	169.9

*Per 1000 livebirths

Table 4.3: Life table by male and female, urban HDSS 2016

Age (years)	Male				Female			
	nqx	lx	Lx	e ⁰ x	nqx	lx	Lx	e ⁰ x
0	61.3	100000	94786	70.4	43.9	100000	96268	72.5
1	4.1	93866	93641	74.0	4.2	95609	95370	74.8
2	0.8	93485	93447	73.3	1.7	95203	95121	74.1
3	0.0	93409	93409	72.4	0.0	95039	95039	73.3
4	0.9	93409	93367	71.4	0.0	95039	95039	72.3
5 - 9	4.2	93325	465718	70.4	4.3	95039	474254	71.3
10-14	5.3	92931	463519	65.7	6.2	94631	471799	66.5
15-19	5.4	92438	461035	61.1	5.5	94043	469031	61.9
20-24	5.8	91937	458466	56.4	8.6	93530	465799	57.3
25-29	8.6	91408	455236	51.7	5.4	92728	462486	52.7
30-34	13.8	90626	450240	47.1	8.5	92228	459337	48.0
35-39	13.3	89374	444126	42.7	3.2	91446	456557	43.4
40-44	17.2	88185	437430	38.3	18.9	91153	451796	38.5
45-49	25.5	86672	428239	33.9	28.7	89434	441226	34.2
50-54	58.7	84458	410746	29.7	32.3	86865	427826	30.2
55-59	58.2	79497	386718	26.4	54.0	84058	409745	26.1
60-64	110.4	74870	354914	22.9	49.1	79522	388550	22.4
65-69	123.7	66602	313589	20.4	125.6	75621	355719	18.4
70-74	99.9	58362	278129	17.9	67.3	66126	320260	15.7
75-79	236.8	52530	232626	14.6	397.1	61678	246948	11.6
80-84	146.3	40090	186560	13.3	170.2	37187	170877	12.6
85+	1000.0	34223	346037	10.1	1000.0	30858	299324	9.7

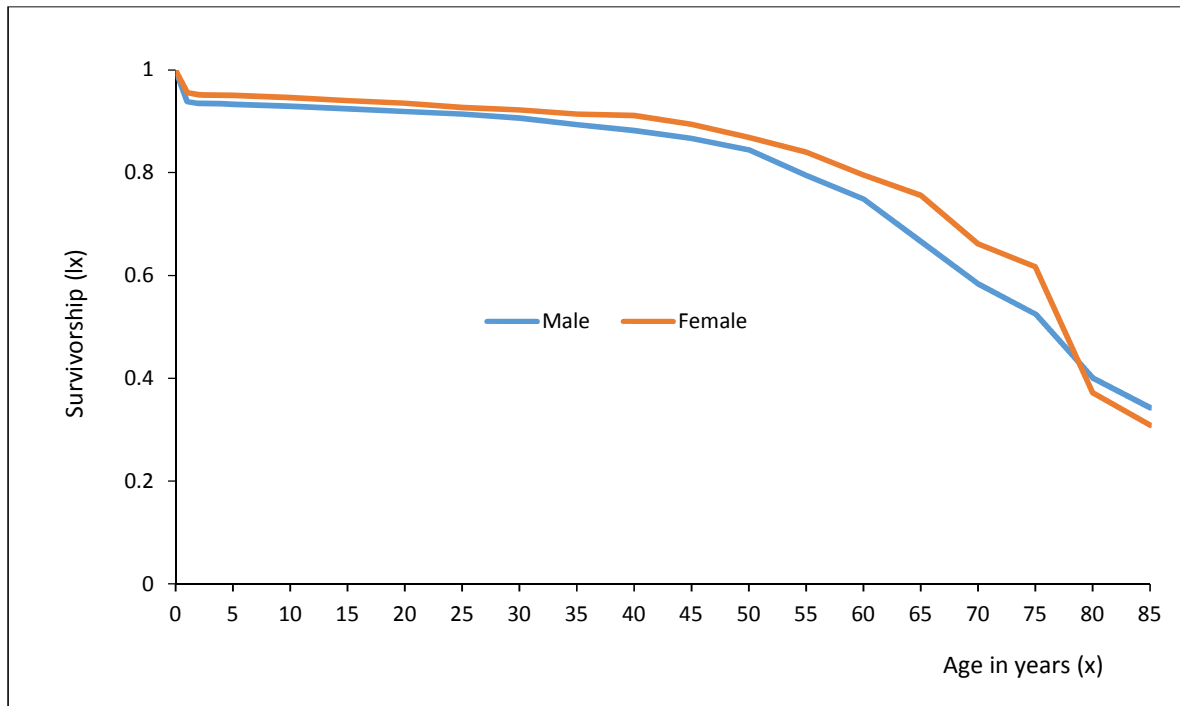
Table 4. 4: Death by major cause and sex (per cent), urban HDSS 2016

Cause of death	Male	Female	Total
Communicable	11.11(31)	14.35(30)	12.5(61)
Maternal and neonatal	10.75(30)	8.13(17)	9.63(47)
Non communicable	53.76(150)	48.8(102)	51.64(252)
Accidental/Injury/Murder	11.47(32)	8.13(17)	10.04(49)
Miscellaneous causes	3.23(9)	6.22(13)	4.51(22)
Unspecified/Unknown	3.23(9)	4.78(10)	3.89(19)
Senile/old age	6.45(18)	9.57(20)	7.79(38)
Total	100.0(279)	100.0(209)	100.0(488)

Table 4. 5: Death by detail cause and sex (per cent), urban HDSS 2016

Cause of death	Male	Female	Both sexes
Communicable diseases	11.11(31)	14.35(30)	12.5(61)
Pneumonia/Respiratory infection	8.96(25)	9.57(20)	9.22(45)
Diarrhoeal	0.72(2)	0.48(1)	0.61(3)
Jaundice	0.72(2)	1.91(4)	1.23(6)
Tuberculosis(TB)	0.72(2)	2.39(5)	1.43(7)
Maternal and neonatal conditions	10.75(30)	8.13(17)	9.63(47)
Unspecified neonatal causes of death	7.17(20)	5.26(11)	6.35(31)
Maternal death(Mother)	0(0)	0.96(2)	0.41(2)
Death for cord(Neonatal)	0.36(1)	0(0)	0.2(1)
Delivery complication	3.23(9)	0.96(2)	2.25(11)
Pre-matured	0(0)	1.44(3)	0.61(3)
Non communicable	53.76(150)	48.8(102)	51.64(252)
Paralyses	1.79(5)	3.35(7)	2.46(12)
Cancer	11.47(32)	9.09(19)	10.45(51)
Appendicitis	0.72(2)	0.48(1)	0.61(3)
Stroke(cerebrovascular)	16.49(46)	18.18(38)	17.21(84)
Brain tumor/Tumor	0.72(2)	0(0)	0.41(2)
Asthma/Bronchitis/COPD	3.58(10)	1.91(4)	2.87(14)
Kidney problem	2.51(7)	3.35(7)	2.87(14)
Diabetics	1.43(4)	1.91(4)	1.64(8)
Heart Disease(Cardiovascular)	11.47(32)	6.22(13)	9.22(45)
Drug addiction	0.72(2)	0(0)	0.41(2)
Liver problem	2.87(8)	4.31(9)	3.48(17)
Accidental/Injury/Murder	11.47(32)	8.13(17)	10.04(49)
Poison	0(0)	0.48(1)	0.2(1)
Burn	0.36(1)	1.91(4)	1.02(5)
Accident	6.09(17)	2.39(5)	4.51(22)
Suicide	1.08(3)	2.87(6)	1.84(9)
Drowning	3.58(10)	0.48(1)	2.25(11)
Murder	0.36(1)	0(0)	0.2(1)
Miscellaneous causes	3.23(9)	6.22(13)	4.51(22)
Fever/Cold	3.23(9)	6.22(13)	4.51(22)
Unspecified/Unknown	3.23(9)	4.78(10)	3.89(19)
Illness/unspecified causes	3.23(9)	3.35(7)	3.28(16)
No cause identified	0(0)	0.96(2)	0.41(2)
Senile/old age	6.45(18)	9.57(20)	7.79(38)
Total	100.0(279)	100.0(209)	100.0(488)

Figure 4.1: Probability of survival from birth to age (x) by sex, urban HDSS 2016



Chapter 5

Fertility

Out of 2,209 pregnancy outcomes, 82.6% was livebirth, 5.4% induced miscarriage, 9.2% spontaneous miscarriage and 2.8% stillbirth (Table 5.1). Compared to the Matlab HDSS area, livebirth pregnancy was 4% lower in the urban HDSS area (82.6% vs 86.1%), induced miscarriage was 54% higher (5.4% vs 3.5%), spontaneous miscarriage was 3% higher (9.2% vs 8.9%) and stillbirth was 86% higher (2.8% vs 1.5%). There were 10 multiple birth pregnancies and of these pregnancies, 6 pregnancies were twin livebirths, while 4 pregnancies were one livebirth and one stillbirth.

Table 5.2 shows distribution of birth by mother's age. Twenty-five per cent births were for mothers aged under 20 years, 35.1% births were for mother aged 20-24 years, while 4.8% births were for mothers of age 35 or more, while compared to the comparable figures of the Matlab HDSS area, those were 15.1%, 34.5%, and 8.0% respectively (Table 5.2).

Table 5.3 shows the age-specific fertility rates (per 1000 women) and indices, urban HDSS 2016. The total fertility rates in the urban HDSS area was 1.3 (per 1000 women), which was 35% lower than the total fertility rate recorded in the slums (1.3 vs 2.0) by the Urban Health Survey 2013. Figure 5.1 shows the age-specific fertility rates. Age-specific fertility rate (per 1000 women) was higher in age 20-24 (84.7), followed by age 25-29 (63.7) and age 15-19 (54.5).

Table 5.4 shows the distribution of pregnancy outcome by month of occurrence and sex. The data shows livebirths were high in October, August, January and June. The overall sex ratio of livebirth was 100 males per 100 females, while there was no definite trend by month; low in January and May (74-84) and high in November and August (120-118).

Table 5.1: Distribution of pregnancy outcome, urban HDSS 2016

Type of pregnancy	Urban HDSS		Matlab HDSS-2012
	Number	Percent	Percent
Total pregnancies	2209	100.0	100.0
Livebirth pregnancies	1824	82.6	86.1(82.7*)
Early miscarriage			
Induced	119	5.4	3.5
Spontaneous	204	9.2	8.9
Stillbirth pregnancies	62	2.8	1.5(3.1*)
Multiple pregnancy birth	10		
Multiple livebirth pregnancy			
Two	6		
One	4		

Note: *Chakaria HDSS, a rural field site of icddr,b

Table 5.2: Distribution of birth by mother's age, urban HDSS 2016

Mother's age at birth (yrs)	Urban HDSS		Matlab HDSS- 2012
	Number	Percent	Percent
15-19	448	24.6	15.1
20-24	640	35.1	34.5
25-29	471	25.8	25.7
30-34	177	9.7	16.7
35+	88	4.8	8.0
Total	1824	100.0	100.0

Table 5.3: Age specific fertility rates (per 1000 women) and indices, urban HDSS 2016

Age (years)	No. of women	No. of births	Rate
All Ages	38191	1824	47.8
15-19*	8226	448	54.5
20-24	7552	640	84.7
25-29	7398	471	63.7
30-34	4704	177	37.6
35-39	4672	68	14.6
40-44	2891	13	4.5
45-49*	2748	7	2.5
Total fertility rate ⁺			1.3 (2.0 ⁺⁺⁺)
General fertility rate ⁺			47.8

* Births to mothers under age 15 were included in this group.

** Births to mothers age 50 and above were included in this group.

+++ TFR recorded in the slums by Urban Health Survey 2013

⁺ Total fertility rate represents the average number of children that would be borne by a woman if she goes through life having children at the current age-specific rates.

⁺⁺ The general fertility rate is the total number of livebirths per 1,000 women of reproductive age (ages 15 to 49 years) in a population per year.

Table 5.4: Pregnancy outcome by month, urban HDSS 2016

Months	Pregnancy outcome					No. of live born children			
	All	Miscarriage		Still birth	Live birth	Both sexes	Male	Female	Ratio
		Induced	Spon.						
All months	2209	119	204	62	1824	1824	913	911	1.00
January	195	14	14	5	162	162	69	93	0.74
February	163	8	13	6	136	136	70	66	1.06
March	181	13	29	3	136	136	73	63	1.16
April	187	10	26	6	145	145	71	74	0.96
May	170	20	15	8	127	127	58	69	0.84
June	194	10	15	6	163	163	84	79	1.06
July	188	11	19	4	154	154	84	70	1.20
August	223	9	15	9	190	190	103	87	1.18
September	181	4	20	4	153	153	76	77	0.99
October	228	12	13	4	199	199	94	105	0.90
November	155	5	16	4	130	130	71	59	1.20
December	144	3	9	3	129	129	60	69	0.87

Figure 5.1: Age-specific fertility rates (per 1000 women), urban HDSS 2016

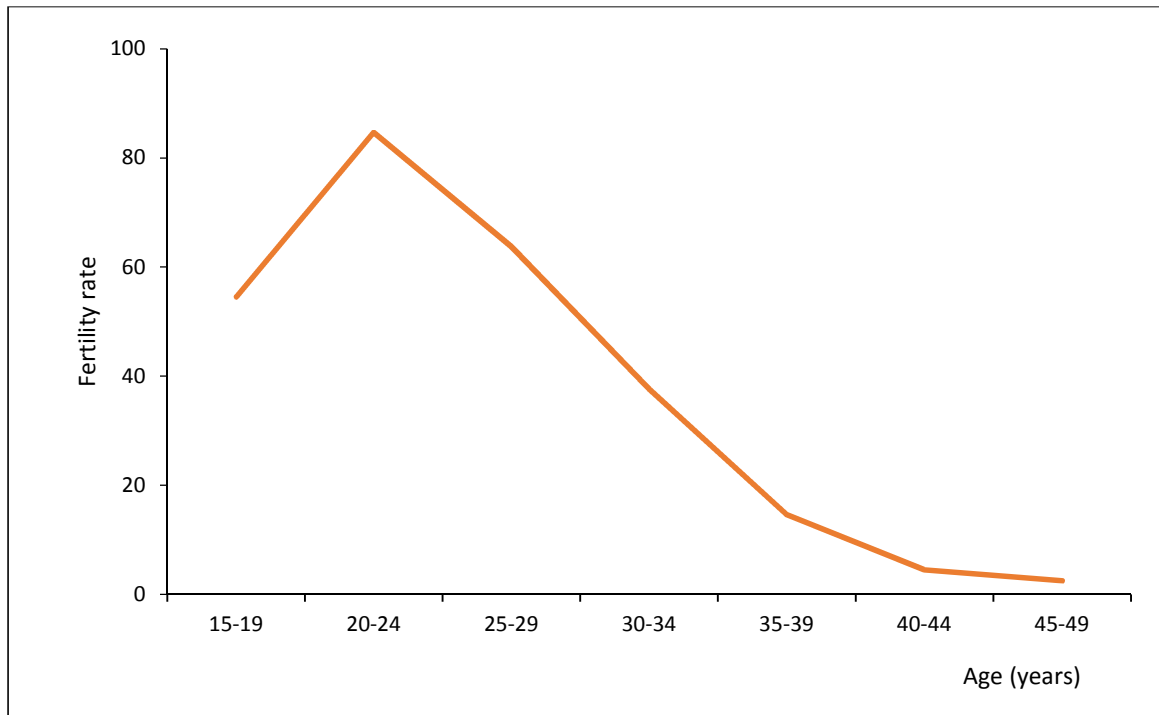
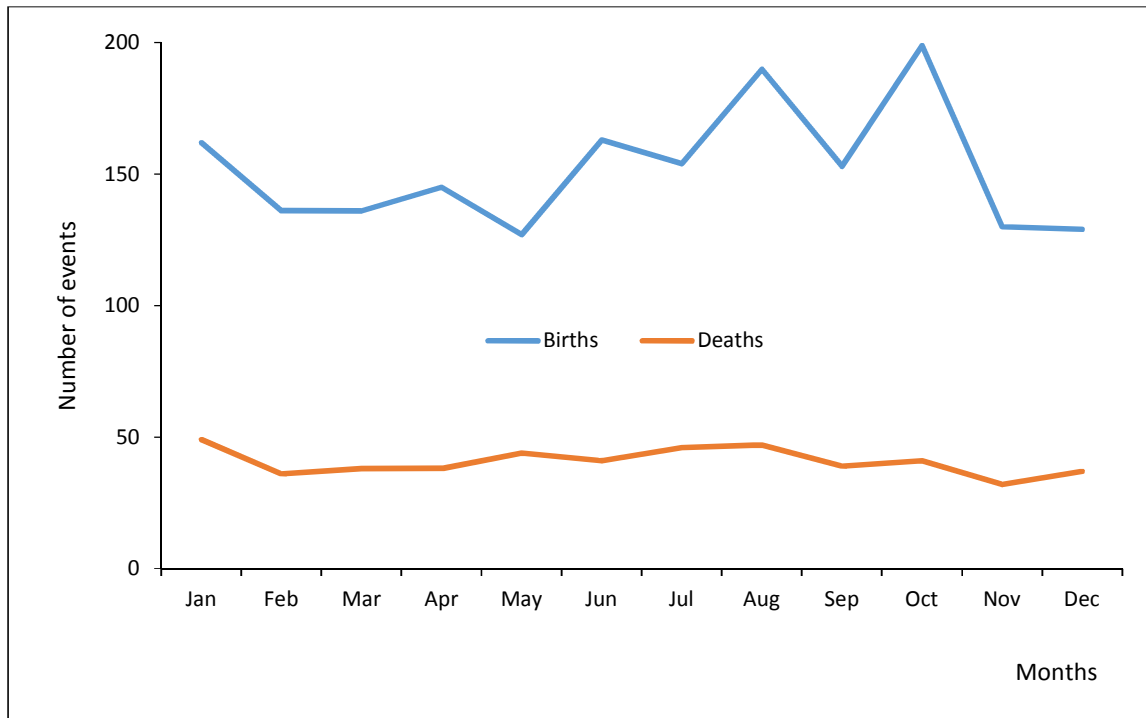


Figure 5.2: Number of births and deaths by months, urban HDSS 2016



Chapter 6

Marriage and Divorce

The procedures adopted by the urban HDSS state that if either a partner is a resident in the HDSS area, the marriage/divorce should be registered.

The mean age at first marriage for brides was 17.5, which was 7.9% lower than the mean age at marriage in the Matlab HDSS area (17.5 vs 19.2) (Table 6.1); forty-five per cent marriages took place before age 18 years. For grooms, the mean age of marriage was 22.6, which was 16.9% lower than the mean age of marriage in the Matlab HDSS area (22.6 vs 27.2) (Table 6.2); eighteen per cent marriage took place before age 20 years.

The mean age of divorce for brides was 21.4, which was 15.1% lower than the mean age of divorce in the Matlab HDSS area (21.4 vs 25.2) (Table 6.3); fifty-two per cent divorces took place before age 20 years. For grooms, the mean age of divorce was 26.8, which was 16.3% lower than the mean age of divorce in the Matlab HDSS area (26.8 vs 32%) (Table 6.4); fourteen per cent divorce took place before age 20 years.

Figure 6.1: Shows the distribution of marriages and divorces by months. Marriages were high in April and July and low in June and November; however almost same seasonal pattern for divorce.

Table 6.1: Bride's age at marriage, urban HDSS 2016

Age (years)	All bride (n=1484)	Previous marital status	
		Single (n=1381)	Ever married (n=103)
10-14	8.8	9.4	1.0
15-17	36.2	38.3	7.8
18-19	36.5	38.5	8.7
15-19	72.7	76.8	16.5
20-24	12.7	11.2	33.0
25+	5.8	2.5	49.5
Total	100.0	100.0	100.0
Mean age at marriage		17.5(19.2*)	24.7

* Mean age at marriage of Matlab HDSS 2014

Table 6.2: Groom's age at marriage, urban HDSS 2016

Age (years)	All groom (n=1484)	Previous marital status	
		Single (n=1346)	Ever married (n= 138)
15-19	17.6	19.1	2.9
20-22	33.8	36.2	10.9
23-24	11.0	11.4	8.0
20-24	44.9	47.5	18.8
25-29	27.1	27.4	23.9
30+	10.4	5.9	54.3
Total	100.0	100.0	100.0
Mean age at marriage		22.6(27.2*)	31.1

* Mean age at marriage of Matlab HDSS 2014

Table 6.3: Bride's age at divorce, urban HDSS 2016

Age (Years)	Number	Percent
10-14	1	1.3
15-19	40	50.6
20-24	17	21.5
25-29	10	12.7
30+	11	13.9
Total	79	100.0

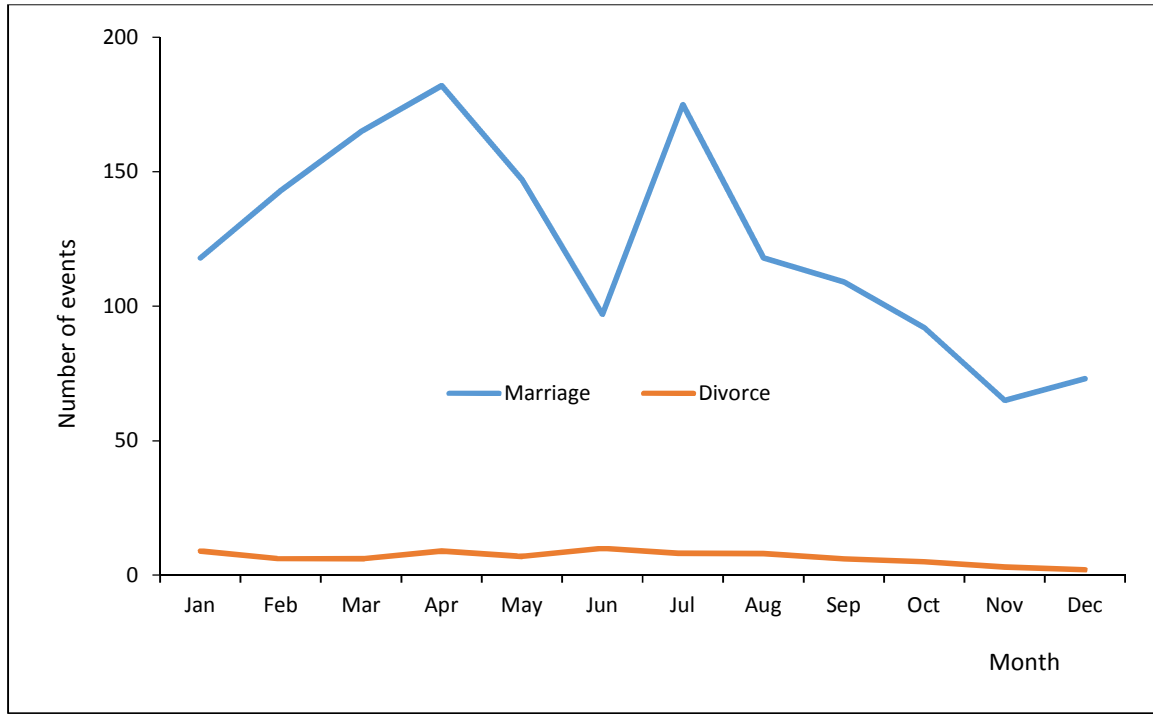
Mean age at divorce= 21.4

Table 6.4: Groom's age at divorce, urban HDSS 2016

Age (Years)	Number	Percent
<20	11	13.9
20-24	26	32.9
25-29	17	21.5
30+	25	31.6
Total	79	100.0

Mean age at divorce= 26.8

Figure 6.1: Number of marriages and divorces by month, urban HDSS 2016



Chapter 7

Migration

An in-migrant is an individual neither recorded during the last population census nor born in the surveillance area after the census, who has moved permanently into the surveillance area. An out-migrant is defined as a person who listed during the baseline population census as a resident, or a person who became a resident⁹ by birth or in-migrant, who subsequently moved out of the surveillance area permanently. An internal migrant is a person who was a resident of the study area and moved to another household or constructed a new household or moved to another location of the study area.

Forty-four per cent causes of in-migration were due to joining family, followed by looking for work (41.1%) (Table 7.2). For out-migration, 46.7% causes were due to joining family, followed by looking for work (25.5%) (Table 7.2). For internal movement, 55.6% causes were due to marriage/joining family followed by household split (36.2%) (Table 7.3).

During 2016, a total of 16,582 persons moved into the HDSS area, resulting 132.9 in-migration rate (per 1000 population, 129.1 for male and 136.5 for female), while a total of 15,976 persons moved-out of the HDSS area, resulting 128.0 out-migration rate (per 1000 population, 123.0 for male and 132.9 for female). On the other hand, 11,378 persons internally moved within the HDSS area, resulting 94.0 internal movement rate (per 1000 population, 92.7 for male and 95.4 for female).

Table 7.4 shows distribution of migrants by age, sex and direction. The highest incidence of in-migration occurred in age 20-24 (14.8%), out-migration occurred in age 15-19 (13.9%) and internal-movement in age 0-4 (13.8%). Table 7.5 shows age-specific migration rates (per 1000 population). The highest rate of in-migration occurred in age 20-24 (212.3 per 1000 population), out-migration occurred in age 25-29 (161.8 per 1000 population), and internal-movement occurred in age 0-4 (126.3 per 1000 population).

Figure 7.1 shows age-specific marriage rates by direction. Migrants of all type were low in age group 5-10 and those in age 50 or more years. However, there is no systematic pattern of migration for each type by months, except low migration in November and December.

⁹ Those who stay in an area continuously for at least 6 months in a year, or come home at least once a month to stay overnight, are treated as permanent residents. Exceptions are made if someone moves into the area due to marriage or divorce or settlement.

Table 7.1: In-migration by cause and sex, urban HDSS 2016

Cause of in-migration	Number			Percent		
	Both sexes	Male	Female	Both sexes	Male	Female
Looking for work	6811	3588	3223	41.1	45.1	37.3
To earn more money	861	448	413	5.2	5.6	4.8
River erosion	425	212	213	2.6	2.7	2.5
To join family	7233	3234	3999	43.6	40.7	46.3
For children education	26	13	13	0.2	0.2	0.2
For own education	147	74	73	0.9	0.9	0.8
Marriage	496	88	408	3	1.1	4.7
Other	527	259	268	3.2	3.3	3.1
NA(since birth)	56	32	24	0.3	0.4	0.3
Total	16582	7948	8634	100.0	100.0	100.0

Table 7.2: Out-migration by cause and sex, urban HDSS 2016

Cause of out-migration	Number			Percent		
	Both sexes	Male	Female	Both sexes	Male	Female
Looking for work	4067	2133	1934	25.5	28.2	23.0
To earn more money	391	209	182	2.4	2.8	2.2
To join family	7462	3407	4055	46.7	45	48.2
For own education	169	76	93	1.1	1.0	1.1
Marriage	396	19	377	2.5	0.3	4.5
Divorce	40	12	28	0.3	0.2	0.3
Earning not sufficient	222	127	95	1.4	1.7	1.1
Others	3229	1588	1641	20.2	21.0	19.5
Total	15976	7571	8405	100.0	100.0	100.0

Table 7.3: Internal-movement by cause and sex, urban HDSS 2016

Cause of internal-movement	Number			Percent		
	Both sexes	Male	Female	Both sexes	Male	Female
Work/economic	458	283	175	3.9	5.0	2.9
Marriage/join family	6529	2943	3586	55.6	51.6	59.4
Due to split	4254	2232	2022	36.2	39.1	33.5
Merging family	403	208	195	3.4	3.6	3.2
Other	94	39	55	0.8	0.7	0.9
Total	11738	5705	6033	100.0	100.0	100.0

Table 7.4: Distribution of migrants by age, sex and direction, urban HDSS 2016

Age (Years)	Both sexes			Male			Female		
	In	Out	Internal	In	Out	Internal	In	Out	Internal
0-4	12.9	10.8	13.8	13.4	11.7	14.7	12.3	10.0	13.8
5-9	10.4	10.8	13.1	11.3	11.1	13.4	9.6	10.4	13.0
10-14	8.1	8.7	9.9	7.9	8.5	9.2	8.3	8.9	9.9
15-19	16.0	13.9	12.4	8.7	8.8	8.9	22.7	18.4	12.4
20-24	14.8	13.1	11.9	13.9	10.7	9.6	15.6	15.2	11.9
25-29	14.7	14	12.5	17	14.9	13.5	12.5	13.1	12.5
30-34	7.5	8.4	8.4	9.2	9.7	9.4	5.9	7.3	8.4
35-39	5.6	7.5	6.1	6.8	8.9	7.0	4.6	6.3	6.1
40-44	3.6	4.2	4.1	4.5	5.4	5.0	2.7	3.1	4.1
45-49	2.5	3.2	2.9	2.7	3.8	3.0	2.3	2.7	2.9
50-54	1.5	2.2	2.0	1.6	2.5	2.7	1.3	1.9	2.0
55-59	0.9	1.1	1.2	1.2	1.3	1.5	0.7	0.9	1.2
60-64	0.7	0.9	0.7	0.8	1.1	0.6	0.6	0.8	0.7
65+	0.9	1.4	1.0	1.0	1.7	1.3	0.9	1.1	1.0

Table 7.5: Migration rates (per 1000 population) by age, sex and direction, urban HDSS 2016

Age (years)	In-migration			Out-migration			Internal-movement		
	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes
0-4	160.2	165.2	162.6	132.8	130.0	131.3	126.3	121.3	123.7
5-9	126.3	118.5	122.3	119.0	125.8	122.2	107.8	110.0	108.8
10-14	94.9	111.9	103.2	97.7	116.1	106.7	80.0	98.3	89.0
15-19	107.8	238.4	180.9	103.4	188.1	150.8	78.9	115.1	99.1
20-24	212.3	177.8	191.7	156.1	169.5	163.9	105.3	112.4	109.4
25-29	194.0	146.0	169.2	161.8	149.4	155.3	110.7	94.6	102.3
30-34	145.4	107.8	127.1	145.8	130.5	138.3	106.4	95.2	100.9
35-39	110.8	84.8	98.0	139.0	113.0	126.2	82.4	67.6	75.1
40-44	102.0	81.3	92.5	118.5	88.9	104.9	83.0	68.5	76.3
45-49	74.1	72.1	73.0	98.2	82.2	90.4	58.9	61.9	60.3
50-54	63.3	60.7	62.0	90.3	86.9	88.7	73.4	45.9	60.5
55-59	71.8	55.4	64.4	71.8	66.4	69.3	65.8	48.9	58.2
60-64	54.1	53.2	53.6	66.6	64.3	65.5	28.3	46.2	36.4
65+	44.2	62.9	52.0	71.8	72.3	71.9	43.1	32.2	38.5

Figure 7.1: Age and sex-specific migration rates (per 1000 population) by direction, urban HDSS 2016

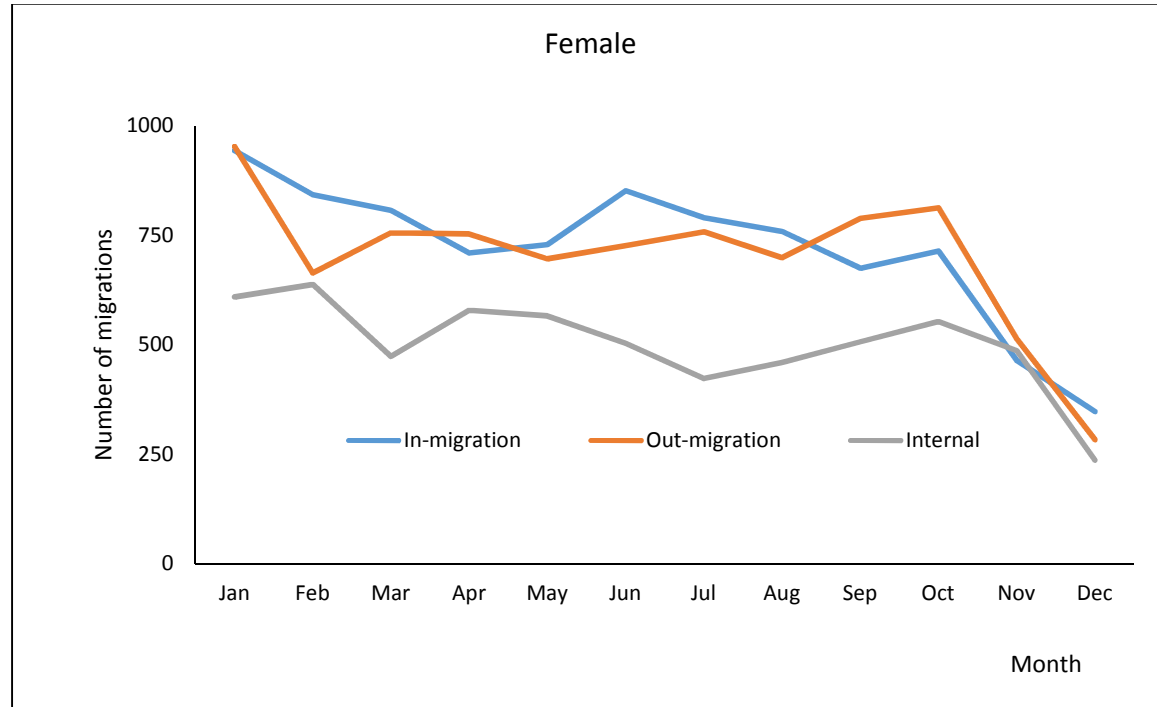
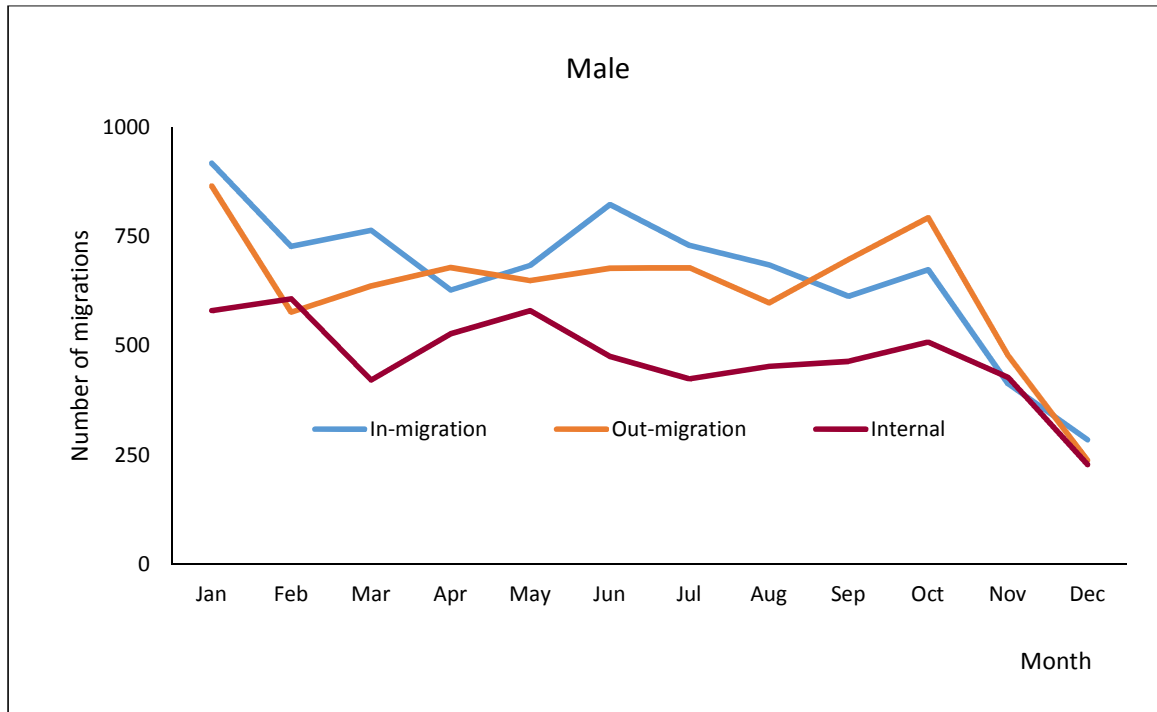
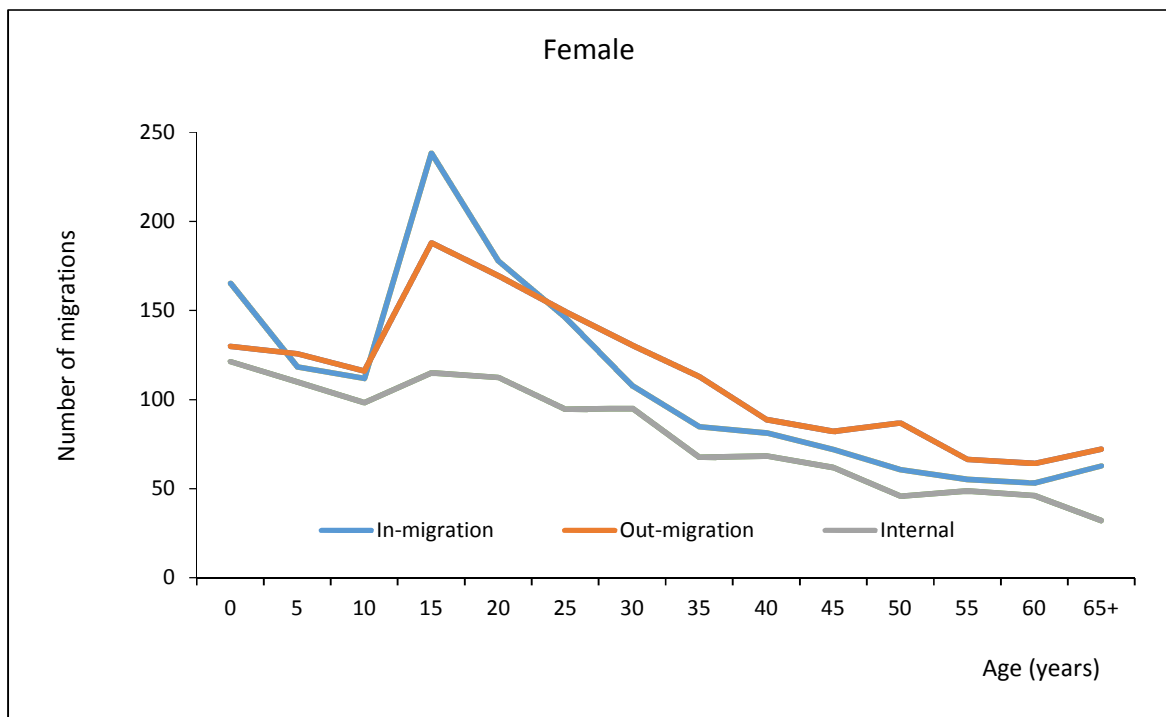
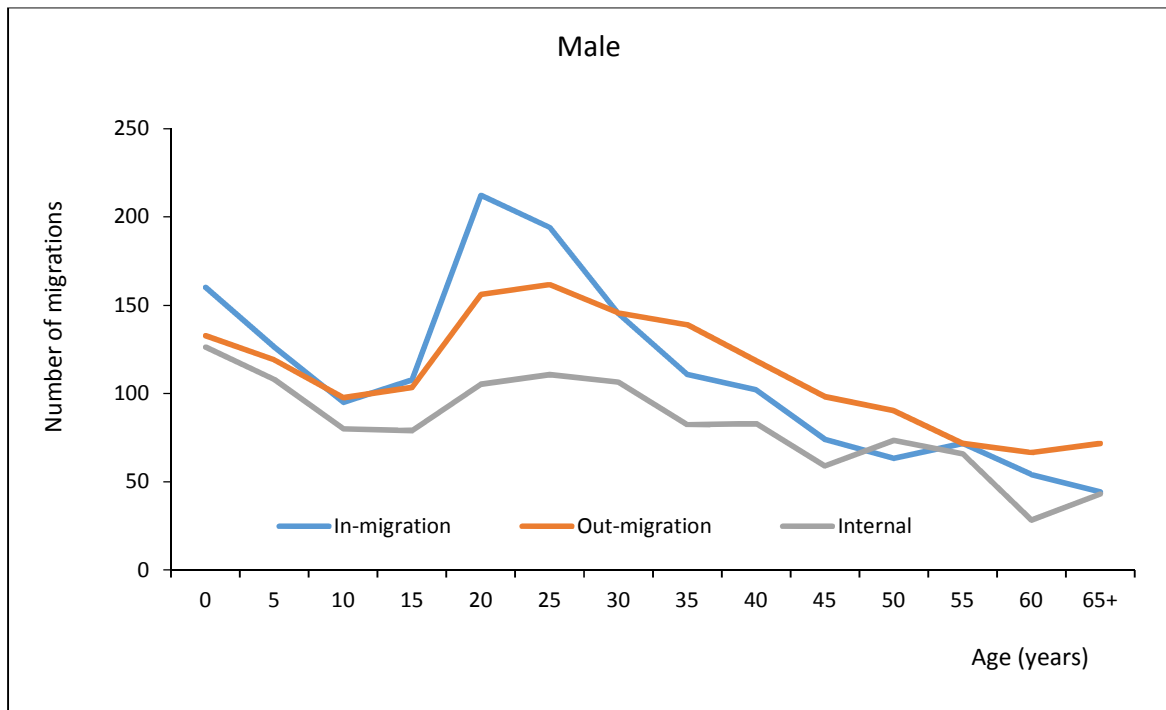


Figure 7.2: Number of in-migration, out-migrations and internal movement by sex and month, urban HDSS 2016



Chapter 8

Safe Motherhood Practices

The urban HDSS also recorded antenatal care received by mother in different stages of pregnancy. Out of 1824 livebirth pregnancies, 25% women did not go for any antenatal check-up, while only 34.3% had four or more antenatal check-ups (Table 8.1). Forty-eight per cent women had antenatal check-ups in between 3-4 months followed by 32% in between 5-6 months (Table 8.2). Slightly over 75% women reported that they had antenatal check-ups at NGO sector followed by the private sector (10.9%), while only 6.4% had antenatal check-ups at the public sector (Table 8.3).

Table 8.4 shows the distribution of livebirth pregnancies by place of delivery. Forty-seven per cent deliveries took place at home, followed by private sector (22.4%), NGO sector (21.7%), and public sector (8.3%), while such data reported by the Urban Health Survey 2013 were 59.7%, 12.6%, 11.4%, and 12.8% respectively.

Delivery attended by MBBS doctor was the highest (32.6%), followed by TTBA (29.4%), TBA (19.6%), and nurse (14.5%) (Table 8.5), while such data reported by the Urban Health Survey 2013 were 25.1%, 0.0%, 15.1%, and 12% respectively.

Table 8.6 shows data on mode of delivery. Seventy-two per cent were normal deliveries followed by C-section (28%), while the Urban Health Survey 2013 reported 44% deliveries by C-section.

Fifty-six per cent mothers did not have any postnatal visit while 24% had one postnatal visit, and 21% mother had two or more postnatal visits (Table 8.7). Sixty-nine per cent mothers had postnatal visits at NGO sector followed by the public sector (13.7%), while visit to the private sector was only 12.3% (Table 8.8). About 60% mothers had post-natal visits within two days of delivery (Table 8.9).

Table 8.1: Number of antenatal visits, urban HDSS 2016

No. of visits	Urban HDSS		UHS-2013 (slum)
	Number	Percent	Percent
0	454	24.9	27.9
1	132	7.2	7.2
2	280	15.4	14.8
3	333	18.3	21.6
4+	625	34.3	28.5
Total	1824	100.0	100.0

Table 8.2: Antenatal care by duration of pregnancy, urban HDSS 2016

Visit by duration (months)	Urban HDSS		UHS-2013 (slum)
	Number	Percent	Percent
<3	102	7.4	-
3-4	654	47.7	-
5-6	435	31.8	-
7+	179	13.1	-
Total	1370	100.0	-

Table 8.3: Place of antenatal care, urban HDSS 2016

Place of care	Urban HDSS		UHS- 2013 (slum)
	Number	Percent	Percent
Home	76	5.5	14.2
Public sector	88	6.4	23.9
NGO sector	793	57.9	42.4
Private sector	149	10.9	29.5
NGO (UPHCSDP)	264	19.3	-
Other	-	-	0.2
Total	1370	100.0	100.0

Table 8.4: Livebirth pregnancies (per cent) by place of delivery, urban HDSS 2016

Place of delivery	Urban HDSS		UHS- 2013 (slum)
	Number	Percent	Percent
Home	864	47.4	59.7
Public sector	152	8.3	12.8
NGO sector	347	19.0	12.6
Private sector	409	22.4	11.4
NGO (UPHCSDP)	50	2.7	-
Other	2	0.1	3.5
Total	1824	100.0	100.0

Table 8.5: Livebirth pregnancies (per cent) by birth attendant, urban HDSS 2016

Birth attendant	Urban HDSS		UHS- 2013 (slum)
	Number	Percent	Percent
TBA	357	19.6	15.1
TTBA	537	29.4	-
Un-trained TBA	-	-	32.2
LFPV/FWV	0	0	0.3
Nurse	265	14.5	12.0
MBBS	595	32.6	25.1
Other	70	3.8	15.3
Total	1824	100.0	100.0

Table 8.6: Livebirth pregnancies by mode of delivery, urban HDSS 2016

Mode of delivery	Urban HDSS		UHS- 2013 (slum)
	Number	Percent	Percent
Normal	1320	72.4	-
Operation(C/S)	497	27.2	44.0
Instrumental	7	0.4	-
Total	1824	100.0	100.0

Table 8.7: Number of postnatal visits, urban HDSS 2016

No. of visits	Urban HDSS		BMMS 2011
	Number	Percent	Percent
0	1019	55.9	59.4
1	422	23.9	-
2	239	13.1	-
3	98	5.4	-
4+	46	2.5	-
Total	1824	100.0	-

Table 8.8: Place of postnatal care, urban HDSS 2016

Place of care	Urban HDSS		UHS-2013 (slum)
	Number	Percent	Percent
Home	40	5.0	-
Public sector	110	13.7	-
NGO sector	250	31.1	-
Private sector	99	12.3	-
NGO (UPHCSDP)	306	38.0	-
Total	805	100.0	-

Table 8.9: Postnatal care by day of delivery, urban HDSS 2016

Day of delivery	Urban HDSS		BMMS 2011
	Number	Percent	Percent
0-2	482	59.9	32.0
3+	323	40.1	-
Total	805	100.0	-

References

BBS, 2015. Census of Slum Areas and Floating Population - 2014, Bangladesh Bureau of Statistics, Statistics Division, Ministry of Planning, Government of the People's Republic of Bangladesh.

ICDDR,B (2014). Registration of health and demographic events 2012, Scientific Report No. 124. Health and Demographic Surveillance System–Matlab, vol. 46. Dhaka: ICDDR,B.

ICDDR,B (2016). Registration of health and demographic events 2014, Scientific Report No. 133. Health and Demographic Surveillance System–Matlab, vol. 49. Dhaka: ICDDR,B.

Hanifi SMA, A Sultana, MN Mia, S Hoque, SS Mahmood, M Iqbal, A Bhuiya (2016). Chakaria Health and Demographic Surveillance System: Focusing on the Sustainable Development Goals 2015, Scientific Report No. 134, Dhaka: ICDDR,B

Bangladesh Urban Health Survey 2013, Preliminary Results, National Institute of Population Research and Training (NIPORT), MEASURE Evaluation, UNC-Chapel Hill, USA, icddr,b

INDEPTH, 2002. HDSS Network (www.indepth-network.org)

Appendix A

Appendix A.1a: Mid-year population by age, sex and slum location, urban HDSS 2106

Age (years)	Karail		Mirpur		Dhalpur & Shaympur		Tongi		Total
	Male	Female	Male	Female	Male	Female	Male	Female	
0	528	523	292	280	228	239	789	793	3672
1	451	410	255	248	223	203	298	314	2402
2	438	438	230	212	215	176	358	330	2397
3	476	427	239	219	194	182	336	355	2428
4	409	389	174	182	186	184	340	342	2206
5-9	2520	2488	1386	1354	1028	1088	2161	2051	14076
10-14	2242	2111	1211	1233	970	968	2149	2104	12988
15-19	2079	2549	1206	1851	1020	1071	2144	2755	14675
20-24	1756	2588	981	1647	782	956	1677	2361	12748
25-29	2338	2432	1548	1609	941	972	2158	2385	14383
30-34	1734	1532	1026	936	631	662	1645	1574	9740
35-39	1602	1476	1034	980	678	665	1541	1551	9527
40-44	1129	965	709	517	508	382	1123	1027	6360
45-49	931	874	614	511	377	367	980	996	5650
50-54	692	564	337	274	296	248	745	743	3899
55-59	387	269	268	170	200	165	482	480	2421
60-64	368	248	179	131	193	147	462	470	2198
65-69	181	86	123	68	97	52	284	281	1172
70-74	154	88	64	23	108	49	294	272	1052
75-79	31	11	33	23	15	14	108	73	308
80-84	22	15	18	9	25	18	94	93	294
85 +	23	15	13	9	11	11	44	62	188
Total	20491	20498	11940	12486	8926	8819	20212	21412	124784

Appendix A.2a: Death by age and slum location, urban HDSS 2016

Age (Year)	Korail	Mirpur	Dhalpur & Shayampur	Tongi	Total
<1 year	43	16	11	26	96
1	7	1	1	1	10
2	2	1	0	0	3
4	0	0	1	0	1
5-9	5	1	3	3	12
10-14	3	1	2	9	15
15-19	8	3	0	5	16
20-24	6	6	1	6	19
25-29	5	1	4	10	20
30-34	8	2	5	7	22
35-39	8	0	1	7	16
40-44	9	2	4	8	23
45-49	15	2	3	11	31
50-54	11	5	3	18	37
55-59	9	3	5	11	28
60-64	11	6	4	17	38
65-69	8	4	4	15	31
70-74	2	2	1	14	19
75-79	3	0	3	16	22
80-84	0	2	1	7	10
85+	1	1	4	13	19
Total	164	59	61	204	488

Appendix A.2b: Death by month and slum location, urban HDSS 2016

Months	Korail	Mirpur	Dhalpur & Shayampur	Tongi	Total
January	13	7	7	22	49
February	12	4	3	17	36
March	11	7	5	15	38
April	17	3	4	14	38
May	14	10	2	18	44
June	15	2	6	18	41
July	23	4	4	15	46
August	17	5	7	18	47
September	15	4	5	15	39
October	12	5	9	15	41
November	11	4	5	12	32
December	4	4	4	25	37
Total	164	59	61	204	488

Appendix A.3a: Pregnancy outcome by mother's age and slum location, urban HDSS 2016

Mother's age (Years)	Korail	Mirpur	Dhalpur & Shayampur	Tongi	Total
15-19	175	94	90	171	530
20-24	292	110	98	259	759
25-29	191	95	67	217	570
30-34	74	36	33	87	230
35-39	37	12	11	33	93
40-44	10	1	2	5	18
45+	3	4	0	2	9
Total	782	352	301	774	2209

Appendix A.3b: Pregnancy outcome by month and slum location, urban HDSS 2016

Months	Korail	Mirpur	Dhalpur & Shayampur	Tongi	Total
January	54	31	28	82	195
February	48	34	22	59	163
March	56	28	29	68	181
April	63	29	23	72	187
May	75	26	12	57	170
June	73	29	32	60	194
July	79	23	24	62	188
August	74	41	27	81	223
September	70	33	27	51	181
October	76	34	38	80	228
November	58	20	22	55	155
December	56	24	17	47	144
Total	782	352	301	774	2209

Appendix A.4a: Antenatal care by mother's age and slum location, urban HDSS 2016

Mother's age (Year)	Korail	Mirpur	Dhalpur & Shayampur	Tongi	Total
15-19	105	65	66	115	351
20-24	197	70	67	184	518
25-29	117	54	40	162	373
30-34	50	18	11	67	146
35-39	20	6	5	18	49
40-44	4	0	2	3	9
45+	3	1	0	1	5
Total	496	214	191	550	1451

Appendix A.4b: Antenatal care by month and slum location, urban HDSS 2016

Age (Year)	Korail	Mirpur	Dhalpur & Shayampur	Tongi	Total
January	18	2	11	31	62
February	23	13	12	26	74
March	26	8	13	37	84
April	33	16	11	51	111
May	46	17	6	40	109
June	55	24	30	46	155
July	61	19	18	51	149
August	59	34	20	67	180
September	57	23	19	43	142
October	50	30	29	74	183
November	43	15	13	51	122
December	25	13	9	33	80
Total	496	214	191	550	1451

Appendix A.4c: Postnatal care by mother's age and slum location, urban HDSS 2016

Mother's age (Year)	Korail	Mirpur	Dhalpur & Shayampur	Tongi	Total
15-19	27	46	46	83	202
20-24	59	42	45	132	278
25-29	35	34	25	121	215
30-34	13	9	7	51	80
35-39	5	6	6	12	29
40-44	0	0	1	2	3
45+	1	2	0	0	3
Total	140	139	130	401	810

Appendix A.4d: Postnatal care by month and slum location, urban HDSS 2016

Age (Year)	Korail	Mirpur	Dhalpur & Shayampur	Tongi	Total
January	7	2	8	16	33
February	5	7	11	16	39
March	11	7	11	22	51
April	15	16	7	36	74
May	16	15	5	30	66
June	15	15	23	36	89
July	20	8	11	43	82
August	18	22	12	52	104
September	15	14	12	31	72
October	8	20	13	56	97
November	5	8	9	37	59
December	5	5	8	26	44
Total	140	139	130	401	810

Appendix A.5: Marriage and divorce by months, urban HDSS 2016

Months	Number		Percent	
	Marriage	Divorce	Marriage	Divorce
January	118	9	8.0	11.4
February	143	6	9.6	7.6
March	165	6	11.1	7.6
April	182	9	12.3	11.4
May	147	7	9.9	8.9
June	97	10	6.5	12.7
July	175	8	11.8	10.1
August	118	8	8.0	10.1
September	109	6	7.3	7.6
October	92	5	6.2	6.3
November	65	3	4.4	3.8
December	73	2	4.9	2.5
Total	1484	79	100.0	100.0

Appendix A.6a: Number of in-migration, out-migration and internal-movement by month and sex, urban HDSS 2106

Months	In-migration			Out-migration			Internal		
	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female
All months	16582	7948	8634	15976	7571	8405	11738	5705	6033
January	1862	918	944	1819	866	953	1190	581	609
February	1571	728	843	1241	577	664	1246	608	638
March	1572	765	807	1393	637	756	895	422	473
April	1338	628	710	1432	679	753	1107	528	579
May	1413	684	729	1345	649	696	1147	581	566
June	1675	823	852	1405	678	727	979	476	503
July	1520	730	790	1437	679	758	848	425	423
August	1445	686	759	1298	599	699	913	453	460
September	1289	614	675	1487	698	789	972	465	507
October	1388	674	714	1606	793	813	1062	509	553
November	877	413	464	992	478	514	914	428	486
December	632	285	347	521	238	283	465	229	236

Appendix A.6b: In-migration by age and slum location, urban HDSS 2016

Age (Year)	Korail	Mirpur	Dhalpur & Shayampur	Tongi	Total
0-4	651	716	394	371	2132
5-9	605	543	280	295	1723
10-14	456	460	211	215	1342
15-19	849	856	432	519	2656
20-24	847	830	376	393	2446
25-29	741	894	318	482	2435
30-34	387	431	179	242	1239
35-39	269	345	136	184	934
40-44	180	221	92	96	589
45-49	153	139	54	67	413
50-54	85	80	33	44	242
55-59	45	60	30	21	156
60-64	24	51	18	25	118
65+	31	58	22	46	157
Total	5323	5684	2575	3000	16582

Appendix A.6c: In-migration by cause and slum location, urban HDSS 2016

Cause	Korail	Mirpur	Dhalpur & Shayampur	Tongi	Total
Looking for work	2590	2522	954	745	6811
To earn more money	77	314	293	177	861
River erosion	25	380	10	10	425
For familial	2345	2177	1027	1684	7233
For children education	7	6	9	4	26
For own education	23	55	19	50	147
Marriage	163	97	71	165	496
Other	93	132	172	130	527
NA(since birth)	0	1	20	35	56
Total	5323	5684	2575	3000	16582

Appendix A.6d: In-migration by month and slum location, urban HDSS 2016

Months	Korail	Mirpur	Dhalpur & Shayampur	Tongi	Total
January	553	713	302	294	1862
February	426	634	319	192	1571
March	488	580	227	277	1572
April	429	444	181	284	1338
May	541	459	193	220	1413
June	681	454	310	230	1675
July	627	494	221	178	1520
August	431	525	222	267	1445
September	435	499	132	223	1289
October	449	366	244	329	1388
November	136	304	137	300	877
December	127	212	87	206	632
Total	5323	5684	2575	3000	16582

Appendix A.6e: Out-migration by age and slum location, urban HDSS 2016

Age (Year)	Korail	Mirpur	Dhalpur & Shayampur	Tongi	Total
0-4	436	478	366	442	1722
5-9	441	513	333	435	1722
10-14	336	391	298	362	1387
15-19	470	650	450	644	2214
20-24	481	663	394	553	2091
25-29	488	753	401	593	2235
30-34	332	407	237	372	1348
35-39	278	379	224	322	1203
40-44	147	207	135	179	668
45-49	131	155	87	138	511
50-54	100	93	62	91	346
55-59	41	55	29	43	168
60-64	33	44	24	43	144
65+	54	44	47	72	217
Total	3768	4832	3087	4289	15976

Appendix A.6f: Out-migration by cause and slum location, urban HDSS 2016

Cause	Korail	Mirpur	Dhalpur & Shayampur	Tongi	Total
Looking for work	1040	2034	450	543	4067
To earn more money	114	40	117	120	391
Familial	1800	1658	1408	2596	7462
For own education	47	52	19	51	169
Marriage	94	80	55	167	396
Divorce	7	10	8	15	40
Could not earn sufficient money	159	0	6	57	222
Other	507	958	1024	740	3229
Total	3768	4832	3087	4289	15976

Appendix A.6g: Out-migration by month and slum location, urban HDSS 2016

Months	Korail	Mirpur	Dhalpur & Shayampur	Tongi	Total
January	561	562	255	441	1819
February	238	356	270	377	1241
March	395	379	229	390	1393
April	291	450	246	445	1432
May	371	377	262	335	1345
June	388	420	240	357	1405
July	314	514	289	320	1437
August	221	473	237	367	1298
September	246	453	391	397	1487
October	335	482	432	357	1606
November	259	262	155	316	992
December	149	104	81	187	521
Total	3768	4832	3087	4289	15976

Appendix A.6h: Internal movement by age and slum location, urban HDSS 2016

Age (Year)	Korail	Mirpur	Dhalpur & Shayampur	Tongi	Total
0-4	415	462	323	423	1623
5-9	453	402	330	348	1533
10-14	323	345	196	293	1157
15-19	342	438	265	411	1456
20-24	364	407	261	364	1396
25-29	337	433	291	412	1473
30-34	289	294	171	230	984
35-39	191	232	134	159	716
40-44	140	150	83	113	486
45-49	94	95	58	94	341
50-54	67	72	37	60	236
55-59	29	32	42	38	141
60-64	18	20	15	27	80
65+	24	20	21	51	116
Total	3086	3402	2227	3023	11738

Appendix A.6i: Internal movement by cause and slum location, urban HDSS 2016

Cause	Korail	Mirpur	Dhalpur & Shayampur	Tongi	Total
Work/economic	299	30	8	121	458
Marriage/familial	1290	2407	1082	1750	6529
Other	1439	810	1031	974	4254
Due to split	58	115	86	144	403
Due to Merge	0	40	20	34	94
Total	3086	3402	2227	3023	11738

Appendix A.6j: Internal movement by month and slum location, urban HDSS 2016

Months	Korail	Mirpur	Dhalpur & Shayampur	Tongi	Total
January	414	302	205	269	1190
February	261	413	278	294	1246
March	224	284	181	206	895
April	294	315	208	290	1107
May	279	285	210	373	1147
June	274	314	183	208	979
July	203	264	157	224	848
August	173	293	165	282	913
September	276	300	122	274	972
October	250	286	256	270	1062
November	298	188	181	247	914
December	140	158	81	86	465
Total	3086	3402	2227	3023	11738

Appendix B

Life Table Equations

$$1. \quad {}_nq_x = \frac{{}_nM_x}{\frac{1}{n} + {}_nM_x \left[\frac{1}{2} + \frac{n}{12} + ({}_nM_x - \ln C) \right]} \quad \text{if } X > 0$$

q_0 = Infant death rate per 1,000 live births.

$$2. \quad l_0 = 100,000$$

$$l_x = (1 - {}_nq_{x-n})l_{x-n}$$

$$3. \quad l_0 = 0.15 l_1 + 0.85 l_1$$

$$l_1 = 0.410 l_1 + 0.590 l_2$$

$$l_i = \frac{1}{2} (l_i + l_{i+1}), \text{ for } i=2, 3, 4$$

$${}_n l_x = \frac{{}_nM_x}{{}_nM_0}, \text{ for } 5 \leq x \leq 80$$

$${}_n L_{85} = \frac{l_{85}}{{}_nM_{85}}, \text{ for the last age group } 85+$$

$$4. \quad e_x = \frac{T_x}{l_x}, \text{ where } T_x = \sum_{y=x}^{\infty} L_y$$

NOTE: Computed using Greville's method, as suggested in: Shryock HS, Seigel JS, et al. (1975).

NOTE: $\ln C$ assumed to be 0.095; separation factors in equation 3 correspond to an infant mortality rate of 50 per 1,000 livebirths

Appendix C

Member of Technical Review Committee

1. Md. Abdul Hakim Majumder ndc, Project Director (Joint Secretary), UPHCSDP
2. Mr. Dhiraj Kumar Nath, Staff consultant, BRM, ADB
3. Dr. Zahirul Islam, Program Officer, Embassy of Sweden, Dhaka
4. Dr. Rafiqus Sultan, PTO, UNFPA
5. Director (Research), NIPORT
6. Prof. Nitai Chakraborty, Department of Statistics, University of Dhaka
7. Dr. Md. Shafiqul Islam, Professor, Department of Epidemiology, NIPSOM
8. Chief Health Officer, Dhaka South City Corporation
9. Chief Health Officer, Dhaka North City Corporation
10. Abdur Razzaque, PhD, PI, Operations Research, (icddr,b)
11. Mr. Sabirul Islam, Deputy Project Director, (A&T/SD), UPHCSDP

Appendix D 1

Staff List of Urban HDSS, 2016

Name of Staff	Designation
Research and Management Team	
Abdur Razzaque, PhD	Principal Investigator
Mohammad Iqbal	Co-Principal Investigator
SM Monjur Ahmed Hanifi	Co-Principal Investigator
Shehrin Shaila Mahmud, PhD	Co-Principal Investigator
A H M Golam Mustafa	Senior Programmer
Md Razib Chowdhury	Senior Research Officer
Kasham Iqbal	Office Manager
Field Team	
Md Shaninur Islam	Field Research Assistant
Nargis Akter	Field Research Assistant
Md Mokbul Hossain sharif	Field Research Assistant
Asma Akter	Field Worker
Dilnur Akter	Field Worker
Fatema Khatun	Field Worker
Gita Rani Roy	Field Worker
Lutfu Akter Lipi	Field Worker
Momotaz Akter	Field Worker
Moryom Akter	Field Worker
Nargis Begum	Field Worker
Rehana Parvin	Field Worker
Roksana Rahman	Field Worker
Rashida Akter	Field Worker
Salma Akter	Field Worker
Sonia Islam	Field Worker
Santa Islam	Field Worker
Sabina Yasmin	Field Worker
Sumi Akter	Field Worker
Sanjida Akter Pome	Field Worker