

Slum Health in Bangladesh

Insights from Health and Demographic Surveillance



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Phone: +(880 2) 988 1760

Fax: +(880 2) 982 7077

Email: razzque@icddrb.org

Web: www.icddrb.org

In memory of Dhiraj Kumar Nath (1945-2018)

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Preface

icddr,b, through support from the Government of the People's Republic of Bangladesh, has established the Health and Demographic Surveillance System (HDSS) in selected slums of Dhaka (North & South) and Gazipur City Corporations. The population covered by the HDSS is about 120,000 people living in 30,000 households. Funding for the study was provided by the Government of the People's Republic of Bangladesh, the Embassy of Sweden and the Asian Development Bank.

HDSS is a methodological approach to monitoring the demographic and health outcomes in a registered and defined population living in a confined geographic area. It starts with an initial census of the population, followed by regular household visits by female Field Workers to update information about pregnancy outcomes (livebirth, stillbirth, miscarriage induced and miscarriage spontaneous), demographic events including death, marriage and divorce, migrations (in-, out-, and internal-), household split and head change, as well as safe motherhood practices and fertility regulation. In addition to regular surveillance activities, icddr,b has conducted a series of four surveys within the HDSS sampling frame that provide insight on the health risks and health-seeking behaviour of slum dwellers, and their utilization of services provided by partner NGOs and local urban bodies under the Urban Primary Health Care Services Delivery Project (UPHCSDP).

The Technical Review Committee guiding the HDSS consisted of experts from government-, and non-government organizations as well as researchers and professionals working in the health and population sectors. Their contributions to each phase of the study were innumerable and greatly appreciated. Heartfelt thanks are also due to icddr,b's researchers and field staff for their dedication to ensuring the quality of data collection, and to participating households for their valued time and engagement. Finally, I would like to acknowledge officials and staff of the Project Management Unit, UPHCSDP whose continuous support enabled the smooth functioning of project activities.



Md. Abdul Hakim Majumder, Ndc
Project Director (Additional Secretary)
UPHCSDP

Foreword

To improve the health status of the growing urban population of Bangladesh, the Local Government Division has been implementing the Urban Primary Health Care Project since 1998. Delivering primary health care services through urban local bodies and partner NGOs, the project has seen three phases: Urban Primary Health Care Project (1998-2005), Second Urban Primary Health Care Project (2005-2012) and Urban Primary Health Care Services Delivery Project (UPHCSDP) (2012-2018). Under UPHCSDP, service coverage expanded substantially to around 10 million urban population through a primary health care network of 25 Comprehensive Reproductive Health Care Centers, 113 Primary Health Care Centers and 226 Satellite Clinics at the community level. A central goal of UPHCSDP is to improve the health status of the urban poor through increased access to and utilization of efficient, effective, and sustainable primary health care services. The Urban Health and Demographic Surveillance System (UHDSS) has been established in selected slums of Dhaka (North & South) and Gazipur City Corporations to shed light on contemporary health and population dynamics in these disadvantaged populations, and thus inform the service provision activities of partner NGOs and local urban bodies under UPHCSDP.

Bangladesh must be commended on its remarkable achievements in health and development over the last several decades, and its continued dedicated efforts to ensure that no one is left behind. In light of concerning health disparities when comparing slum and non-slum areas, a specific focus on populations in slum settlements is important in addressing and closing gaps in health and nutrition indicators, as well improving access and utilization of quality primary healthcare services. While findings from the HDSS are regularly shared with stakeholders for their deliberation and actions supporting Universal Health Coverage, this book enables broader public access, reporting on the findings from the baseline population and socioeconomic census in 2015, the HDSS annual report of 2016, as well as results from four cross-sectional surveys which focus on: (i) Maternal, neonatal and child health-seeking behaviour as well as adolescent reproductive health, violence-against-women and gender related aspects of primary health care; (ii) Rural-urban migration and adult health status; (iii) Health expenditure and financial coping mechanisms; and (iv) Socio-demographic differentials in selected risk factors for non-communicable diseases.

The findings of this study and its policy and programmatic implications will be instrumental in providing wider perspectives on urban health focusing on disadvantaged populations and will inform current and future phases of UPHCSDP implementation and other urban health initiatives.



Prof. John D. Clemens, MD
Executive Director
icddr,b

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icddr,b also acknowledges the authors who contributed to various chapters of the book and the editorial team for managing the publication. Thanks also to the field staff for their dedication to ensuring quality data collection, and to participating households for their valued time and engagement.

Finally, icddr,b would like to acknowledge officials and staff of the Project Management Unit, UPHCSDP whose continuous support enabled the smooth functioning of project activities.

List of Contributors

Abdur Razzaque, PhD	PI, Urban Health and Demographic Surveillance System, icddr,b
Dr. Mohammad Iqbal	Project Coordinator, icddr,b
SMA Hanifi, PhD	Associate Scientist, icddr,b
Shehrin Shaila Mahmood, PhD	Assistant Scientist, icddr,b
Mohammad Nahid Mia	Research Officer, icddr,b
Razib Chowdhury	Senior Research Officer, Urban Health and Demographic Surveillance System, icddr,b
AHM Golam Mustafa	Senior Programmer, Urban Health and Demographic Surveillance System, icddr,b
Abbas Bhuiya, PhD	Ex-Deputy Executive Director, icddr,b
Md. Abdul Hakim Majumder, Ndc	Project Director (Additional Secretary), UPHCSDP
Brian Chin, PhD	Social Sector Specialist, Asian Development Bank, Manila
Dr. Mohammad Zahirul Islam	Health Advisor, Embassy of Sweden, Dhaka
Dr. David Vlahov	Associate Dean for Research and Professor, Yale School of Nursing

Members of the Technical Review Committee

1. Md. Abdul Hakim Majumder, Ndc, Project Director (Additional Secretary), UPHCSDP
2. Md. Rafiqul Islam Sarker, Director (Research), NIPORT
3. Brig Gen. (Dr.) Sheikh Salahuddin, MBBS, MPH, Chief Health Officer, Dhaka South City Corporation
4. Brig Gen. (Dr.) S M M Saleh Bhuiyan, Chief Health Officer, Dhaka North City Corporation
5. Mr. Sabirul Islam, Joint Secretary & Deputy Project Director (former), UPHCSDP
6. Md. Ahsanur Rahman Hasib, Deputy Secretary & Deputy Project Director (Admin & Training), UPHCSDP
7. Dr. Sharmin Mizan, MBBS, MPH, Deputy Project Director (Service Delivery), UPHCSDP
8. Mr. Dhiraj Kumar Nath, Urban Health Specialist, Bangladesh Resident Mission, Asian Development Bank
9. Dr. Mohammad Zahirul Islam, Health Advisor, Embassy of Sweden, Dhaka
10. Dr. Rafiqus Sultan, PTO, UNFPA
11. Prof. Nitai Chakraborty, Department of Statistics, University of Dhaka
12. Dr. Md. Shafiqul Islam, Professor, Department of Epidemiology, NIPSOM
13. Dr. Abdur Razzaque, PI, Operations Research, icddr,b

Abbreviations

ADB	Asian Development Bank
ASA	Association for Social Advancement
BBS	Bangladesh Bureau of Statistics
BMMS	Bangladesh Maternal Mortality Survey
BRAC	Bangladesh Rural Advancement Committee
COPD	Chronic Obstructive Pulmonary Disease
Co-PI	Co-Principal Investigator
CS	Caesarean Section
DSK	Dushtha Shasthya Kendra
DNCC	Dhaka North City Corporation
DSCC	Dhaka South City Corporation
FWV	Family Welfare Visitor
GCC	Gazipur City Corporation
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
LGD	Local Government Division
MoHFW	Ministry of Health and Family Welfare
MoLGRD&C	Ministry of Local Government, Rural Development & Cooperatives
MBBS	Bachelor of Medicine and Bachelor of Surgery
NIPORT	National Institute of Population Research and Training
NGO	Non-Governmental Organization
PMU	Project Management Unit
PI	Principal Investigator
TBA	Traditional Birth Attendant
TRC	Technical Review Committee
TTBA	Trained Traditional Birth Attendant
UHDSS	Urban Health and Demographic Surveillance System
UHS	Urban Health Survey
UN	United Nations
UPHCP	Urban Primary Health Care Project
UPHCSDP	Urban Primary Health Care Services Delivery Project
UPPR	Urban Partnerships for Poverty Reduction

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Chapter 1

Urban Health in Bangladesh

David Vlahov

In 2019, for the first time in history, half of the population in Asia will be urban accounting for 54% of the world's urban population. While China and India drive these numbers and our attention, the full constellation of countries in Asia offer insights into the challenges and opportunities for health in urban settings.

Bangladesh provides a striking portrait of urbanization. One-third of the current population lives in urban areas up from 5% in the 1960s, and projections suggest it will exceed 50% by 2050 (1).

Slum settlements have proliferated as part of this trend (2), with a recent census counting approximately 14,000 slum settlements across the country (3, 4). Although these settlements differ in size, they share certain characteristics; including a steady migration of the poor from rural areas (accounting for half of the residents of slums), overcrowding, rising inequalities, environmental hazards, inadequate infrastructure, and a limited and disorganized health care system.

The increasing size and density of slums come from migration and natural growth. The mechanism for migration from rural to urban can be described as "push-pull". The "push" can be related to multiple factors including adverse weather and natural disasters that result in the loss of livelihoods and the displacement of people, as well as political or religious violence. The "pull" is due to economic opportunity. At a national level, Bangladesh has progressively increased its position within global economic rankings, and is projected to move from the 31st in 2018 to the 23rd largest economy in the world by 2050.

In parallel, the proportion of the population living in poverty has declined, although summative measures conceal distinctions of inequalities. When a migrant population exceeds employment openings in the formal sector, the informal economy provides the opportunity for income. Slums mainly supply these informal labor markets, characterized by low wages, insecurity and long working hours. Almost all the newcomers to the city join the informal sector including the garment industry, rickshaw pulling, street vending, construction work, and small business. Migration is not unidirectional as some move back

and forth between slums and rural communities, and a substantial proportion of urban income is transferred back to rural areas, most often families, in the form of remittances.

While urbanization is typically viewed as rural-to-urban migration, this only partially explains the increasing size of slum populations as “natural growth”; which occurs as a function of births and extended life expectancy, may also contribute. In Bangladesh, a steady decline in family size has been accompanied by an increase in life expectancy which together balances towards increasing slum population size. Another factor contributing to the emergence of slums involves changing political boundaries; as cities expand, they may incorporate and count previously distinct villages which then become peri-urban slums.

Slum conditions reflect concentrated disadvantage reflected in unemployment, underemployment, insecure land tenure and inadequate housing with poor or absent ventilation, drinking water, electricity and sewerage facilities. Pollution is widespread and adverse environmental hazards and weather-related events are constant insults affecting the health of slum dwellers (5, 6, 7). Transportation for work opportunities and access to advanced health care are typically limited in slums settlements, and crime and violence take their toll.

Recently, the health of slum populations has been receiving greater attention. However, a comprehensive approach to slum health is largely absent due to the unregistered, unwanted and powerless status conferred to slum populations. Slum settlements are commonly perceived as eyesores, and even recently an official approach to addressing slum formation was to have them bulldozed (8). Contributing to the “hidden” nature of slums has been a failure to count or undercount unregistered slum dwellers, and to present statistics in terms of “urban” versus “rural” comparisons. In most cases, indicators like “infant” and “under 5 mortality” were worse off in rural than urban areas, prompting donor agencies and governments to preferentially direct funding to rural areas – sometimes labelled the anti-urban bias (9). By working to improve the rural settings, the thinking was that rural to urban migration would slow down, and reverse migration might be encouraged. Despite years of investments, these goals did not materialize. Furthermore, once data were disaggregated into the more granular units of urban, urban slum and rural categories, it was seen that slums had worse health outcomes than rural areas in countries as varied as Kenya, Bangladesh, Egypt and India (10). While the consistent health disadvantage of slum populations underlined the need to address the social determinants of health and health services,

governments have been slow to make these investments due to persistent biases and limited resources to effect the change in a highly complex environment.

Provision of health services to slum populations in Bangladesh faces many challenges. A 2018 report from the World Bank (11) lays out concerns regarding uncoordinated urban governance for health services between multiple national and local agencies, outdated regulations for facilities and coverage, inadequate oversight of service delivery, and the lack of an overarching urban health policy. Conclusions of the report note the following:

i.-“Urban governments do not have a separate budget allocation for health services or public health initiatives, and they have limited capacity to mobilize their own funds. Each urban local body may employ a small number of health staff, paying their salaries from its budget and through donor-funded projects. This is in line with the country’s overall administrative structure, which is not fiscally decentralized and does not allow local participation in funding decisions.”

ii.-“Most regulations are weak and outdated for government responsibilities and health providers.”

iii.-“Bangladesh’s health system consists of different legal entities, with limited horizontal and vertical integrations and no mechanism in place to facilitate patient referrals. The health system puts inadequate emphasis on aspects such as equitable access to quality care, continuity of care, patient-centeredness, and patient rights”.

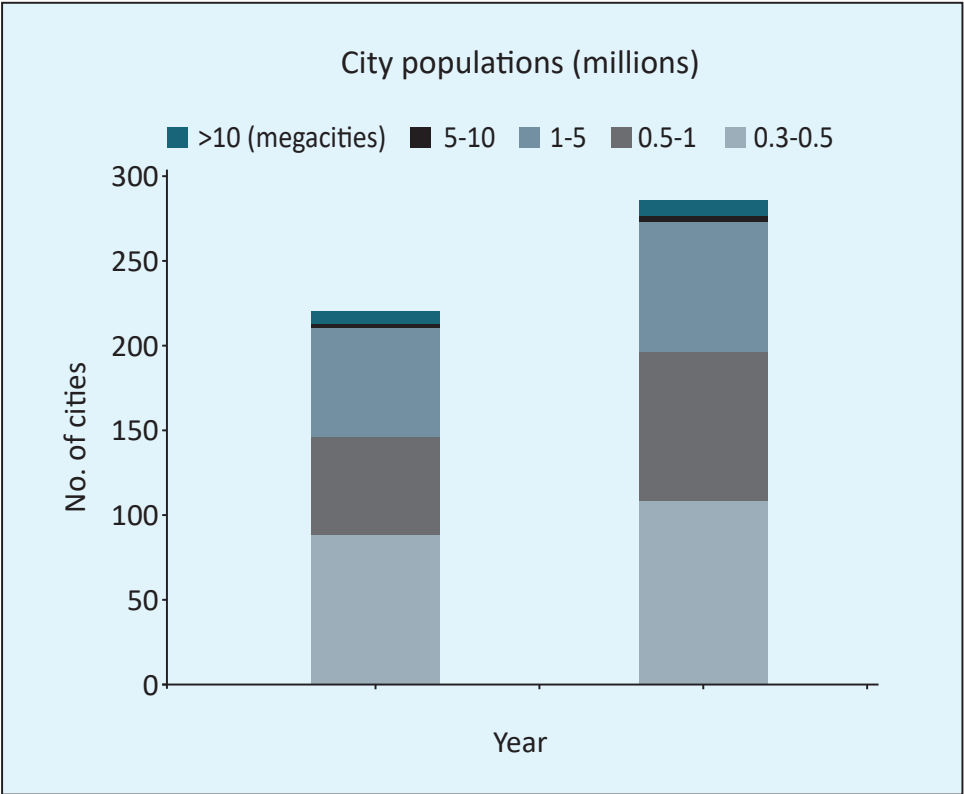
iv.-“The urban health landscape is evolving in Bangladesh without a concurrent vision of how the health system should work in city corporations and municipalities.”

The complexity of issues around urban health governance makes plans for a comprehensive approach to slum health daunting. BRAC and other non-government agencies’ success on building trust and increasing capacity to deliver services has been the key to moving the dial toward population health for the residents of urban slums in Bangladesh (12, 13).

The image of “urban” portrayed here is one of an unrelenting increase in the growth of megacities with expanding slum populations. Making slums in megacities “healthy” requires attention to the social determinants of health, health care, and good urban governance.

However, while this focus on megacities is crucial, they represent only 8.6% of urban populations globally; although the proportion of living in megacities in Bangladesh is already higher. As Figure 1 shows, if we project from 2010 to 2030, the number of cities in South Asia by size, we can expect that the greatest growth will be in the formation and increasing size of smaller cities. Many of these so-called “secondary” cities consist of less than one million people each, but have the potential to become megacities in future. If the patterns of urban migration and natural population growth continue as projected in the coming decade, it is crucial to anticipate, plan and resource secondary cities with infrastructure and good urban governance to make them healthy cities. We have the opportunity, we need the evidence, and we must act to achieve the goals of urban health including universal health care coverage (14). The United Nation’s Millennium Development Goals paid scant attention to the challenges of urban health. The Sustainable Development Goals of 3 for “health” and 11 for “urban” are separated to bring the world closer to designing and producing healthy cities.

Figure 1.1: Number of Cities in the South Asia by Size in 2010 and 2030



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Chapter 2

Making Slums Visible: Studying Slums and their Dynamics in Urban Bangladesh

Abdur Razzaque, Razib Chowdhury & AHM Golam Mustafa

Introduction

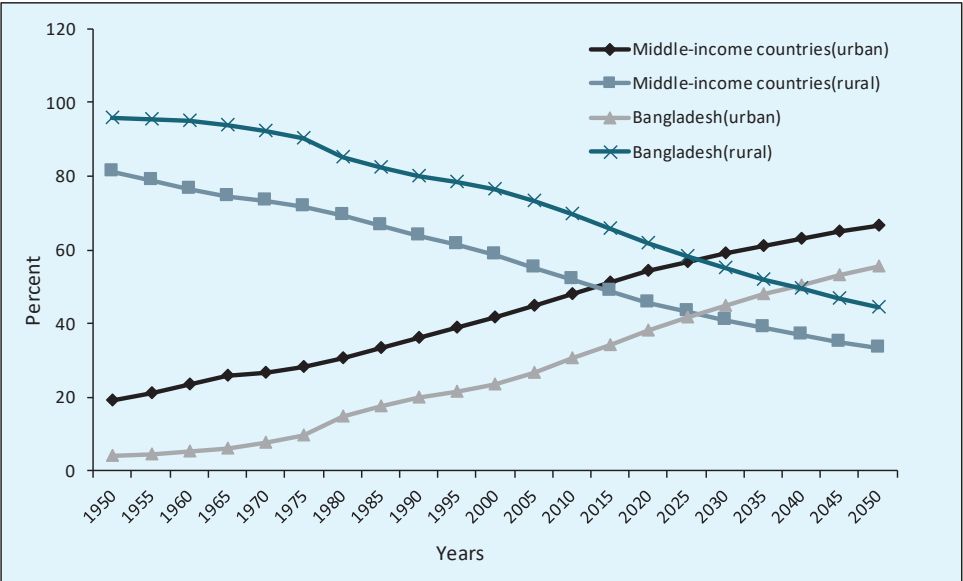
As the majority of the world's population now lives in urban areas, one of the key 21st-century challenges in population health is to improve the global urban condition (1, 2, 3). According to the latest United Nations' projections (4), the world's urban population will increase by about 1.3 billion by 2030, while the rural population will remain largely unchanged. This shift reflects a rapid global urbanization process that has been underway for more than two centuries that is especially visible in the global south. In fact, more than 90% of the world's urban population growth by 2030 will occur in the low and middle-income countries in Africa and Asia.

Bangladesh was largely rural until the early 1970s, after which time, urban population growth has steadily increased to over 30% in 2014 (Figure 2.1). Moreover, according to United Nations' estimates, the population of Bangladesh will increase from 158 million in 2014 to roughly 185 million by 2030 (4); bringing the urban population from about 50 million in 2014 to nearly 83 million. It is also estimated that Bangladesh will be more urban than rural by the middle of this century (Figure 2.1); more than one-third of these urban residents will dwell in slum settlements.

Although urbanization is a powerful engine of economic growth and socio-cultural development worldwide, there is increasing concern about the effect of expanding cities on human health, livelihood and the environment, especially when it takes place at a pace as rapid as that of Bangladesh. The force propelling most of this growth is migration from rural areas. The task of meeting the growing population's need for employment, services, and social benefits has proven difficult for urban local bodies. As a result, the lifestyle and socioeconomic benefits of urbanization are not equitably shared. Moreover, heavy demand on urban utilities and services¹, and the adverse environmental impacts that result pose challenges to the long-term health of city dwellers.

¹For example, electricity, gas, water, sanitation, sewerage, garbage disposal, transport and social services.

Figure 2.1: Urban and Rural Population: Middle-Income Countries and Bangladesh, 1950-2050.



Source: United Nations (2015). World Urbanization Prospects: The 2014 Revision.

Although Bangladesh has witnessed remarkable progress over the last few decades in terms of health and population indicators, significant disparities exist within urban areas. These disparities are particularly stark when comparing slum and non-slum dwellers in terms of health, nutrition, housing, water and sanitation (5, 6, 7, 8). A recent review of Bangladesh’s health performance over the last half-century (9), applauded the country’s exceptional improvements in under-five survival, life expectancy, immunization coverage, and tuberculosis control, while noting persistent challenges of poverty and malnutrition, that are further exacerbated by an evolving set of 21st-century challenges including massive and rapid urbanization, an upsurge in chronic and non-communicable diseases, and increasing vulnerability to climate change. While the urban poor are positioned at the center of these intersectional challenges, remarkably little is known about their demographic, health and socioeconomic characteristics, and how these are changing over time.

Background of the Project

In rural areas of Bangladesh, structured primary health care services are provided by the Ministry of Health and Family Welfare (MoHFW). By contrast, in urban areas, primary care provision is the responsibility

of the Ministry of Local Government, Rural Development and Cooperatives, with only secondary and tertiary care under the purview of MoHFW. To improve the health status of the urban poor, the Local Government Division has been implementing an Urban Primary Health Care Services Delivery Project (UPHCSDP) which contracts out the delivery of primary health-care services through urban local bodies and NGOs². The goal of the project is to improve health status through improved access to and utilisation of efficient, effective, and sustainable primary health-care services.

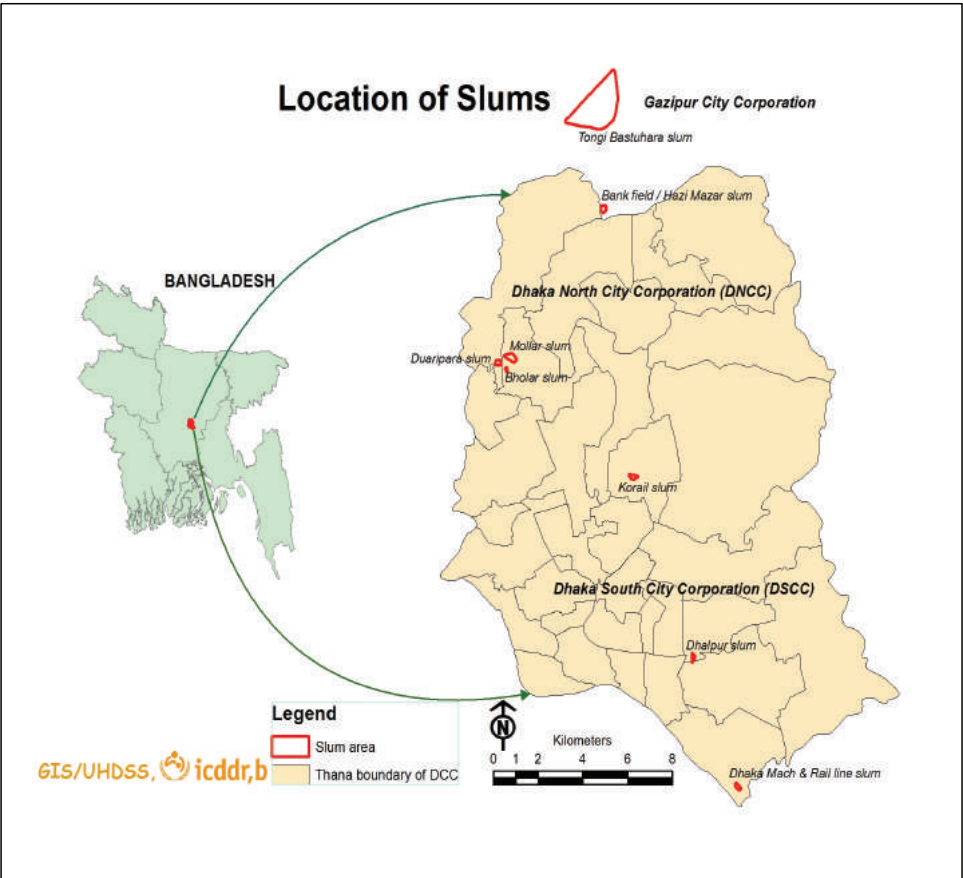
To monitor use of health services and track the population, health, and socioeconomic conditions of the urban poor population it covers, a Health and Demographic Surveillance System (HDSS) was established in 2016 in selected slums of Dhaka (North & South) and Gazipur City Corporations through a collaboration between UPHCSDP and icddr,b (Figure 2.2: Location of Slums).

The HDSS Project

The HDSS project is comprised of three components, the first of which was a baseline demographic and socioeconomic census which collected data at the individual and household level. The second component was the surveillance system itself, which employed a prospective study design to enable the monitoring of population, health and socioeconomic indicators, and as needed, the assessment of intervention impact. Under this system, each household in selected slum areas was visited every three months to track changes in: a) pregnancy outcomes (livebirth, stillbirth, miscarriage induced and miscarriage spontaneous); b) deaths; c) marriages and divorce; d) migrations (in-, out-, and internal-); e) household split and head change, safe motherhood practice; and f) fertility regulation.

²In fact, the Local Government Division has been implementing Urban Primary Health Care Project with the support of Asian Development Bank and other development partners since 1988. Evolved from earlier two projects, the present Urban Primary Health Care Services Delivery Project has been in operation since July 2012 with the goal to improve the health status of the poor population, especially the poor, through enhancing their access to and utilization of efficient, effective and sustainable primary health care services. The project delivers primary health care services to the urban poor through partnership with urban local bodies and Non-Government Organizations. At present, the project has three types of service facilities: Comprehensive Reproductive Health Care Center (CRHCC) with 32 staff including 7 physicians, Primary Health Care Center (PHCC) with 10 staff including one physician and Satellite Clinic with 3 field staff headed by a Paramedic. About 3,000 staff provide services through 25 CRHCCs, 113 PHCCs and 226 Satellite Clinics. The total project area is divided into 25 partnership areas. For each partnership area one NGO has been engaged under a partnership agreement to deliver services to clients. Each partnership area is comprised of one CRHCC, a number of PHCCs and Satellite Clinics. At present, more than 500,000 services are being delivered each month from the project health centers.

Figure 2.2: Location of Slums: Dhaka (North & South) and Gazipur City Corporations



The third component consisted of four cross-sectional surveys using the HDSS sampling frame which considered the following topics: a) Rural-urban migration and adults health; b) Non-communicable disease risk factors; c) Health seeking behavior related to maternal, neonatal, and child health, adolescent reproductive health, family planning and violence-against-women; and d) Health expenditure and financial coping mechanisms.

Concepts and Definitions

Concepts and definitions employed in the HDSS project are described below:

Slum: A slum is a cluster of compact settlements of 5 or more households which generally grow very unsystematically and haphazardly on government and private vacant land, are prone to adverse environmental hazards and exposures. In Bangladesh, they are known to possess the following six characteristics (10):

- a) Dwellings are small, generally consisting of jhupri, tong, tin-shed, semi-pucca structures and dilapidated buildings;
- b) Population density and the concentration of structures are very high;
- c) Typically located on government, semi-government land, private vacant land, abandoned building/houses, and slopes of hill or rail-line and roadsides;
- d) Water supply is often insufficient and unsafe, sanitation systems are inadequate and unhygienic environmental conditions are common;
- e) Lighting and road infrastructure are lacking; and
- f) The overall socioeconomic status of slum households is very low, with most dwellers engaged in informal non-agricultural jobs.

Health and Demographic Surveillance System: A Health and Demographic Surveillance System (HDSS) is a methodological approach to monitoring demographic and health outcomes in a registered and defined population living in a confined geographic area (11). 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 the defined geographical areas, followed by regular household visits by Field Workers to update information on births, deaths, and migrations. After the initial census, one can only become an HDSS member through birth to a registered member or through in-migration, and one can cease being a member either through death or through out-migration.

Household: 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 head of the household.

De jure Population: Information recorded in the baseline census followed a de jure population definition, i.e., the person who usually lives in the household.

Resident: 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.

Bari: A cluster of households where the owners of these houses are usually the same and the tenants use a common space or facility.

Livebirth: A live birth is the complete expulsion or extraction from its mother of a product of conception, irrespective of the duration of pregnancy, which, after such separation, breathes or shows any other evidence of life, such as beating of the heart, pulsation of the umbilical cord, or any definite movement of voluntary muscles, whether the umbilical cord has been cut or the placenta is attached.

Stillbirth: A baby born with no signs of life at or after 28 weeks' gestation.

Miscarriage Spontaneous: Any pregnancy that is not viable (the fetus cannot survive) or in which the fetus is born before the 28th week of pregnancy.

Miscarriage Induced: As abortion performed by the pregnant woman herself or with the help of other, non-medical assistance.

Death: An irreversible cessation of all vital functions especially as indicated by the permanent stoppage of the heart, respiration, and brain activity.

Neonatal Death: Deaths among live births during the first 28 days of life which can be further sub-divided into early neonatal deaths (deaths between 0 and 7 days of birth) and late neonatal deaths (deaths after 7 days to 28 days of birth).

Post-neonatal Death: Infant deaths in which the infant is more than 27 days and less than one year of age.

Migrant: A household member whose place of birth is different from their current place of residence.

In-migrant: An individual neither recorded during the baseline population census nor born in the surveillance area after the census, who has moved permanently into the surveillance area.

Out-migrant: A person listed during the baseline population census as a resident³, or a person who became resident by birth or in-migration, but who subsequently moved out of the surveillance area permanently.

Internal-migrant: A person who was a resident of the study area and moved to another household or formed a new household or moved to another location of the surveillance area.

Marriage: A legally and socially sanctioned union between a man and a woman.

Divorce: The legal dissolution of a marriage by a court or other competent body.

Household Types: The following categories were applied:

- i. Single-person Households
- ii. One-generation Households
 - Head and wife/husband
 - Head and brother/sister
 - Head, wife/husband and brother/sister.
- iii. Two-generation Households
 - Head, wife/husband and unmarried children.
 - Head, wife/husband and married/unmarried children
 - Head, married/unmarried children.
 - Head, wife/husband and father/mother
 - Head, brother/sister and father/mother
 - Head, wife/husband, brother/sister and father/mother
 - Head and father/mother
- iv. Three-generation Households
 - Head, wife/husband, unmarried children and father/mother
 - Head, wife/husband, unmarried/married children and father/mother
 - Son's wife, daughter's husband and grand-children
- v. Other Households
 - Households including non-relatives (i.e., tutor, cousins, nephews, nieces, servant)

Sex Ratio: The ratio of males to females in a population (Male/Female*100).

³Those 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.

Dependency Ratio: A measure showing the number of dependents (aged zero to 14 and over the age of 65), to the total population (aged 15 to 64). It is also referred to as the 'total dependency ratio'. The dependency ratio is calculated with the formula: $100 P_x / P_{15-64}$ where P_x is the Population in age group x .

Samity: A committee, society, or association.

Mohajan: Mohajan is a moneylender.

Occupation: Those of aged 8 years or more were asked about their occupation (paid job). Self-employed means a person earns a wage independently as a result of their own venture, like selling vegetables /food-items, mat-weaving and marketing, sewing clothes by oneself, etc. If a person receives a monthly salary or if the respondent replies that he/she has a job, then it is considered 'Employment' and specified as either public or private. If a person receives pay from more than one job, the job where the most income is received is considered the primary occupation.

Education:

Type: The type of school at which the respondent is studying/has studied, like the public, private, NGO, or religious school.

Years of Schooling: Completed years of schooling of the respondent.

Violence: Any kind of violent behavior, like attacking, beating, stabbing, destruction, etc.

Robbery: If involved in any kind (in-house/external) of mugging or hijacking.

Theft: Any kind (in-house/external) of stealing or burglary.

Kidnapping: To take somebody away by force and hold him/her prisoner, for money and any demand.

Sexual Harassment: Unwanted or unwelcomed sexual advances, requests for sexual favors, and other verbal or physical harassment of a sexual nature.

Data and Methods

Selection of Slums

In the census of slum areas in 2014, a total of 13,938 slums were counted covering all cities and other urban areas of Bangladesh (for

details, BBS 2015; and Appendices 2.1, 2.2, and 2.3). Out of 13,938 slums, 33.62% were counted in Dhaka North (11.80%), Dhaka South (12.59%), and Gazipur (9.23%) City Corporations. During the census of slums, 22,27,754 residents were counted and of these residents, 11,85,875 (53.2%) lived in big slums (100 or more households).

After extensive field visits⁴, relatively big slums were selected to comprise the surveillance area as they were deemed to be more convenient for female Field Workers in terms of travel time and security. As most of the slums in Dhaka South City Corporation are small in size, it was decided to select more slums from Dhaka North City Corporation than Dhaka South City Corporation (Figure 2.2: Location of Slums: Dhaka (North & South) and Gazipur City Corporations). In general, however, the baseline population and socioeconomic census data reflect the conditions of relatively larger slums.

Data Collection - Baseline Population and Socioeconomic Census

Existing maps from various sources were compiled and reviewed to identify slums, which were then sub-divided into slum areas based on physical landmarks. The household listing was conducted within each of these areas. Each field worker completed about 150 households per day, and assigned a bari number to each, marking this on the door of each household. They also recorded the name of house-owner (bariwala) and household head, as well as household size as indicated by an adult household member or neighbour. Household listing took approximately 3 weeks to complete.

Based on this listing, a baseline population and socioeconomic census was conducted which involved the collection of individual and household level data using a structured questionnaire: Individual data included age, sex, marital status, education (5 years or more), occupation (8 years or more), desire for child among currently married women of age 15-49, and household head's migration.

Household-level data was collected on the possession of selected household items, construction materials used for roof, wall and floor of the main dwelling, source of drinking water, type of latrine, fuel for cooking, sharing water source, latrine and cooking place, garbage disposal, ownership of land and house, number of dwellings and dwelling area. Data were also collected on membership of NGO/samity, and whether a loan received, violence, robbery, theft, kidnapping, and sexual harassment and care of under-five children if mothers work outside the home.

⁴As well as reviewing the data file received from the Bangladesh Bureau of Statistics 'Census of Slum Areas and Floating Population-2014' (10).

Questionnaires were developed by the Principal Investigator (PI) and Co-Principal Investigators (Co-PIs); approved by the Ethical Review Committee of icddr,b; and pre-tested and refined before data collection began. A Field Research Coordinator, Computer Programmer and three Field Research Assistants were initially recruited for the study, followed by 22 female Field Workers. One of the criteria for selecting female Field Workers for a particular area was the proximity of the worker's residence to the field site as this would facilitate household visits after office hours if respondents were not available during daytime.

Both Field Research Coordinator and Field Research Assistants received initial training on the household listing as well as the baseline population and socioeconomic census from the Principal Investigator (PI)/ Co-Principal Investigators (Co-PIs). Subsequently, responsibility for the training of field workers was assumed by the Coordinator and three Field Research Assistants, under the guidance of the PI.

For the household listing, a short training (half-day) was organized. For the baseline population and socioeconomic census, the duration of training was seven days: five days in the classroom (training on questionnaires, mock interview, and use of Tab), and two days in the field. Field Workers were trained on the content of the data collection instrument, the use of the data collection device, as well as interviewing skills and how to administer the consent form.

Data collection was initiated close to each female Field Workers' assigned area. To locate each household or bari, Field Workers carried printouts of the household listing. Once a bari was identified, Field Workers entered the slum name, area name and bari number into a Tab, and verified records with the printout. When confirmed, a household identification number was assigned, and the Field Workers wrote the household identification number on the door.

After assigning the household identification number, Field Workers collected demographic information and household level socioeconomic data. As many women worked outside home, Field Workers paid household visits in some cases during lunch time, in the evening or during a weekly holiday. For baseline census data, Field Workers located the respondent (either head of household or spouse or any adult household member of age 18 years or more) and had them sign an informed consent form indicating if they agreed to provide the information.

Each day a Field Worker completed about 40 households and submitted their completed work (on a memory card) to their supervisor every week. After receiving the memory card, the supervisor transferred the data to his/her laptop and performed a basic check before forwarding to the Field Research Coordinator/Computer Programmer by email (as attachment) for further editing. Following this second check, data were entered into the master database. This phase of data collection (household listing, and baseline population and socioeconomic census) took about 4 months (September 15, 2015 to January 15, 2016).

Data Collection - Health and Demographic Surveillance

Routine data collection as part of the Health and Demographic Surveillance System was undertaken by 16 female Field Workers, with at least 12 years of schooling. These women were selected based on their performance in the baseline population census, and the proximity of their residence to the field site. This enabled Field Workers to more easily visit households beyond office hours, if respondents were not available during daytime. The Field Research Coordinator and three Field Research Assistants were responsible for field operations, and for maintaining day-to-day data quality. Before the data collection started, 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 involved sessions on the data collection instrument, the data collection device, as well as interviewing skills.

HDSS data collection commenced just after the completion of the baseline population and socioeconomic census. Regular surveillance activities were performed by female Field Workers who visited each of the 31,577 households (along with new migrant households) on a quarterly basis according to a schedule organized by the Field Research Coordinator, in consultation with the three Field Research Assistants. Each female Field Worker visited about 40 households per day and was expected to cover her assigned area within a three-month period. In total, fifteen female Field Workers covered 15 working areas while one Field Worker provides backup in case of leave or illness.

Every day, Field Workers' visited their assigned households guided by baseline data from the census that was loaded into their portable devices. To collect information on demographic events that may have occurred in the period between surveillance visits, Field Workers interviewed a household respondent - either the head of the household, their spouse, or any adult household member aged 18

years or more. For pregnancy-related data, eligible women were identified and interviewed. After gaining consent, Field Workers performed a household roll-call using the census information as a reference, to establish whether any demographic event had taken place. If so, the interviewer entered the appropriate identification number into the portable device and indicated the specific event that had occurred.

Two types of identification numbers were maintained for each household member: a) Registration ID number (RID), and b) Current ID number (CID); the RID remains fixed, the CID changes with any change of current residence in the surveillance area. For pregnancy outcomes, mother's information was obtained from the census 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 database was updated through the identification number. For marriage or divorce, relevant data were also updated accordingly if they remained in the surveillance area. In case of a family split, a new household head was identified for the split and a new household identification number was assigned. In the case death or out-migration of the household head, a new household head was determined and the data were updated accordingly. The database was routinely updated in case of any of the following events: a) Birth; b) Death; c) Marriage/divorce; d) Migration (in-, out-, and internal); and e) Head change/household split.

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

Data Management and Quality Control

Data were collected using portable devices equipped with SQLite in the back-end and Android Java in the front-end. Consistency checks were performed when data were collected and entered into the portable device (including range limits and logical patterns), with additional checks and editing occurring when data were loaded and merged into the master database. This relational database was managed in MySQL.

Together, field Research Assistants and the Field Research Coordinator were responsible for assessing day-to-day data quality. Specifically, Field Research Assistants monitored the work of female Field Workers, which included entering a sample of records independently into his/her Tab, and listening to interviews. Field Research Assistants also re-interview 2% households per day.

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 was updated periodically.

Challenges Encountered

Several challenges were confronted due to difficulties in selecting study areas within slums, and the features of slum settlements such as their disorganization and insecurity.

Selection of Slums and Definition of Study Areas

There are about 4,700 slums in Dhaka North, Dhaka South and Gazipur City Corporations. Among these, 93% are small (less than 100 households), and only 7% are big (100 or more households), however the latter account for about 50% of the total slum population. From a management point of view, big slums tended to be easier to work in terms of travel time, security etc. However, defining study areas within these disorganized spaces, required careful attention to landmarks and other natural boundaries (Figure 2.3: View of Korail Slum in Dhaka).

Figure 2.3: View of Korail Slum in Dhaka



Bari and Household Numbering and GIS Coordinates

The haphazard construction of slums made it difficult to identify households in a systematic manner (Figure 2.4: Density of Housing). The density of households also posed challenges in terms of geocoding, especially in the case of two-storied dwellings (Figure 2.5: Finding the House).

Figure 2.4: Density of Housing



Figure 2.5: Finding the House



Absentee and Unavailable Respondents

Sometimes, respondents were absent, or houses were found locked during field worker visits (Figure 2.6: Locked Household and Note for Availability). In these cases, basic information was collected from neighbours and their advice was sought about the best time to return to find the respondent at home (early in the morning, lunch break, in the evening, or during the weekend). In other cases, these absences were permanent due to internal movement or outmigration for reasons of marriage, divorce or change in employment.

Conversely, there were instances where respondents were located, but were too busy to be interviewed (Figure 2.7: Respondent Busy). Field Workers were usually successful in fixing a time for the interview or re-visit which was more convenient.

Figure 2.6: Locked Household and Note for Availability



Figure 2.7: Respondent Busy



Security and Eviction

Slums are not always safe with crime and violence frequently reported by residents (Appendix 2.4). Indeed, according to our data, about 10% slum households suffered from theft during the last six months, 5% households suffered from violence, 1.7% households suffered from sexual harassment, 1.2% households suffered from robbery and 0.7% households suffered from kidnapping. Care was taken to minimize risk to field staff by avoiding work after dark unless a local escort was arranged, and insisting that all Field Workers carry visible identification (Figure 2.8: Security Issues). In addition, substantial investments in community rapport-building helped foster necessary trust and respect, thus security risks to Field Workers were minimized.

Eviction was another issue that Field Workers sometimes confronted whereby illegal settlements on road's side/footpaths, and rail lines are destroyed, or new construction is planned on occupied land. Finding these households was difficult and help from local leaders was crucial in tracking them down.

Figure 2.8: Security Issues



Appendix 2.1: Distribution of Slums by Slum Size and Locality (City Corporation, Municipality and Other Urban), 2014

Locality	Slum Size (HH)					Total	% of slums
	< 10	10-24	25-49	50-99	100+		
1	2	3	4	5	6	7	
Barisal	14	45	34	23	20	136	0.98
Chittagong	313	1002	348	335	217	2215	15.89
Comilla	9	9	12	5	5	40	0.29
Dhaka (N)	255	769	264	157	199	1644	11.80
Dhaka (S)	527	851	254	85	38	1755	12.59
Gazipur	192	616	257	143	78	1286	9.23
Narayanganj	5	18	15	17	27	82	0.58
Khulna	630	361	62	47	34	1134	8.14
Rajshahi	13	24	16	19	31	103	0.74
Rangpur	0	4	7	17	20	48	0.34
Sylhet	217	339	75	35	4	670	4.81
City Corp Total	2175	4038	1344	883	672	9112	65.38
Municipalities	1082	1089	480	409	290	3350	24.04
Other Urban	485	700	186	77	28	1476	10.59
Total	3742	5827	2010	1369	990	13938	100.00

Source: BBS 2014 (10); HH=Household

Appendix 2.2: Distribution of Households by Slum Size and Locality (City Corporation, Municipality and Other Urban), 2014

Locality	Slum Size (HH)					Total	% of HHs
	< 10	10-24	25-49	50-99	100+		
1	2	3	4	5	6	7	
Barisal	107	746	1157	1658	5897	9565	1.61
Chittagong	2199	15755	12043	23164	74275	127436	21.49
Comilla	63	125	377	341	849	1755	0.30
Dhaka (N)	1732	12100	9062	10940	101227	135061	22.78
Dhaka (S)	3574	13112	8843	5612	8874	40015	6.75
Gazipur	1423	9309	8928	10180	26757	56597	9.54
Narayanganj	43	308	594	1292	8567	10804	1.82
Khulna	3909	5078	2119	3376	6054	20536	3.46
Rajshahi	65	425	582	1415	7727	10214	1.72
Rangpur	0	72	287	1280	4415	6054	1.02
Sylhet	1444	4925	2519	2301	702	11891	2.01
City Corp Total	14559	61955	46511	61559	245344	429928	72.50
Municipalities	7160	16159	16916	29128	60438	129801	21.89
Other Urban	3273	10247	6177	5421	8151	33269	5.61
Total	24992	88361	69604	96108	313933	592998	100.00

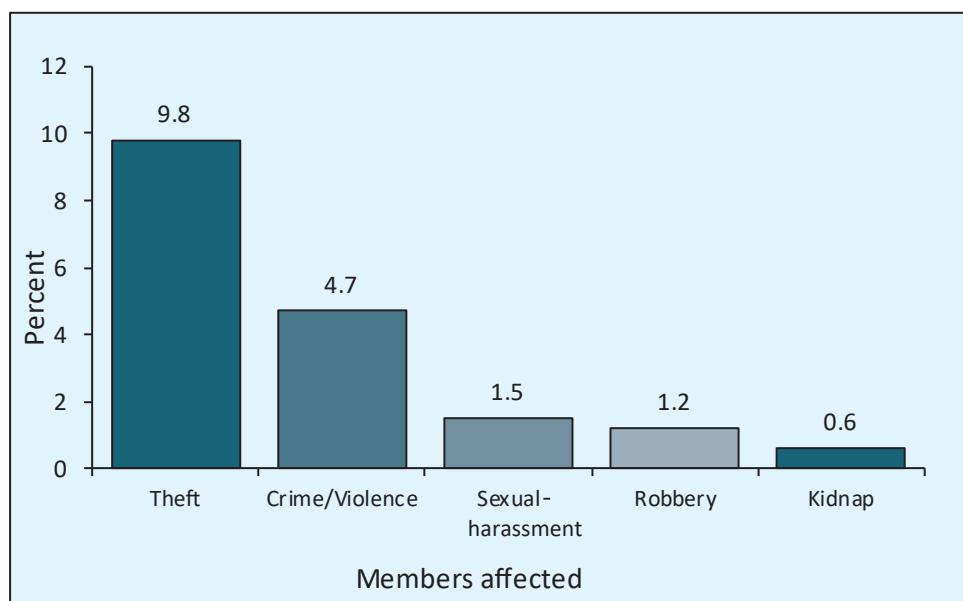
Source: BBS 2014 (10); Note: HH=Household

Appendix 2.3: Distribution of Population by Slum Size and Locality (City Corporation, Municipality and Other Urban), 2014

Locality	Slum Size (HH)					Total popn	% of population
	< 10	10-24	25-49	50-99	100+		
1	2	3	4	5	6	7	
Barisal	420	3027	4810	6671	23808	38738	1.74
Chittagong	7970	58626	44833	90995	282406	484830	21.76
Comilla	257	556	1614	1331	3688	7446	0.33
Dhaka (N)	6305	42842	31965	39684	375873	496669	22.29
Dhaka (S)	12969	47989	32037	21224	32847	147066	6.60
Gazipur	4689	28547	27507	32827	92297	185867	8.34
Narayanganj	165	1178	2202	4976	31964	40485	1.82
Khulna	14628	19242	8610	13612	23735	79827	3.58
Rajshahi	226	1479	2263	5209	29364	38541	1.73
Rangpur	0	255	1032	4521	16156	21964	0.99
Sylhet	6049	20714	10665	9733	2968	50129	2.25
City Corp Total	53678	224455	167538	230783	915106	1591560	71.44
Municipalities	27513	63120	66613	114827	241540	513613	23.06
Other Urban	12162	37581	22895	20714	29229	122581	5.50
Total	93353	325156	257046	366324	1185875	2227754	100.00

Source: BBS 2014 (10); Note: HH=Household

Appendix 2.4: Members Affected by Violence, Robbery etc. during the Last Six Months



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Chapter 3

The Context of Slums in Bangladesh

Abdur Razzaque, Razib Chowdhury & AHM Golam Mustafa

Summary

This chapter describes the demographic characteristics, living conditions and socioeconomic status of slum residents using results from the baseline census of slums located in the Health and Demographic Surveillance area. In terms of population characteristics, slums are comprised predominantly of the working age population, with 31.6% below 15 years of age, and only 2.6% aged 65+ years. Among adults (aged 15 or more), 36.2% of males and 42.3% of females have no schooling and among children (6-14 years), 14.1% of boys and 8.9% of girls do not attend school. As might be expected, rates of participation in income generation (aged 8 years and more) are high among males (71.7%) and females (40.3%).

Living conditions in the slum are precarious. Most slums occupy government land (90%), and almost 70% of residents are tenants. Households are largely male headed (82.3%) and small in size (3.8 members). Dwellings consist mainly of one room (81.6% of households) with tin roofs (94.0%) and walls (70%), a brick/cement floor (88%) and a mean area of 119.4 sq. ft. Ninety-four per cent households used pipe water for drinking, while 90% household had sanitary latrine, however only 30% of the latrines flush to sewerage/septic tank. Most amenities are shared: almost 95% of households share a piped water source, and 90% share a latrine. Electricity is universal as a source of light, but cooking is fuelled via gas line in only 50% of households, with the rest relying mainly on wood. In 60% of households, cooking facilities are shared, and in some slums, the majority share with 5 or more households. Garbage is disposed in an open space outside the dwelling in about 50% of households, and in 37% of cases, it is never collected.

In terms of household socioeconomic status, most households possess an electric fan (96%), and mobile phone (85%), and about 60% of households have a working television. More indicative of relative wealth is household expenditure. A mean of BDT 11,981 is spent by slum households in the previous month with mean household expenditure on food is BDT 6,291 with 65% of households spending BDT 5,000-9,999. Mean expenditures of BDT 604 on education and BDT 1,276 on health were reported, with no such expenditures occurring in 58% and 35% of households respectively. A substantial number of households (72%) reported not managing any monthly savings.

In terms of length of residency in the slum, 35% of household heads reported having migrated 20 years or more ago, largely from Dhaka and Barisal Divisions (50% and 20% respectively), and 9% had been living in the slum since birth. Comparatively few households migrated within the last 5 years (14%). In most cases (62.4%), the household head reported migrating for work, and a further 20% cited family reasons.

Introduction

The surveillance system was constructed to represent a cross-section of slums from Dhaka (North & South) and Gazipur City Corporations. From Dhaka North City Corporation, slums were selected from Banani's Korail slum (9,745 households), and Bhola, Molla and Duaripara slums in Mirpur (6,230 households). Korail slum is situated between the affluent neighbourhoods of Banani and Gulshan, and covers approximately 100 acres of Government land. Mirpur is a fast-growing area in the north-east of the city characterized by a mixture of multi-story residential housing, business and industry and a largely middle and low middle-class population. Just fewer than three-quarters of slums in Mirpur are located on Government land⁵.

In Dhaka South City Corporation, slums were selected from Dhalpur (2,046 households from Pura, Driver, Nubur, City Palli, Power House, and Mannan slums), and Shayampur (2,385 households from Dhaka Mach Colony, Monsur Beel>Nama Para, and Rail Line slums). About 80% of Dhalpur and Shayampur slums are built on Government land. Dhalpur is situated close to old Dhaka and is home to a mix of affluent, middle and low middle-class households, while Shayampur is next to a major industrial zone.

In Gazipur City Corporation, which is a highly industrialized area contiguous with the larger metropolitan area of Dhaka, slums were selected from Tongi (3,133 households from Bank Field, Hazi Mazar, Nishad Nagar and Kalabagan slums), and Ershad Nagar (7,318 households from Ershad Nagar slum). Slums occupy Government land and house a large proportion of the industrial workforce. In addition to industry, many educational institutes are in this area including the country's only international university in the fields of engineering and technology.

⁵Some slums on Government land have granted legal occupancy to their residents (Duaripara, Dhalpur and Ershad Nagar), while others are illegal occupants.

Population Characteristics

The following section describes the demographic and socioeconomic characteristics of the slum populations under surveillance. These details were elicited by census using a de jure population definition which includes all individuals who are usual residents of a household.

Population Size

Table 3.1 shows the distribution of households and total population by slum location. According to de jure population definition above, 30,857 households were counted in these slums with a population of 118,238. Of this total, 35.3% of the population lived in Tongi, followed by Korail (30.8%), Mirpur (19.5%), and finally Dhalpur/Shayampur (14.4%). The average household size was 3.8 and varied little across slum locations (3.7 to 4.0).

Table 3.1: Distribution of Households and Distribution of Population by Slum Location

Location	Household		Population		Mean (HH size)
	Number	Per cent	Number	Per cent	
Korail	9,745	31.6	36,422	30.8	3.7
Mirpur	6,230	20.2	23,049	19.5	3.7
Dhalpur & Shayampur	4,431	14.3	16,981	14.4	3.8
Tongi	10,451	33.9	41,786	35.3	4.0
Total	30,857	100	118,238	100	3.8

Age and Sex Characteristics

Table 3.2 shows the distribution of population by sex and five-year age groups. Slightly more females than males lived in the slum settlements under study (59,758 vs. 58,461), yielding a sex ratio of 97.8. However, sex ratios were not the same in different age groups. Among populations less than 15 years of age and those aged 30 years or more, there were more males than females but in the 15 to 29 year age group, there were more females than males.

Table 3.3 shows the distribution of the population (per cent) by age group and slum location. One-third of the population was below 15 years of age (31.6%), 64.1% was between 15 and 59 years, leaving only a small proportion in the 60+ age group (4.4%). Similar patterns of age distribution were evident across slum locations.

Table 3.2: Distribution of Population by Five-Year Age Groups and Sex

Age (years)	Number				Per cent		
	Both	Male	Female	Sex ratio	Both	Male	Female
0-4	10,877	5,545	5,332	104.0	9.2	9.5	8.9
5-9	13,889	6,973	6,916	100.8	11.8	11.9	11.6
10-14	12,435	6,259	6,176	101.3	10.6	10.7	10.3
15-19	13,829	6,213	7,616	81.6	11.7	10.5	12.7
20-24	11,989	4,872	7,117	68.5	10.1	8.3	11.9
25-29	13,636	6,567	7,069	92.9	11.5	11.2	11.8
30-34	9,365	4,854	4,511	107.6	7.9	8.3	7.6
35-39	9,143	4,667	4,476	104.3	7.7	8.0	7.5
40-44	6,147	3,371	2,776	121.4	5.2	5.8	4.7
45-49	5,504	2,836	2,668	106.3	4.7	4.9	4.5
50-54	3,832	2,043	1,789	114.2	3.2	3.5	3.0
55-59	2,373	1,319	1,054	125.1	2.0	2.3	1.8
60-64	2,154	1,178	976	120.7	1.8	2.0	1.6
65-69	1,170	687	483	142.2	1.0	1.2	0.8
70-74	1,056	626	430	145.6	0.9	1.1	0.7
75-79	304	188	116	162.1	0.3	0.3	0.2
80+	516	263	253	104.0	0.4	0.5	0.4
Total	118,219	58,461	59,758	97.8	100	100	100

Note: Nineteen transgender people were excluded

Table 3.3: Distribution of Population (per cent) by Age Group and Slum Location

Age (years)	Korail (N=36,422)	Mirpur (N=23,049)	Dhalpur & Shayampur (N=16,981)	Tongi (N=41,786)	Total (N=118,238)
<15	33.2	30.2	33.3	29.9	31.5
15-59	63.6	66.9	62.3	63.8	64.1
60-64	1.6	1.3	2.0	2.3	1.8
65+	1.6	1.6	2.4	4.0	2.6
Total	100	100	100	100	100

Dependency Ratio

The dependency ratio quantifies the number of persons in a population who are not economically active for every 100 economically active persons in that population. It can be calculated by dividing the population 0-14 years and 65 years and older by the population in the 15 to 64-year age group.

Table 3.4 shows dependency ratios by slum location. The overall dependency ratio was 51.6; however, the dependency ratio varied across slums– from 55.6 in Dhalpur/Shayampur to 46.6 in Mirpur. The dependency ratio for the young age group (0-14) was 47.7, while for the older age group (65+), the ratio was 3.9, and varied across slum locations.

Table 3.4: Dependency Ratios by Slum Location

Age (years)	Korail (N=36,422)	Mirpur (N=23,049)	Dhalpur & Shayampur (N=16,981)	Tongi (N=41,786)	Total (N=118,238)
<15	12,092	6,952	5,662	12,497	37,203
15-64	23,732	15,722	10,910	27,625	77,989
65+	598	375	409	1,664	3,046
Dependency ratio					
Total	53.5	46.6	55.6	51.3	51.6
Young	51.0	44.2	51.9	45.2	47.7
Old	2.5	2.4	3.7	6.0	3.9

Note: Dependency ratio is calculated with the formula: $100 \text{ Px}/\text{P}_{15-64}$ where Px is the Population in age group x.

Household Size and Type

Table 3.5 shows the distribution of households by type and sex of household head. Out of 30,857 households enumerated in the slums under study, 82.3% were headed by males and 17.7% were headed by females. 57.8% of these households were two-generation and 20.1% were three-generation in composition, while only a few were single-person households (2.7%). Household type differed between male- and female-headed households. Two-generation households were more common among male-headed households (62.6%), while three-generation households were more common among female-headed households (40.2%).

Table 3.5: Distribution of Households by Type and Sex of Household Heads

Type	Number			Per cent		
	Female	Male	Total	Female	Male	Total
Single person	630	220	850	11.7	0.9	2.7
One generation	378	4,200	4,578	6.9	16.5	14.8
Two generations	1,909	15,917	17,826	35.0	62.6	57.8
Three generations	2,193	4,005	6,198	40.2	15.8	20.1
Others	340	1,065	1,405	6.2	4.2	4.6
Total	5,450	25,407	30,857	100	100	100

Marital Status

Table 3.6 shows the distribution of the population (age 12 or more) by marital status and sex. Most of the population was currently married (68.8%), followed by never married (23.9%), with the remainder either separated, divorced or widowed (7.3%). There were slightly more currently married males than females (70.0% vs. 68.8%), while the proportion of those widowed (3.6% vs. 0.3%), separated (1.2% vs. 0.3%) and divorced (8.4% vs. 0.6%) was higher among females than males.

Table 3.6: Distribution of Population⁺ by Marital Status and Sex

Marital Status	Number			Per cent		
	Both	Male	Female	Both	Male	Female
Currently married	60,726	30,317	30,409	68.8	70.0	67.6
Never married	21,096	12,462	8,634	23.9	28.8	19.2
Widowed	1,754	131	1,623	2.0	0.3	3.6
Separated	678	124	554	0.8	0.3	1.2
Divorced	4,024	257	3,767	4.5	0.6	8.4
Total	88,278	43,291	44,987	100	100	100

Note: ⁺Population age 12 or more; almost all were Muslims (99.2%) with negligible per cent were Hindus and Christians (0.8%).

Living Conditions

Exception for questions regarding land and dwelling ownership which were asked of all households in the surveillance area, details on living conditions were elicited on a 10% subsample of households. This included data on housing conditions, the construction material of the household dwelling, water and sanitation facilities, the source of light and fuel used for cooking, and the kind of garbage disposal system in place.

Ownership of Land and Dwelling

Table 3.7 shows the distribution of households (per cent) according to land ownership and slum location. Slums were mostly built on government land (90.7%), while 9.3% were built on private land. Ownership of land varied across slum locations; 100% land in Korail and Tongi were owned by the government, compared to 78.8% of land in Dhalpur/Shayampur, and 69.3% of land in Mirpur.

Table 3.7: Distribution of Households (per cent) by Ownership of Land and Slum Location

Ownership	Korail (N=9,745)	Mirpur (N= 6,228)	Dhalpur & Shayampur (N=4,427)	Tongi (N=10,449)	Total (N=30,857)
Head/other resident	0.0	0.1	1.0	0.0	0.2
Landlord	0.0	30.6	20.2	0.0	9.1
Government	100.0	69.3	78.8	100.0	90.7
Total	100	100	100	100	100

Table 3.8 shows the distribution of households (per cent) by dwelling ownership and slum location. Almost one-third of occupants were tenants, and 31.6% were dwelling owners. There were more tenants in Mirpur (87.4%), followed by Dhalpur/Shayampur and Korail (70%-73%). In Tongi, by contrast, 48.2% of households claimed to own the dwelling in which they resided, followed by Dhalpur/Shayampur and Korail (25%-29%), and Mirpur (12.4%).

Table 3.8: Distribution of Households (per cent) by Ownership of Dwelling and Slum Location

Ownership	Korail (N=9,745)	Mirpur (N=6,230)	Dhalpur & Shayampur (N=4,431)	Tongi (N=10,451)	Total (30,857)
Head/other member	29.1	12.4	25.2	48.2	31.6
House owner/bariwalla	70.5	87.4	72.8	51.6	67.9
Other	0.4	0.2	2.1	0.2	0.5
Total	100	100	100	100	100

Note: Owner (Head/other member); Tenant (House owner/*bariwalla*)

Dwelling Size and Construction Material

The number and size of dwellings owned or rented by slum households were recorded after physical verification (Table 3.9). About 82% of the households possessed one bedroom, 14.7% possessed two bedrooms, and relatively few households reported three or more bedrooms (3.7%). The mean number of dwellings was 1.2. When examined across slums, one-bedroom households were more common in Korail and Mirpur (90%), followed by Dhalpur/Shayampur (83.6%) and Tongi (67.9%). Two-bedroom houses were more prevalent in Tongi (24.2%) compared to Korail and Mirpur (8-10%), as were three or more bedroom houses (Tongi 7.9%; other slums 1%-2%). The mean number of dwellings per household varied only slightly across slum locations (1.1 to 1.4).

Table 3.9: Distribution of Households (per cent) by Number of Dwelling and Slum Location

No. of Dwelling	Korail (N=979)	Mirpur (N=667)	Dhalpur & Shayampur (N=461)	Tongi (N=1,006)	Total (N=3,113)
1	88.9	90.3	83.6	67.9	81.6
2	9.8	8.0	14.5	24.2	14.7
3	1.1	1.4	1.7	7.6	3.4
4	0.2	0.3	0.2	0.3	0.3
Total	100	100	100	100	100
Mean	1.1	1.1	1.2	1.4	1.2

Table 3.10 shows the distribution of households (per cent) by dwelling area and slum location. About 48% households possessed a dwelling area of less than 100 sq. ft., 31.4% had a dwelling area of 100-149 sq. ft., and 21.1% of households had over 150 sq. ft. The mean dwelling area was 119.4 sq. ft., and varied by slum location: Dhalpur/Shayampur (147.3 sq. ft.), dwelling area was larger than Tongi (135.4 sq. ft.), Mirpur (117.6 sq. ft.), and Korail (90.9 sq. ft.).

Table 3.10: Distribution of Households (per cent) by Dwelling Area and Slum Location

Area (sq. ft.)	Korail (N=979)	Mirpur (N=667)	Dhalpur & Shayampur (N=461)	Tongi (N=1,006)	Total (N=3,113)
< 50	18.8	3.9	1.7	5.5	8.8
50-99	50.6	42.4	21.3	32.6	38.7
100-149	20.6	36.6	44.9	32.3	31.4
150-199	6.1	8.0	15.4	11.5	9.6
200+	3.9	9.1	16.7	18.1	11.5
Total	100	100	100	100	100
Mean (sq. ft.)	90.9	117.6	147.3	135.4	119.4

Information on the construction materials of the roof, walls, and floor of the largest dwelling was recorded after physical verification. Roofs were largely tin (94.0%) followed by wood/bamboo (3.1%) and brick/cement (2.9%) with little variation across slum locations (Table 3.11). Walls were mainly constructed of tin (70.4%) and brick/cement (29.1%) (Table 3.12). However, wall material varied across slum locations. Tin wall construction was apparent in 90.7% of dwellings in Korail, followed by 75.3% in Mirpur 55.8% in Dhalpur/Shayampur and 54.1% in Tongi. By contrast, brick/cement wall materials were use in 46% of dwellings in Tongi, followed by Dhalpur/Shayampur (42.1%), Mirpur (24.7%) and Korail (9.1%).

Table 3.11: Distribution of Households (per cent) by Construction Material of Roof and Slum Location

Roof material	Korail (N=979)	Mirpur (N=667)	Dhalpur & Shayampur (N=461)	Tongi (N=1,006)	Total (N=3,113)
Wood/bamboo	5.7	1.2	7.2	0.2	3.1
Brick/cement	1.9	0.9	8.2	2.7	2.9
Tin	92.4	97.9	84.6	97.1	94.0
Total	100	100	100	100	100

Table 3.12: Distribution of Households (per cent) by Construction Material of Wall and Slum Location

Wall material	Korail (N=979)	Mirpur (N=667)	Dhalpur & Shayampur (N=461)	Tongi (N=1,006)	Total (N=3,113)
Wood/bamboo	0.2	0.0	2.1	0.3	0.5
Brick/cement	9.1	24.7	42.1	45.6	29.1
Tin	90.7	75.3	55.8	54.1	70.4
Total	100	100	100	100	100

Table 3.13 shows the distribution of households (per cent) by the construction material used for floors across the four slum locations. Floor material was mostly brick/cement (88%), followed by wood/bamboo (7.8%) and earth/katcha (4.2%). Floor material varied slightly across slum locations. About 90% floor materials of in slum dwellings located Korail, Mirpur and Dhalpur/Shayampur were brick/cement, compared to 82.5% in Tongi. Wood/bamboo or earth/katcha floor materials were used in 18% of dwellings in Tongi, followed by 9-10% in Dhalpur/Shayampur, Mirpur and Korail.

Table 3.13: Distribution of Households (per cent) by Construction Material of Floor and Slum Location

Floor material	Korail (N=979)	Mirpur (N=667)	Dhalpur & Shayampur (N=461)	Tongi (N=1,006)	Total (N=3,113)
Earth/ katcha	1.0	2.9	2.6	8.9	4.2
Wood/bamboo	8.3	6.5	7.2	8.6	7.8
Brick/cement	90.7	90.6	90.2	82.5	88.0
Total	100	100	100	100	100

Water and Sanitation

Information on the source of drinking water as well as type of latrine in slum households was recorded after physical verification, in addition to whether the sanitary latrine drained to septic tank/sewerage or somewhere else.

Table 3.14 shows the distribution of households (per cent) by source of drinking water and slum location. About 95% households used pipe water for drinking, followed by tube well water (5.1%). The source of water did not vary substantially across slum locations except for tube well for drinking water, which was more prevalent in Dhalpur/Shayampur (9.3%) and Korail (8.7%). Most households (91.9%) obtained their water from a shared water source (Table 3.15) ranging from 95% households in Korail, Mirpur and Dhalpur/Shayampur and to 84% in Tongi. Among these households, 37.3% shared with 10 or more households, 31% shared with 5-9 households, and 23.5% shared with 1-4 households.

Table 3.14: Distribution of Households (per cent) by Source of Drinking Water and Slum Location

Source	Korail (N=979)	Mirpur (N=667)	Dhalpur & Shayampur (N=461)	Tongi (N=1,006)	Total (N=3,113)
Pipe water	88.7	98.8	90.5	97.5	93.9
Tube well	8.7	1.2	9.3	2.2	5.1
Others	2.6	0.0	0.2	0.3	1.0
Total	100	100	100	100	100

Table 3.15: Distribution of Households (per cent) by those Sharing Water Source and Slum Locations

Sharing (No. of households)	Korail (N=979)	Mirpur (N=667)	Dhalpur & Shayampur (N=461)	Tongi (N=1,006)	Total (N=3,113)
0	5.7	2.7	3.0	16.3	8.1
1-4	16.5	12.9	13.9	41.8	23.5
5-9	40.5	44.1	29.3	13.9	31.0
10+	37.3	40.3	53.8	28.0	37.4
Total	100	100	100	100	100

Table 3.16 shows the distribution of households (per cent) by type of latrine and slum location. About 30% households had sanitary latrine flush to sewerage/tank, while 60.9% households had sanitary latrine flush to elsewhere and 6.4% households possessed a pit latrine without slab or hanging/open latrine. Types of latrine varied across slum locations. In Korail, sanitary latrine flush to elsewhere was common (75.6%), followed by Mirpur (65.5%) and Dhalpur/Shayampur and Tongi (41%-53%). Pit latrines without slab and hanging/open latrines were more common in Dhalpur/Shayampur (19.6%).

Table 3.17 shows the distribution of households (per cent) by those sharing latrine and slum locations. Latrines were predominantly shared (90%) across all slum locations (Table 3.17); ranging from 95% of households in Korail, Mirpur, and Dhalpur/Shayampur to 78% in Tongi. Among these households, 31.7% of households shared with 10 or more households, 32.4% shared with 5-9 households and 26.2% shared with 1-4 households.

Table 3.16: Distribution of Households (per cent) by Type of Latrine and Slum Location

Type	Korail (N=979)	Mirpur (N=667)	Dhalpur & Shayampur (N=461)	Tongi (N=1,006)	Total (N=3,113)
Sanitary(sewerage/tank)	22.6	24.8	36.8	35.9	29.5
Sanitary(elsewhere)	75.6	65.5	41.0	52.7	60.9
Ventilated(improved)	0.5	7.4	2.6	3.5	3.2
Pit latrine(no slab)	1.1	1.8	11.1	2.4	3.2
Hanging/open	0.2	0.5	8.5	5.5	3.2
Total	100	100	100	100	100

Table 3.17: Distribution of Households (per cent) by those Sharing Latrine and Slum Location

Sharing (No. of households)	Korail (N=979)	Mirpur (N=667)	Dhalpur & Shayampur (N=461)	Tongi (N=1,006)	Total (N=3,113)
0	4.3	2.7	3.7	22.3	9.7
1-4	17.7	13.0	20.0	46.0	26.2
5-9	44.4	43.2	34.9	12.4	32.4
10+	33.6	41.1	41.4	19.3	31.7
Total	100	100	100	100	100

Source of Light and Fuel for Cooking

Use of electricity as a source of light was almost universal (99.6%) across slum locations (Table 3.18). However, greater variation was noted in terms of the type of fuel used for cooking (Table 3.19). Slightly over 50% of households used gas for cooking, followed by wood (34.9%). Use of gas-cylinder (1.4%), kerosene (2.4%), electricity (3.8%) and others (4.0%) were negligible. In Korail and Mirpur, 85%-98% households relied on gas from a gas line, followed by Dhalpur /Shayampur (25.8%). By contrast, in Dhalpur/Shayampur and Tongi, about 70% households used wood as a source of fuel, compared to 10.8% in Mirpur and only 1.7% in Korail. In Tongi, electricity was reported as the source of energy for cooking by 10% of households, but was almost absent in other slums. Also notable was the variation between slums in the proportion of household sharing cooking facilities (Table 3.20). Although almost 60% of households reported sharing a stove, this ranged from 95% in Korail to 18% in Tongi. Overall, 15.9% shared cooking facilities with 10 or more households, 25% with 5-9 households, and 20% shared with 1-4 households.

Table 3.18: Distribution of Households (per cent) by Source of Light and Slum Location

Source	Korail (N=979)	Mirpur (N=667)	Dhalpur & Shayampur (N=461)	Tongi (N=1,006)	Total (N=3,113)
Electricity	99.6	99.8	100.0	99.3	99.6
Kerosene	0.4	0.2	0.0	0.7	0.4
Total	100	100	100	100	100

Table 3.19: Distribution of Households (per cent) by Type of Fuel for Cooking and Slum Locations

Type of Fuel	Korail (N=979)	Mirpur (N=667)	Dhalpur & Shayampur (N=461)	Tongi (N=1,006)	Total (N=3,113)
Gas line	98.1	84.5	25.8	2.1	53.5
Wood	1.7	10.8	67.9	68.1	34.9
Gas cylinder	0.0	0.0	0.0	4.4	1.4
Kerosene	0.0	3.0	5.6	3.0	2.4
Electricity	0.2	1.7	0.7	10.0	3.8
Others	0.0	0.0	0.0	12.4	4.0
Total	100	100	100	100	100

Table 3.20: Distribution Households (per cent) by those Sharing Cooking Place and Slum Location

Sharing (No. of households)	Korail (N=979)	Mirpur (N=667)	Dhalpur & Shayampur (N=461)	Tongi (N=1,006)	Total (N=3,113)
0	5.4	11.7	55.8	82.3	39.1
1-4	25.8	21.8	21.4	12.6	20.0
5-9	42.1	40.6	15.0	2.6	25.0
10+	26.7	25.9	7.8	2.5	15.9
Total	100	100	100	100	100

Garbage Disposal

In crowded slum conditions, the way garbage is disposed of has important health and hygiene impacts. Table 3.21 shows the distribution of households (per cent) in terms of the kind of garbage dumping system they utilized by slum location. Almost 50% of households deposited garbage in an open space outside the house, 30.3% within the house, and 16.9% used a bin outside the house. The use of open space outside home did not vary much across slum locations (42%-55%). However, variations were seen in the proportion of households that reported keeping garbage at house (38.1% in Mirpur and 15.2% in Dhalpur/Shayampur); and in those utilizing bins outside the house (6%-20% across slum locations). The frequency of garbage collection by slum location is found in Table 3.22. For about 40% of households, garbage was collected daily but considerable variation was apparent across slums: from 84.4% in Mirpur to 21.3% in Tongi. Garbage collection occurred 1-3 times a week in 18.3% of households, but was more common in Korail (28.7%) and Tongi (24.8%). Collection 3-4 times a month was reported by 3.4% of households, and an alarming 36.5% of households claimed that garbage was never collected.

Table 3.21: Distribution of Households (per cent) by Garbage Dumping System and Slum Location

Dumping System	Korail (N=979)	Mirpur (N=667)	Dhalpur & Shayampur (N=461)	Tongi (N=1,006)	Total (N=3,113)
Open space(outside)	44.0	42.0	55.3	50.4	47.3
At house	36.2	38.1	15.2	26.5	30.3
Bin outside house	19.5	15.4	6.5	20.0	16.9
Others	0.3	4.5	23.0	3.1	5.5
Total	100	100	100	100	100

Table 3.22: Distribution of Households (per cent) by Frequency of Garbage Collection and Slum Location

Frequency	Korail (N=979)	Mirpur (N=667)	Dhalpur & Shayampur (N=461)	Tongi (N=1,006)	Total (N=3,113)
Everyday	24.9	84.4	61.0	21.3	41.8
1-3 times a week	28.7	2.3	5.0	24.8	18.3
3-4 times a month	1.0	0.0	0.8	9.2	3.4
Never collected	45.4	13.3	33.2	44.7	36.5
Total	100	100	100	100	100

Socioeconomic Status

This chapter describes the broader socioeconomic status of slum households as indicated by their educational profile, occupation, asset ownership, household expenditure (total, food, education and health), and household savings. Information was collected on education level achieved by each member of the household aged five years or more. Completed year(s) of schooling was also recorded. Information on the primary occupation (paid job) of individuals aged eight years or more was collected, while information on household expenditure and savings were collected during last month for 10% systematically selected households.

Educational Qualifications

Table 3.23 shows the distribution of population aged 15 years and above by level of completed years of schooling and sex. Overall, levels of education were low: 39.4% of individuals did not have any schooling, 22.3% reported between 1-5 years of primary schooling, 33.6% reported 6-10 years of secondary schooling, and only 4.3% reported any higher secondary education. The proportion of males reporting having received some form of education was greater than females, overall (63.8% vs. 57.7%), and at every level of education, except primary complete and secondary incomplete.

Table 3.24 shows the distribution (per cent) of children aged 6-14 years by type of school attended and slum location. Almost 12% children were not attending school. Of those in school, 29.4% were in private schools, 27% were in NGO schools, 25.4% were in government schools, and 6.7% were in religious schools. Patterns differed across slum locations: NGO schools were reported more frequently in Korail and Mirpur (33%-42%); private schools in Tongi (43.8%), and government schools in Dhalpur/Shayampur (36.3%).

Table 3.23: Distribution of Population⁺ by Level of Schooling and Sex

Level of Schooling	Number			Per cent		
	Male	Female	Both	Male	Female	Both
No education	13,878	16,934	30,812	36.2	42.3	39.4
Primary incomplete	1,457	801	2,258	3.8	2.0	2.9
Primary complete	7,429	7,791	15,220	19.4	19.5	19.4
Secondary incomplete	5,634	6,161	11,795	14.7	15.4	15.1
Secondary complete	7,563	6,927	14,490	19.8	17.3	18.5
Higher secondary or more	2,015	1,373	3,388	5.3	3.4	4.3
Missing	315	26	341	0.8	0.1	0.4
Total	38,291	40,013	78,304	100	100	100

Note: ⁺Age 15 or more

As shown in Figure 3.1 the proportion of girls aged 6-14 years attending school is substantially higher than boys (91.1% vs. 85.9%). This was apparent across all types of schools except for religious schools where there were more boys (9.6%) than girls (3.7%).

Table 3.24: Distribution of Children⁺ (per cent) by Type of School Attended and Slum Location

Type of School	Korail (N=7,493)	Mirpur (N=4,353)	Dhalpur & Shayampur (N=3,551)	Tongi (N=7,824)	Total (N=23,221)
No schooling	13.8	10.7	12.1	9.4	11.5
Government school	18.1	26.7	36.3	26.7	25.4
Private school	20.7	22.6	24.5	43.8	29.4
NGO school	42.5	33.3	21.1	11.5	27.0
Religious school	4.9	6.7	6.0	8.6	6.7
Total	100	100	100	100	100

Note: ⁺Age 6-14 years

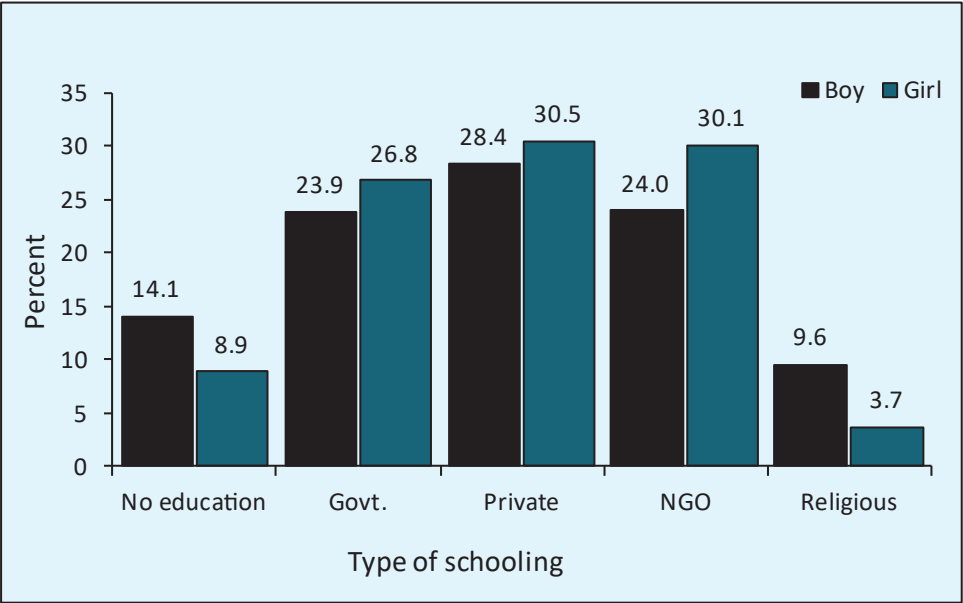
Occupation

Information on the occupational profile of individuals eight years of age and greater was collected. Table 3.25 shows the distribution of occupation by sex. Among males, 71.7% were involved in income-generating activities compared to 40.3% among females⁶. The dominant occupations among males were labourer (26.4%), service holder (22.0%, of it 10.3% garment worker), student (14.5%), business (13.2%), and rickshaw/van puller (11.3%). For females, the dominant occupations were housewife (35.7%), service holder

⁶ If mother is involved in income generating activities, it is expected that she will go outside the home. In these cases, care for under-five children becomes relevant. Out of 288 working (outside) mothers with under-five children, 41% reported that nobody took care of their under-five children, while in 41.3% of cases under-five children were looked after by relatives, and in 8% of cases, by siblings (for details, see Appendix 3.3).

(22.0%, of it 19.1% garment worker), student (14.7%), domestic work (9.6%) and labourer (4.6%). Substantial variation in occupational patterns was evident across slums (Table 3.26). The proportion of service holders was greater in Dhalpur/Shayampur and Korail (16-20%, including garment worker), while garment work was relatively more important in Mirpur (24.7%), and Tongi (18.8%). The proportion of rickshaw/van pullers was largest in Korail (8.5%), followed by Dhalpur/Shayampur and Mirpur (5%-6%) and smallest in Tongi (2.9%). The labourer category was the largest in Dhalpur/Shayampur (23.4%), followed by Tongi and Mirpur (15.5%) and Korail (11.1%). Female domestic work accounted for a larger proportion of overall occupational activity in Korail (10.3%), compared to Mirpur (5.9%) or Tongi and Dhalpur/Shayampur (1%-3%).

Figure 3.1: Distribution of Children⁺ (per cent) by Type of School Attended and Sex



Note: ⁺Age 6-14 years

Table 3.25: Distribution of Population by Occupation⁺ and Sex

Occupation	Number			Per cent		
	Male	Female	Both	Male	Female	Both
Private service	4,944	1,172	6,116	10.5	2.4	6.4
Garment worker	4,847	9,296	14,143	10.3	19.1	14.8
Government service	580	253	833	1.2	0.5	0.9
Self-employed	297	595	892	0.6	1.2	0.9
Rickshaw/van puller	5,302	0	5,302	11.3	0.0	5.5
Business	6,237	894	7,131	13.2	1.7	7.4
Labourer (skill/un-skill)	12,445	2,224	14,669	26.4	4.6	15.3
House-wife	0	17,415	17,415	0.0	35.7	18.2
Domestic work (female)	0	4,667	4,667	0.0	9.6	4.9
Domestic work (male)	6	222	228	0.0	0.5	0.2
Student	6,822	7,149	13,971	14.5	14.7	14.6
No work	5,082	4,539	9,621	10.8	9.3	10.0
Other	572	321	893	1.2	0.7	0.9
Total	47,134	48,747	95,881	100	100	100

Note: ⁺Age 8 or more; less than 0.1% was considered as '0'.

Table 3.26: Distribution of Population (per cent) by Occupation⁺ and Slum Location

Occupation	Korail	Mirpur	Dhalpur & Shayampur	Tongi	All
	(N=29,096)	(N=18,872)	(N=13,576)	(N=34,337)	(N=95,881)
Private service	11.0	3.6	8.3	3.2	6.4
Garment worker	8.4	24.7	4.1	18.8	14.8
Government service	0.2	0.3	4.2	0.3	0.9
Self-employed	0.6	0.2	2.7	0.9	0.9
Rickshaw/van puller	8.5	5.9	5.2	2.9	5.5
Business	7.7	6.6	6.2	8.2	7.4
Labour (skill/un-skill)	11.1	15.6	23.4	15.5	15.3
House-wife	16.2	15.6	19.1	20.9	18.2
Domestic work (female)	10.3	5.9	2.8	0.6	4.9
Domestic work (male)	0.7	0.0	0.0	0.0	0.2
Student	12.7	13.4	14.2	17.0	14.6
No work	11.4	7.4	8.5	11.0	10.0
Other	1.2	0.8	1.3	0.7	0.9

Note: ⁺Age 8 or more

Household Possessions

To assess relative wealth, ownership of various possessions was enumerated such as chair/table, dining table, khat, chawki, sofa set, almirah/wardrobe, radio, television, fridge, mobile phone, electric fan, watch/clock, rickshaw/van, computer/laptop, and sewing machine. Damaged items were included, if these were repairable.

Table 3.27 shows the distribution of households (per cent) owning selected items by slum location. Most households possessed an electric fan (94-97%), and mobile phone (82%-87%), followed by television (50%-70%) and khat (41%-71%), chawki (23%-55%), and almirah/wardrobe (15%-49%), chair/table, watch/clock, and fridge (8%-31%) and sewing machine (4%-10%). Few households reported owning a dining table or sofa set or radio or rickshaw/van or computer/laptop (0.2%-3.5%). A few differences were apparent between slums. In Dhalpur/Shayampur and Tongi, a large proportion of households reported owning a khat (71.0% & 68.6%) compared to other slums, while in Korail many more households reported owning a chawki (54.8%). The proportion of households owning a television was greatest in Tongi (70.3%) and smallest in Korail (50.5%); as was the position of an almirah/wardrobe (49.2%) in Tongi vs. 15.4% in Korail.

Table 3.27: Distribution of Households (per cent) Owning Selected Items by Slum Location

Asset	Korail (N=9,745)	Mirpur (N=6,230)	Dhalpur & Shayampur (N=4,431)	Tongi (N=10,451)	All (N=30,857)
Chair/table	17.1	25.2	31.0	22.1	22.4
Dining table	0.6	1.9	0.8	1.8	1.3
Khat	41.1	58.1	71.0	68.8	58.2
Chawki	54.8	37.9	23.1	32.1	39.2
Sofa set	1.3	1.9	1.6	3.0	2.0
Almirah/wardrobe	15.4	27.6	29.2	49.2	31.3
Radio	0.5	0.2	0.5	0.5	0.4
Television	50.5	55.6	57.4	70.3	59.2
Fridge	7.7	12.0	18.7	24.8	15.9
Mobile phone	82.5	83.5	86.6	86.7	84.7
Electric fan	96.5	96.6	94.0	94.8	95.6
Watch/clock	14.3	19.7	26.5	29.0	22.1
Rickshaw/van	2.3	2.2	3.3	2.4	2.5
Computer/laptop	0.9	1.0	0.7	1.2	1.0
Sewing machine	4.4	4.9	6.9	10.1	6.8

Household Expenditure and Savings

Table 3.28 shows the distribution of households (per cent) by total expenditure during the previous month. Mean household expenditure was BDT 11,981 during the last month, with 60% of households spending between BDT 10,000-14,999, followed by BDT 15,000-19,999 (15.4%), BDT 7,500-9,999 (13%) and BDT 20,000 or more (6.1%). Mean household expenditure on food during the last month was BDT 6,291 (Table 3.29) with 44.4% of households spending BDT 5,000-7,499, followed by BDT 7,500-9,999 (20.3%), BDT 3,000-4,999 (16.3%) and BDT 10,000 or more (11.2%). Only 6.7% of households spent BDT 3,000 or less.

Table 3.28: Distribution of Household (per cent) Total Expenditure during the Last Month

Expenditure (BDT)	Korail (N=979)	Mirpur (N=667)	Dhalpur & Shayampur (N=461)	Tongi (N=1,006)	Total (N=3,113)
<5,000	1.2	1.5	1.3	2.5	1.7
5,000-7,499	6.4	5.4	6.3	5.0	5.7
7,500-9,999	14.5	13.6	12.3	11.5	13.0
10,000-14,999	59.1	63.0	59.9	53.1	58.1
15,000-19,999	14.5	11.2	12.8	20.1	15.4
20,000+	4.3	5.3	7.4	7.8	6.1
Total	100	100	100	100	100
Mean	11,715.3	11,813.1	12,054.8	12,318.7	11,981.5

Table 3.29: Distribution of Households (per cent) Expenditure on Food during the Last Month

Expenditure (BDT)	Korail (N=979)	Mirpur (N=667)	Dhalpur & Shayampur (N=461)	Tongi (N=1,006)	Total (N=3,113)
<3,000	5.9	5.4	6.0	8.6	6.7
3,000-4,999	15.4	18.8	21.0	13.3	16.3
5,000-7,499	43.4	48.9	42.9	43.0	44.4
7,500-9,999	21.8	16.8	20.4	21.2	20.3
10,000+	11.4	9.3	9.0	13.2	11.2
Don't know	2.1	0.9	0.6	0.7	1.1
Total	100	100	100	100	100
Mean	6,306.4	6,120.4	6,185.2	6,438.6	6,291.3

Table 3.30 shows the distribution of household (per cent) expenditure on health during the last month. Although the mean expenditure on health was BDT 1,276, 35.2% of households reported no such spending. Almost 25% of households spent BDT 1,000 or more the previous month, 24.2% of households spent BDT 500-999 and 15.7% spent less than BDT 500.

Table 3.31 displays the distribution of household (per cent) expenditure on education during last month, the mean of which was BDT 604. In fact, almost 60% of households did not spend any money on education the month prior to the census, and among households reporting such expenditures, 17.6% of households spent BDT 1,000 or BDT 500-999, while 6.7% spent less than BDT 500.

Table 3.30: Distribution of Households (per cent) Expenditure on Health during the Last Month

Expenditure (BDT)	Korail (N=979)	Mirpur (N=667)	Dhalpur & Shayampur (N=461)	Tongi (N=1,006)	Total (N=3,113)
<500	12.5	18.1	12.2	18.8	15.7
500-999	21.8	24.4	25.4	25.8	24.2
1,000+	20.6	24.0	27.1	28.5	24.9
No expense	45.1	33.4	35.4	26.8	35.2
Total	100	100	100	100	100
Mean	1,078.3	1,191.6	1,640.2	1,357.2	1,275.9

Table 3.31: Distribution of Households (per cent) Expenditure on Education during the Last Month

Expenditure (BDT)	Korail (N=979)	Mirpur (N=667)	Dhalpur & Shayampur (N=461)	Tongi (N=1,006)	Total (N=3,113)
<500	6.3	7.2	5.4	7.4	6.7
500-999	16.8	15.6	16.7	20.3	17.6
1,000+	14.2	13.9	19.3	22.6	17.6
No expense	62.7	63.3	58.6	49.7	58.1
Total	100	100	100	100	100
Mean	485.2	501.1	619.1	781.6	604.2

Table 3.32 shows the distribution of households (per cent) by the amount saved during the previous month. Mean savings were only BDT 527, and three-quarters of households reported no savings whatsoever. Only 12.8% of households saved BDT 1,000 or more, followed by 9.1% of households saving BDT 500-999 and 5.8% saving less than BDT 500⁷.

Table 3.32: Distribution of Households (per cent) by Amount Saved during Last Month

Savings (BDT)	Korail (N=979)	Mirpur (N=667)	Dhalpur & Shayampur (N=461)	Tongi (N=1,006)	Total (N=3,113)
<500	2.6	3.9	11.3	7.7	5.8
500-999	14.3	6.5	11.5	4.7	9.1
1,000+	14.0	12.1	11.9	12.3	12.8
No savings	69.1	77.5	65.3	75.3	72.3
Total	100	100	100	100	100
Mean	518.9	586.8	486.5	514.5	527.2

Migration of Household Head

Each household in the surveillance area was asked about the migration history of the household head, including when migration to the slum had occurred, where they migrated from, and the reason for migration.

When Migration Occurred

Table 3.33 shows the distribution of households (per cent) in terms of when the household head had migrated into the slum, expressed as the duration of stay in years. Almost 36% of household heads migrated 20 or more years ago. The second most common response was migration during the last 5-9 years (15%), within the last 5 years (14.3%), and during the last 10-14 years (12.6%). 8.6% of household heads reported living in the city since birth. Duration of migration did not vary substantially across slum locations, although a greater percentage of longer-term migrants (20+ year) were enumerated in Dhalpur/Shayampur (52.9%), followed by Tongi (44.6%), and fewer in Korail and Mirpur (23%-26%). In Tongi, 20.7% of household heads had been living in the city since birth.

⁷ Households were asked if they had membership in an NGO/samity and/or Grameen Bank, and if they had taken any loans from any of these groups including mahajans, relatives or others (for detail, see Appendices 3.3 and 3.4). 44.2% of households reported at least one NGO/Grameen Bank/other member: 6.1% in BRAC, 5.5% in ASA, 5.5% in DSK, 1.7% in Grameen, and 1.5% in UPPR, while 23.9% had membership in an (NGO or a registered or unregistered samity. About 47% of households had taken a loan from an NGO, Grameen Bank, mahajan, relative or another source. Most of these were from BRAC (5.4%), followed by ASA (4.9%), DSK (4.3%), and fewer from UPPR and Grameen (0.3%-1.0%). 7.0% households had taken a loan from relatives, 2.9% from mahajans, 1.4% from a samity, and an exceptionally high per cent from other sources (20.3%).

Causes of Migration

Table 3.34 shows the distribution of household heads (per cent) in terms of why they migrated into the slum. Most household heads migrated for work (62.4%), followed by joining family (19.9%). Cause of household head's migration for work varied considerably across slum locations. In Korail, 87.3% household heads migrated for work, followed by Mirpur (65.6%), while comparatively fewer household heads migrated for work in Dhalpur/Shayampur and Tongi (42%-48%). For joining family, most household heads migrated in Dhalpur/Shayampur and Tongi (28%), followed by Mirpur (20.1%), while fewer migrated for reasons of joining family in Korail (8.5%).

Table 3.33: Distribution of Household Heads (per cent) by when Migration Occurred and Slum Location

Duration (Years)	Korail (N=9,745)	Mirpur (N=6,230)	Dhalpur & Shayampur (N=4,431)	Tongi (N=10,451)	Total (N=30,857)
<5	18.0	21.6	7.9	9.1	14.3
5-9	19.8	21.1	11.0	8.6	15.0
10-14	17.5	14.5	12.1	7.2	12.6
15-19	15.9	13.1	11.5	7.5	11.9
20+	26.2	23.6	52.9	44.6	35.7
Since birth	1.7	3.7	1.8	20.7	8.6
Missing	0.9	2.4	2.8	2.3	1.9
Total	100	100	100	100	100

Table 3.34: Distribution of Household Heads (per cent) by Cause of Migration and Slum Location

Cause	Korail (N=9,745)	Mirpur (N=6,230)	Dhalpur & Shayampur (N=4,431)	Tongi (N=10,451)	Total (N=30,857)
Looking for work	87.3	65.6	48.5	42.3	62.4
Earn more money	0.6	5.2	8.3	2.4	3.2
River erosion	1.6	6.4	1.9	6.4	4.2
To Join family	8.5	20.1	27.4	27.6	19.9
Children's education	0.0	0.2	0.1	0.1	0.1
Own education	0.1	0.3	0.3	0.3	0.2
Other	0.1	0.7	2.1	0.9	0.8
Since birth	1.8	1.5	11.4	20.0	9.2
Total	100	100	100	100	100

Origin of Migration

Table 3.35 shows the distribution of household heads (per cent) by place of origin. 52.2% of household heads migrated from Dhaka division, followed by Barisal division (20.5%), Chittagong division (11.6%) and the rest from Khulna, Rajshahi, Rangpur, and Sylhet divisions (15.7%). Place of origin varied across slum locations. In Tongi, 71.1% of household heads migrated from Dhaka division, compared to 27.2% in Mirpur. In Mirpur, many more household heads migrated from Barisal division (39%), as was the case with Dhalpur/-Shayampur (29.7%). In Mirpur, a substantial percentage of household heads also migrated from Rangpur (20.5%).

Table 3.35: Distribution of Household Heads (per cent) by Place of Origin and Slum Location

Origin	Korail (N=9,745)	Mirpur (N=6,230)	Dhalpur & Shayampur (N=4,431)	Tongi (N=10,451)	Total (N=30,857)
Barisal	16.4	39.0	29.7	9.4	20.5
Chittagong	16.7	1.6	16.0	10.9	11.6
Dhaka	54.1	27.2	38.6	71.1	52.2
Khulna	2.3	4.1	3.2	1.1	2.4
Rajshahi	3.5	4.8	2.3	2.1	3.1
Rangpur	4.6	20.5	5.7	3.8	7.7
Sylhet	2.3	2.7	3.5	0.9	2.1
Missing	0.1	0.1	1.0	0.7	0.4
Total	100	100	100	100	100

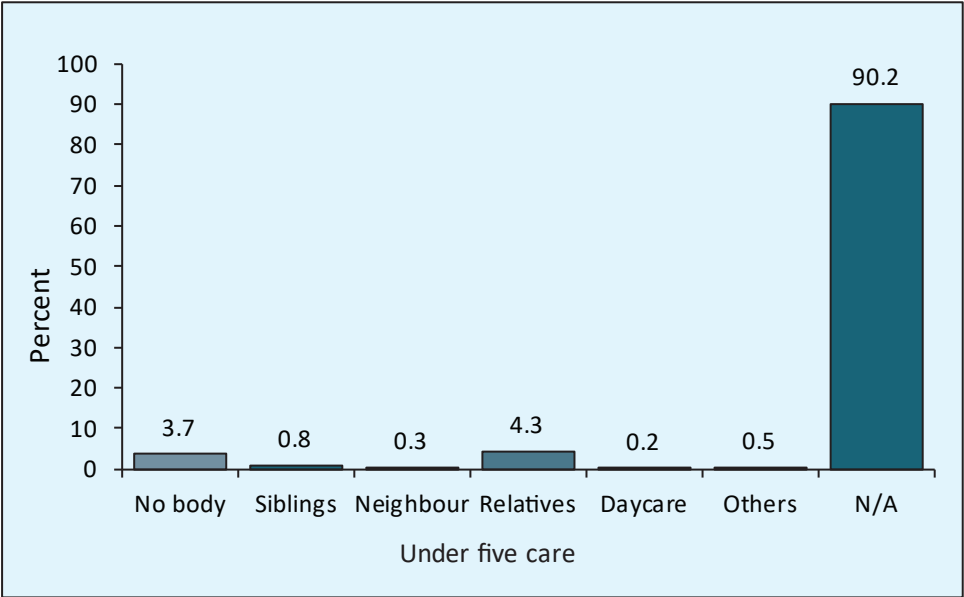
Appendix 3.1: Key Findings-Baseline Population and Socioeconomic Census, 2015

Indicators	Results of baseline population and socioeconomic census - 2015	Results from other slum surveys
Population by broad age groups (%)		
0-14 yrs.	31.4	33.2 ⁺
15-64 yrs.	66.0	66.4 ⁺
65 or more yrs.	2.6	2.4 ⁺
Family size	3.8	4.1 ⁺
Female headed household (%)	17.6	14.2 ⁺⁺
Sex ratio	97.8	104.8 ⁺
Dependency ratio (%)		
Total	51.6	-
Young	47.7	57 ⁺⁺
Old	3.9	-
No education		
Among aged 15 or more yrs. (%)		
Male	36.2	25.7 ⁺ (aged 15 -54)
Female	42.3	31.8 ⁺ (aged 15 -49)
Among aged 6 -14 yrs. (%)		-
Boy	14.1	-
Girl	8.9	-
Occupation		
Income generating activity (%)		
Male	73.5	-
Female	39.6	38.1 ⁺
Laborer (%)		
Male	26.4	-
Female	4.6	-
Garment worker (%)		
Male	10.3	-
Female	19.1	-
Student (%)		
Male	14.5	-
Female	14.7	-
Ownership (%)		
Mobile phone	84.7	92.0 ⁺
Television	59.2	63.0 ⁺
Electric fan	95.6	93.0 ⁺
Expenditure/saving during last month (BDT)		
Total household expenditure		-
Mean	11,981	-
BDT 10,000 -14,999 (%)	58.1	-
Household expenditure on food		-
Mean	6291	-
BDT 5,000 -9,999 (%)	64.7	-
Household expenditure on health		-
Mean	1,276	-
BDT 1,000 or more (%)	24.9	-
Household expenditure on education		-
Mean	604	-
BDT 1,000 or more (%)	17.6	-
Household saving		
Mean	527. 2	
BDT 1,000 or more (%)	12.8	

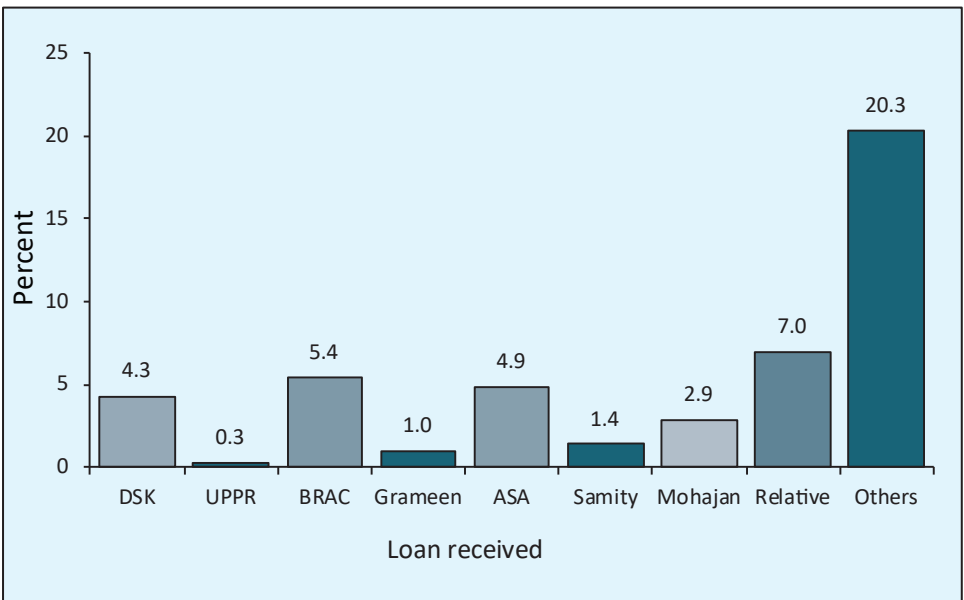
Indicators	Results of baseline population and socioeconomic census- 2015	Results from other slum surveys
Ownership of land (%)		
Owned by government	90.7	7.9 ⁺
Ownership of house (%)		
Tenant	67.8	75.6 ⁺
Owned by HH/other member	31.6	21.2 ⁺
Dwelling (%)		
One bed room	81.6	74.6 ⁺
Mean area of dwelling sq. ft.	119.4	
Construction material of dwelling (%)		
Roof- Tin	94.0	88.4 ⁺
Wall- Tin	70.4	42.6 ⁺
Floor- Brick/cement	88.0	75.4 ⁺
Source of drinking water (%)		
Pipe water	93.8	59.3 ⁺
Sharing water source 10 or more HH	37.4	64.7 ⁺
Type of toilet (%)		
Sanitary flush to sewerage/tank	29.5	1.0 ⁺
Sanitary flush to elsewhere	60.9	8.6 ⁺
Ventilated improved pit	0.5	82.8 ⁺
Sharing toilet- 10 or more HH	31.7	42.9 ⁺
Source of light (%)		
Electricity	99.6	97.8 ⁺
Type of fuel for cooking (%)		
Gas line	53.5	
Wood	34.9	
Sharing cooking place- 10 or more HHs	15.9	
Garbage disposal system (%)		
Type of store (%)		
Open space outside	47.3	47.4 ⁺
At home/bin outside	47.2	52.3 ⁺
Frequency of collection (%)		
Every day	41.8	
Never collected	36.5	
Migration of household head		
Duration of migration (%)		
Less than 5 yrs.	14.3	
Twenty or more yrs.	35.7	
Since birth	8.6	
Cause of migration (%)		
Looking for work	62.4	
To join family	19.9	
Origin of migration (%)		
Dhaka	52.2	
Barisal	20.5	
Chittagong	11.6	

Note: ⁺Bangladesh Urban Health Survey, 2013 (1); ⁺⁺Bangladesh Urban Health Survey, 2006 (2).

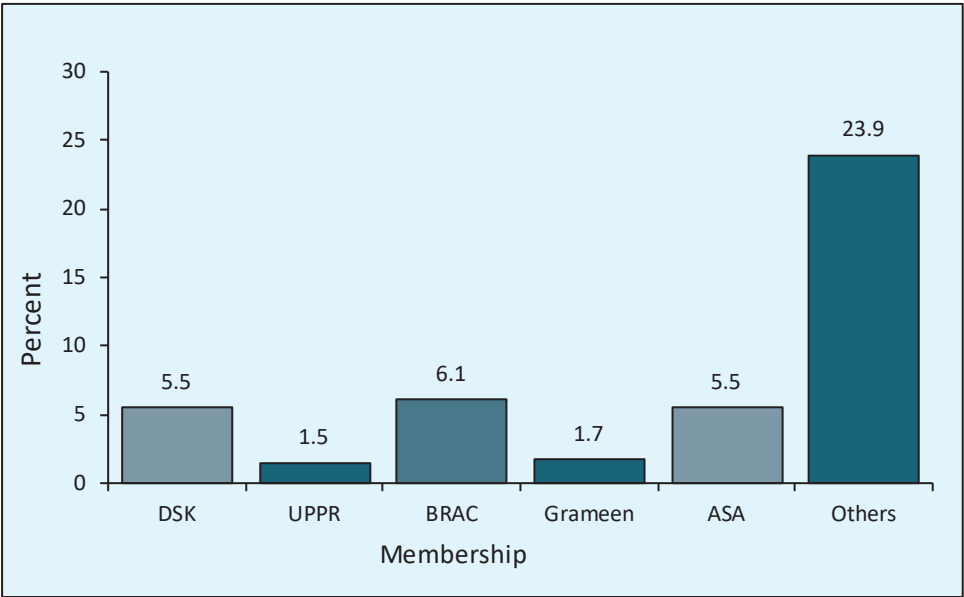
Appendix 3.2: Under-Five Care (per cent) when Mothers Work Outside



Appendix 3.3: Loans Received (per cent) from NGO/Others



Appendix 3.4: NGO/Samity (per cent) Membership



References

1. National Institute of Population Research and Training, MEASURE Evaluation, UNC-Chapel Hill, USA, and icddr,b. Bangladesh Urban Health Survey 2013- Preliminary Results, 2014.
2. Bangladesh Urban Health Survey 2006 (2008). Dhaka, Bangladesh and Chapel Hill, NC, USA: NIPOORT, MEASURE Evaluation, icddr,b and ACPR, 2008.

Chapter 4

The Vicious Circle of Life in Urban Slums

Abdur Razzaque, Razib Chowdhury & AHM Golam Mustafa

Summary

This chapter explores the major life cycle events that occurred among slum populations in the HDSS area, including pregnancy outcomes (live-birth, miscarriage, and still-birth), death, migration, and marriage/divorce. Based on analysis of HDSS data from 2016 (January-December), key findings are presented below:

Fertility

Among all pregnancies occurring in the HDSS area, 82.0% were livebirth, 5.5% were induced miscarriage, 9.8% were spontaneous miscarriage, and 2.7% were stillbirth. The crude birth rate was 16.6 (per 1000 population), while the total fertility rate was 1.5 (per woman). Among all women giving birth, 29.6% were mothers under 20 years of age, 31.6% of births occurred among mothers aged 20-24 years, while 5.2% births were to mothers aged 35 years or more.

Mortality

The crude death rate recorded in the HDSS area was 4.4 (per 1000 population), but 40% higher for males than for females (5.1 vs 3.7). Infant mortality rate was 51.6 (per 1000 livebirths) and under-five mortality rate was 58.8 (per 1000 livebirths). Among these deaths, more boys than girls died during infancy (61.1 vs 41.6) and in the first five years of life (68.6 vs 48.5). Life expectancy at birth was also higher for females than males (70.4 vs 67.9). In terms of the leading cause of death, non-communicable disease was first (53.4%), followed by communicable disease (12.9%), maternal and neonatal (10.5%) and accident/injury/murder (10.0%). The remaining 10% of deaths were attributed to old-age or were unspecified. Among non-communicable diseases, the most prevalent cause was stroke (17.7%), followed by cancer (10.5%) and heart disease (9.0%). The most common cause of death due to communicable diseases was pneumonia/respiratory infection (9.0%). For maternal and neonatal conditions, the most prevalent cause was delivery complications (4.3%), followed by unspecified neonatal causes (3.5%). Finally, for accident/injury/murder, the most prevalent causes were accidents (5.0%), followed by death by drowning (2.1%).

Marriage/divorce

The mean age at first marriage for women living in the HDSS area was 17.5, and 45% of marriages took place before 18 years of age. For men, the mean age at first marriage was 22.6 and 18% were married before age 20 years of age. The mean age at divorce for women was 21.6, with over half of divorces taking place before 20 years of age. For men, the mean age at divorce was 26.7, and about 50% took place before age 25.

Migration

The in-migration rate into the slums that constitute the HDSS area was 159.5 per 1000 population. The rate of out-migration and internal- movement were 149.8 and 102.2 per 1000 population respectively. Forty-three per cent of in-migration was due to joining family followed by looking for work (41.2%). For out-migration, 47.5% was due to joining family, and 25.6% for job seeking. Internal movement predominantly occurred due to marriage/joining family (57.8%), followed by 'other' causes (33.8%). Most in-migration (230.9 per 1000 population) and out-migration (192.9 per 1000 population) occurred between the ages of 20-24, while internal-movement mainly occurred at much younger ages 0-4 (133.1 per 1000 population).

Demographic Surveillance Data

Since January 2016, the slum surveillance system has been collecting the following data: a) Pregnancy outcomes: livebirth, stillbirth, miscarriage induced, and miscarriage spontaneous; b) Death: all ages including infant and under-five, and cause of death; c) Migration-out: place migrated to, and cause of migration; d) Migration-in: migrated from, cause of migration, marital status, education, and occupation of migrant; e) Internal movement: relation to head, and cause of movement; f) Marriage: age at marriage, and previous marital status; g) Divorce: age at divorce, and duration of marriage; and h) Head change/family split: causes of each.

Population Changes

The vital statistics and migration data of the urban HDSS area are shown in Table 4.1. The crude death rate in the urban HDSS area was 4.4 (per 1000 population), which was similar to the crude death rate recorded in the urban Kamalapur HDSS area (unpublished report), but 34.3% lower than the crude death rate in the Matlab HDSS area (4.4 vs 6.7) (Table 4.1). This difference could be due to the characteristics of age distribution comparing urban and rural HDSS areas; there was a larger active population, and smaller elderly population in the urban HDSS area than the Matlab HDSS area (Table 4.2, Table 4.3 and Figure 4.1).

The infant mortality rate in the urban HDSS area was 51.6 (per 1000 livebirths), which was 88.3% higher than the infant mortality rate in the Matlab HDSS area (51.6 vs 27.4) (Table 4.1). Further, the infant mortality rate in the urban HDSS area was only 5.3% higher than the infant mortality rate recorded in the City Corporation slums of the Urban Health Survey 2013 (51.6 vs 49.0).

The under-five mortality rate in the urban HDSS area was 58.8 (per 1000 livebirths), which was 60.7% higher than the under-five mortality rate in the Matlab HDSS area (58.8 vs 36.6) (Table 4.1). Further, it was only 3.2% higher than the under-five mortality rate recorded in the City Corporation slum of the Urban Health Survey 2013 (58.8 vs 57.0).

The crude birth rate in the urban HDSS area was 16.6⁸ (per 1000 population), which was 23.1% lower than the crude birth rate in the Matlab HDSS area (16.6 vs 21.6) (Table 4.1).

Compared to the Matlab HDSS area, the marriage rate (per 1000 population) of the urban HDSS area was 6.2% lower (13.7 vs 14.6), while the divorce rate was 47.1% (0.9 vs. 1.7) lower than Matlab (Table 4.1).

The number of in-migrating and out-migrating population registered in the HDSS area was 19,905 and 18,692 respectively, giving an in-migration rate of 159.5, an out-migration rate of 149.8 and a net migration rate of 9.7 (per 1000 population). The in-migration rate was 243.7% higher (159.5 vs 46.4) and the out-migration rate was 184.8% higher (149.8 vs 52.6) compared to the comparable rates in the Matlab HDSS area. The rate of internal movement within the urban slum surveillance area was 236.2% higher than the rural Matlab HDSS area (102.2 vs 30.4) (Table 4.1).

Table 4.2 compares the mid-year population of the urban and rural HDSS by age group. In the urban HDSS area, there were more active population (15-59 years) than the Matlab HDSS area (63.7% vs 57.7%), but similar populations of under 15 years (32.3% vs 32.1%) and appreciably fewer population aged 60 or more years (4.0% vs 10.2%) (Table 4.3). These differences in age distribution have implications for the crude death rate.

⁸For delivery, some women return to the village and stay for periods extending beyond six months (the definition of out-migrants in the HDSS), thus affecting the fertility rate of the study area. We estimated that there could be about 2750 pregnancies in 2016, but due to out-migration of pregnant women, we identified only about 2500 pregnancy outcomes. If there was no out-migration for delivery, the crude birth fertility rate in the study area would be 18.0 instead of 16.6.

Table 4.1: Population, Events Registered, and Population Changes, Urban HDSS 2016

Demographic indicator	Number			Rate per 1,000			Matlab HDSS-2014 (1)
	Both	M	F	Both	M	F	Both
Population ++	124 817	61 517	63 300	-	-	-	-
Events registered							
Births**	2074	1064	1010	16.6	17.2	16.0	21.6
Deaths**	543	311	232	4.4	5.1	3.7	6.7
Infants death*	107	65	42	51.6*(49 ⁺)	61.1*	41.6*	27.4*
Under-five death*	122	73	49	58.8*(57 ⁺)	68.6*	48.5*	36.6*
In-migration**	19905	9561	10344	159.5	155.3	163.6	46.4
Out-migration**	18692	8892	9800	149.8	144.4	155.0	52.6
Internal movement**	12755	6200	6555	102.2	100.7	103.7	30.4
Marriage**	1711			13.7			14.6
Divorce**	115			0.9			1.7
Population change							
Net migration**	1213	669	544	9.7	10.9	8.6	-6.2
Natural increase**	1501	739	662	12.0	12.0	10.5	14.9
Net increase**	2714	1408	1206	21.7	22.9	19.1	7.4
Note: ++ June 30, 2016							
+City Corporation slums, Urban Health Survey, 2013 (2)							
* Per 1000 livebirths							
** Per 1000 population							
M=Male, F= Female							

Table 4.2: Distribution of Population by Age Group and Sex, Urban HDSS 2016

Age (years)	Urban HDSS						Matlab HDSS 2014(1)
	Number			Percent			Percent Both
	Both	Male	Female	Both	Male	Female	
<1 year	2432	1220	1212	1.9	2.0	1.9	2.1
1	2686	1367	1319	2.2	2.2	2.1	2.1
2	2509	1294	1215	2.0	2.1	1.9	2.2
3	2630	1348	1282	2.1	2.2	2.0	2.1
4	2481	1275	1206	2.0	2.1	1.9	2.0
1-4	10306	5284	5022	8.3	8.6	7.9	8.3
5-9	14650	7375	7275	11.7	12.0	11.5	10.7
10-14	12911	6477	6434	10.3	10.5	10.2	11.0
15-19	15182	6507	8675	12.2	10.6	13.7	9.0
20-24	13168	5482	7686	10.5	8.9	12.1	7.3
25-29	14516	7194	7322	11.6	11.7	11.6	6.9
30-34	9607	4977	4630	7.7	8.1	7.3	6.4
35-39	9202	4715	4487	7.4	7.7	7.1	5.7
40-44	6224	3404	2820	5.0	5.5	4.5	5.9
45-49	5508	2815	2693	4.4	4.6	4.3	5.9
50-54	3724	1973	1751	3.0	3.2	2.8	6.0
55-59	2354	1286	1068	1.9	2.1	1.7	4.5
60-64	2109	1142	967	1.7	1.9	1.5	3.2
65-69	1151	672	479	0.9	1.1	0.8	2.6
70-74	1013	592	421	0.8	1.0	0.7	2.0
75-79	310	185	125	0.2	0.3	0.2	1.3
80-84	293	149	144	0.2	0.2	0.2	0.7
85+	157	68	89	0.1	0.1	0.1	0.4
Total	124817	61517	63300	100.0	100.0	100.0	100.0

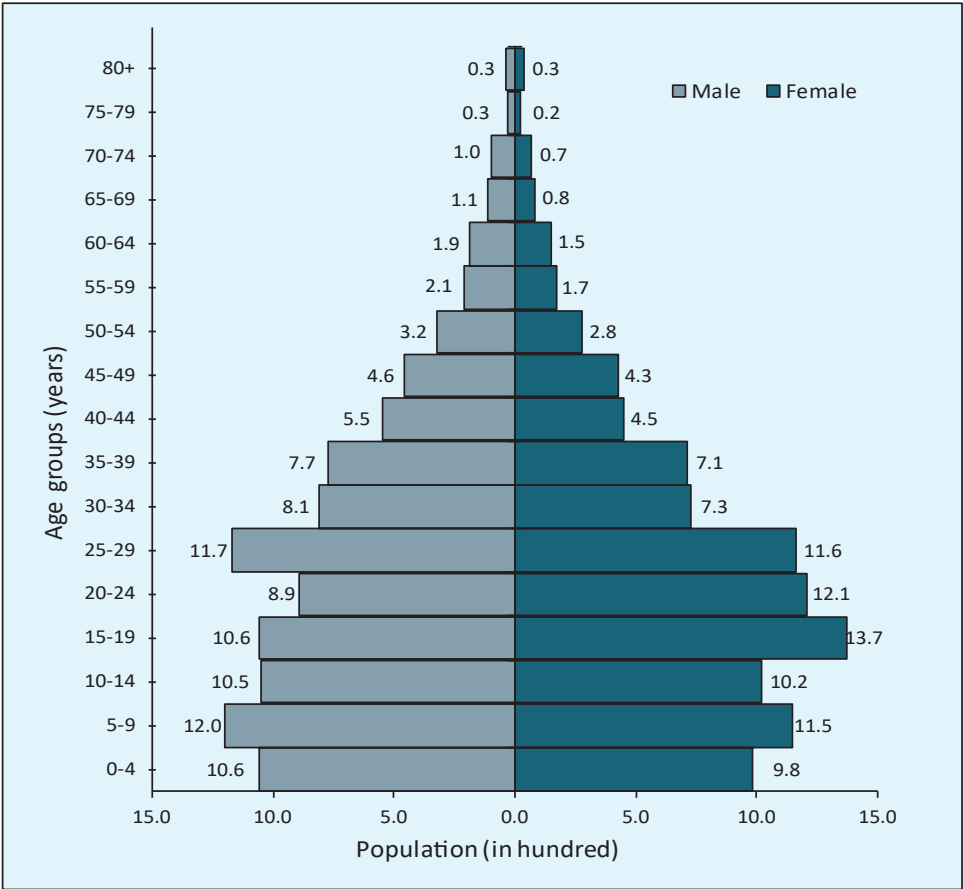
Note: Population as of June 30, 2016; Nineteen transgendered people were excluded

Table 4.3: Distribution of Population by Broad Age Group and Sex, Urban HDSS 2016

Age (years)	Urban HDSS						Matlab HDSS- 2014(1)
	Number			Percent			Percent Both
	Both	Male	Female	Both	Male	Female	
<15	40299	20356	19943	32.3	33.1	31.5	32.1
15-59	79485	38353	41132	63.7	62.3	65.0	57.7
60-64	2109	1142	967	1.7	1.9	1.5	3.2
65+	2924	1666	1256	2.3	2.7	2.0	7.0
Total	124 817	615 17	63 300	100.0	100.0	100.0	100.0

Note: Population as of June 30, 2016

Figure 4.1: Age Pyramid of the 2016 Mid-year Population



Mortality

The data on causes of death were collected from an informed household member; however, in each case this individual was asked whether the cause was ascertained by a medical person or family member. The interviewer then wrote down a brief, verbatim description of the cause of death as reported. A total of 543 deaths were registered during January to December 2016. These were later coded by cause under the guidance of a physician.

Table 4.4 shows the distribution of deaths by age and sex in the urban HDSS area as well as deaths in the Matlab HDSS area on the right side for comparison. Out of 543 total deaths, 19.7% were among infants, 2.8% of deaths of children aged 1-4 years, 48.5% were among those aged 5-59 years and 29.0% 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 4.5 shows death rates (per 1000 population). The overall death rate was 4.4 (per 1000 population), and death rates for males and females were 5.1 and 3.7 respectively. The infant mortality rate was 51.6 (per 1000 livebirths), while infant mortality rates were 61.1 and 41.6 for boys and girls respectively. The crude death rate was higher in the Matlab HDSS area, but age-specific death rates below 70 years of age were higher in the urban HDSS than the Matlab HDSS area except children aged 1-4 years.

Table 4.6 shows the abridged life table for males and females derived from the age-sex-specific death rates. The survival (l_x) times are plotted in Figure 4.2. Life expectancy at birth was higher for females than males (70.4 vs 67.9), as well as for most age-groups below 55 years.

The probability of dying ($45q_{15}$) for the age group 15-59 years was 185.7 for male and 141.0 for female (per 1000 population). Interestingly, while the probability of survival was higher for females than males up to age 54 years, this reversed in the population aged 55 years or more, when survival for males exceeded that of females.

Deaths by underlying causes are shown in Tables 4.7 and 4.8. Non-communicable diseases were the leading cause of death (53.4%), followed by communicable diseases (12.9%), maternal and neo-natal (10.5%) and accident/injury/murder (10.0%); ten per cent of deaths were due to either old age or unspecified cause (Table 4.7).

Among non-communicable diseases, the most prevalent was stroke (17.7%), following by cancer (10.5%), heart disease (9.0%), and asthma/bronchitis/COPD (3.9%) (Table 4.8). Overall, non-communicable disease was higher for male than female (56.4% vs 49.1%); however, cancer, heart diseases, asthma/bronchitis/COPD, and kidney were higher for males than females, while liver problem and paralysis, stroke and diabetics and were higher for females than males (Table 4.8). Of communicable diseases, the most prevalent was pneumonia/respiratory infection (9.0%), followed by jaundice and tuberculosis (1.3%, each); Pneumonia/respiratory infection was higher for males than females, while jaundice and tuberculosis were higher for females than males. For maternal and neo-natal conditions, the most prevalent was delivery complication (4.3%), followed by unspecified neonatal causes (3.5%); unspecified neo-natal causes were higher for males than females. Among the accident/injury/murder category, the most prevalent were accidents (5.0%), followed by drowning (2.1%); these were higher for males than females.

Table 4.4: Distribution of Deaths (per cent) by Age and Sex, Urban HDSS 2016

Age (Years)	Both		Male		Female		Matlab HDSS- 2014 (1)
	Number	Percent	Number	Percent	Number	Percent	Both
All ages	543	100.0	311	100.0	232	100.0	100.0
<1 year	107	19.7	65	20.9	42	18.1	8.8
<7 days	72	13.3	47	15.1	25	10.8	5.6
7-29 days	10	1.8	5	1.6	5	2.2	1.5
1-5 months	16	2.9	8	2.6	8	3.4	1.5
6-11 months	10	1.8	5	1.6	5	2.2	0.1
1-4	15	2.8	8	2.6	7	3.0	2.9
5-9	13	2.4	7	2.3	6	2.6	0.8
10-14	17	3.1	8	2.6	9	3.9	0.4
15-19	17	3.1	7	2.3	10	4.3	1.2
20-24	19	3.5	5	1.6	14	6.0	0.6
25-29	23	4.2	13	4.2	10	4.3	1.5
30-34	23	4.2	15	4.8	8	3.4	1.4
35-39	17	3.1	12	3.9	5	2.2	1.0
40-44	29	5.3	15	4.8	14	6.0	1.3
45-49	33	6.1	16	5.1	17	7.3	3.4
50-54	45	8.3	33	10.6	12	5.2	6.1
55-59	28	5.2	15	4.8	13	5.6	7.2
60-64	43	7.9	31	10.0	12	5.2	5.9
65-69	32	5.9	19	6.1	13	5.6	8.6
70-74	20	3.7	15	4.8	5	2.2	12.4
75-79	25	4.6	10	3.2	15	6.5	16.5
80-84	15	2.8	8	2.6	7	3.0	10.7
85+	22	4.1	9	2.9	13	5.6	9.1

Table 4.5: Death Rates (per 1,000 population), Urban HDSS 2016

Age (years)	Both	Male	Female	Matlab HDSS 2014(1) Both sexes
	4.4	5.1	3.7	6.7
<1 year	51.6*	61.1*	41.6*	27.4*
1-4	1.5	1.5	1.4	2.4
5-9	0.9	0.9	0.8	0.5
10-14	1.3	1.2	1.4	0.2
15-19	1.1	1.1	1.2	0.9
20-24	1.4	0.9	1.8	0.6
25-29	1.6	1.8	1.4	1.5
30-34	2.4	3.0	1.7	1.4
35-39	1.8	2.5	1.1	1.2
40-44	4.7	4.4	5.0	1.5
45-49	6.0	5.7	6.3	3.9
50-54	12.1	16.7	6.9	6.8
55-59	11.9	11.7	12.2	10.7
60-64	20.4	27.1	12.4	12.6
65-69	27.8	28.3	27.1	22.2
70-74	19.7	25.3	11.9	40.9
75-79	80.6	54.1	120.0	83.7
80-84	51.2	53.7	48.6	108
85 +	140.1	132.4	146.1	169.9

*Per 1000 livebirths

Table 4.6: 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	61.1	100000	94807	67.9	41.6	100000	96465	70.4
1	4.4	93891	93648	71.3	4.5	95842	95585	72.5
2	0.8	93480	93444	70.6	0.8	95407	95367	71.8
3	0.0	93408	93408	69.7	0.0	95328	95328	70.9
4	0.8	93408	93371	68.7	0.0	95328	95328	69.9
5-9	4.7	93334	465653	67.7	4.1	95328	475737	68.9
10-14	6.2	92892	463143	63.0	7.0	94936	473153	64.2
15-19	5.4	92320	460460	58.4	5.7	94274	470121	59.6
20-24	4.6	91825	458162	53.7	9.1	93732	466700	54.9
25-29	9.0	91407	455139	49.0	6.8	92882	462952	50.4
30-34	15.0	90585	449794	44.4	8.6	92250	459418	45.7
35-39	12.7	89229	443540	40.0	5.6	91456	456108	41.1
40-44	21.8	88100	436060	35.5	24.5	90948	449576	36.3
45-49	28.1	86179	425300	31.2	31.1	88716	437188	32.2
50-54	80.5	83761	403052	27.0	33.7	85956	423063	28.1
55-59	56.8	77020	374926	24.2	59.2	83056	403841	24.0
60-64	127.6	72647	341377	20.5	60.3	78141	379734	20.3
65-69	132.5	63380	297069	18.1	127.5	73428	345054	16.5
70-74	119.6	54981	259424	15.4	57.8	64064	311705	13.5
75-79	239.1	48407	214093	12.2	459.3	60362	231050	9.1
80-84	237.7	36835	163043	10.2	217.6	32636	146109	9.8
85+	1000.0	28081	212167	7.6	1000.0	25533	174805	6.8

Figure 4.2: Probability of Survival from Birth to Age (x) by Sex, Urban HDSS 2016

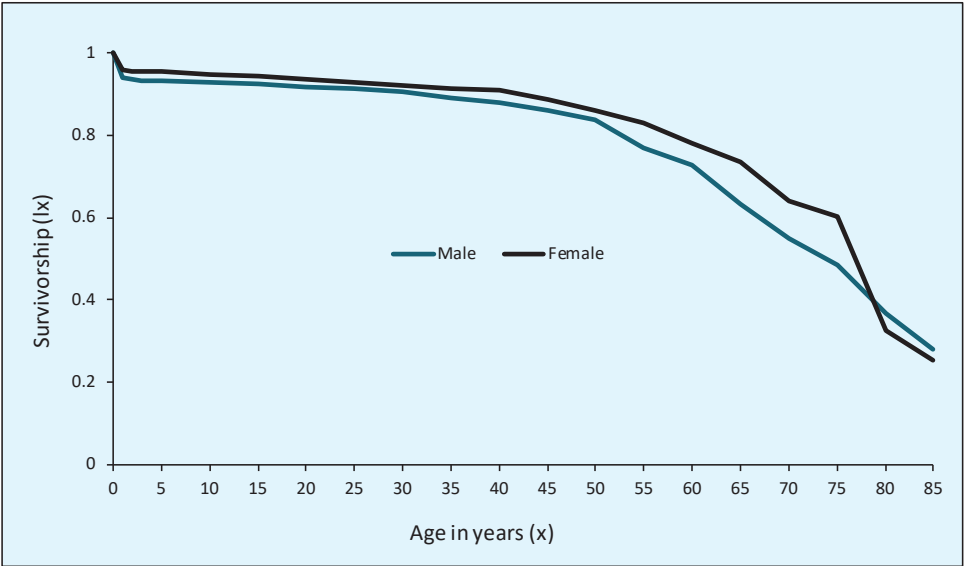


Table 4.7: Death by Major Cause and Sex (per cent), Urban HDSS 2016

Cause of death	Male	Female	Total
Communicable	12.3(38)	13.8(32)	12.9(70)
Maternal and neonatal	11.3(35)	9.5(22)	10.5(57)
Non-communicable	56.4(176)	49.1(114)	53.4(290)
Accidental/Injury/Murder	11.0(34)	8.6(20)	10.0(54)
Miscellaneous causes	2.3(7)	5.2(12)	3.5(19)
Unspecified/Unknown	2.3(7)	4.3(10)	3.1(17)
Senile/old age	4.4(14)	9.5(22)	6.6(36)
Total	100.0(311)	100.0(232)	100.0(543)

Fertility

Out of 2,523 pregnancy outcomes, 82.0% were livebirths, 5.5% induced miscarriages, 9.8% spontaneous miscarriages and 2.7% stillbirths (Table 4.9). Compared to the Matlab HDSS area, livebirth pregnancy was 4.8% lower in the urban HDSS area (82.0% vs 86.1%), induced miscarriage was 57.1% higher (5.5% vs 3.5%), spontaneous miscarriage was 10.1% higher (9.8% vs 8.9%) and stillbirth was 80.0% higher (2.7% vs 1.5%). There were 14 multiple birth pregnancies and of these pregnancies, all were twin livebirths.

Table 4.10 shows the distribution of birth by mother’s age. Thirty per cent births occurred in mothers aged under 20 years, 31.6% births in

mothers aged 20-24 years and 5.2% births in mothers of aged 35 or more, while comparable figures of the Matlab HDSS area were 15.7%, 32.1% and 7.3% respectively (Table 4.10).

Table 4.8: Death by Detail Cause and Sex (per cent), Urban HDSS 2016

Cause of death	Male	Female	Both sexes
Communicable diseases			
Pneumonia/Respiratory infection	9.6(30)	8.1(19)	9.0(49)
Diarrhoeal	1.0(3)	1.3(3)	1.1(6)
Jaundice	0.7(2)	2.2(5)	1.3(7)
Tuberculosis (TB)	0.7(2)	2.2(5)	1.3(7)
Dog bite	0.3(1)	0.0(0)	0.2(1)
Maternal and neonatal conditions			
Unspecified neonatal causes of death	4.5(14)	2.2(5)	3.5(19)
Maternal death (Mother)	0.0(0)	1.7(4)	0.7(4)
Death for cord (Neonatal)	0.3(1)	0.0(0)	0.2(1)
Delivery complication	4.2(13)	4.3(10)	4.3(23)
Pre-matured	0.7(2)	1.3(3)	0.9(5)
Other neonatal	1.6(5)	0.0(0)	0.9(5)
Non-communicable			
Paralyses	1.6(5)	3.5(8)	2.4(13)
Cancer	10.7(34)	10.3(24)	10.5(57)
Appendicitis	0.7(2)	0.4(1)	0.6(3)
Stroke (Cerebrovascular)	17.4(54)	18.2(42)	17.7(96)
Brain tumor/Tumor	1.0(3)	0.0(0)	0.6(3)
Asthma/Bronchitis/COPD	4.8(15)	2.6(6)	3.9(21)
Kidney problem	3.3(10)	3.0(7)	3.1(17)
Diabetics	1.6(5)	2.2(5)	1.9(10)
Heart disease (Cardiovascular)	11.7(37)	5.2(12)	9.0(49)
Drug addiction	0.7(2)	0.0(0)	0.4(2)
Liver problem	2.9(9)	3.7(9)	3.3(18)
Accidental/Injury/Murder			
Poison	0.0(0)	0.4(1)	0.2(1)
Burn	0.3(1)	1.7(4)	0.9(5)
Accident	6.1(19)	3.5(8)	5.0(27)
Suicide	1.0(3)	2.6(6)	1.8(9)
Drowning	3.3(10)	0.4(1)	2.1(11)
Murder	0.3(1)	0.0(0)	0.2(1)
Miscellaneous causes			
Fever/Cold	2.3(7)	5.2(12)	3.5(19)
Unspecified/Unknown			
Illness/Unspecified causes	2.3(7)	2.6(6)	2.4(13)
Unknown	0.0(0)	1.7(4)	0.7(4)
Senile/Old age	4.5(14)	9.5(22)	6.6(36)
Total	100.0(311)	100.0(232)	100.0(543)

Table 4.11 shows age-specific fertility rates (per 1000 women) and indices comparing urban HDSS with prior data from slums. The total fertility rate in the urban HDSS area was 1.5 (per 1000 women), which was 25% lower than the total fertility rate recorded in the City Corporation slums of the Urban Health Survey 2013 (1.5 vs 2.0). Figure 4.3 shows how age-specific fertility rates peak in the 20-24 age group (86.7, followed by age 15-19 (73.3) and age 25-29 (66.8).

Table 4.12 shows the distribution of pregnancy outcomes by month of occurrence and sex. Livebirths appear higher in August, October, November and December (Figure 4.4). The overall sex ratio of livebirths was 105 males per 100 females, but no definite trend by month was apparent.

Table 4.9: Distribution of Pregnancy Outcomes, Urban HDSS 2016

Type of pregnancy	Urban HDSS		Matlab HDSS-2014(1)
	Number	Percent	Percent
Total pregnancies	2523	100.0	100.0
Livebirth pregnancies	2067	82.0	86.1 (82.7*)
Early miscarriage			
Induced	140	5.5	3.5
Spontaneous	247	9.8	8.9
Stillbirth pregnancies	69	2.7	1.5 (3.1*)
Multiple pregnancy birth	14		
Multiple livebirth pregnancy			
Two	14		

Note: *Chakaria HDSS, a rural field site of icddr,b (3)

Table 4.10: Distribution of Birth by Mother’s Age, Urban HDSS 2016

Mother’s age at birth (yrs)	Urban HDSS		Matlab HDSS - 2014(1)
	Number	Percent	Percent
15-19	636	29.6	15.7
20-24	666	31.6	32.1
25-29	489	23.9	28.6
30-34	188	9.7	16.3
35+	95	5.2	7.3
Total	2074	100.0	100.0

Table 4.11: Age-specific Fertility Rates (per 1,000 women) and Indices, Urban HDSS 2016

Age (years)	No. of women	No. of births	Rate	Rate ⁺⁺⁺	Rate
				UHS 2013	Matlab HDSS 2014(1)
All Ages	38313	2074	54.1	-	-
15-19*	8675	636	73.3	84.0	73.1
20-24	7686	666	86.7	127.0	160.2
25-29	7322	489	66.8	92.0	145.6
30-34	4630	188	40.6	56.0	92.6
35-39	4487	72	16.0	31.0	37.7
40-44	2820	14	5.0	12.0	9.4
45-49**	2693	9	3.3	1.0	0.9
Total fertility rate ⁺			1.5(2.0 ⁺⁺⁺)	2.0	2.6
General fertility rate ⁺⁺			54.1	79.0	80.0

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

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

⁺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.

⁺⁺⁺ City Corporation slums, Urban Health Survey 2013 (2)

Table 4.12: Pregnancy Outcomes by Month, Urban HDSS 2016

Months	Pregnancy outcome					No. of live-born children			
	All	Miscarriage		Still-birth	Live birth	Both	Male	Female	Ratio
		Induced	Spon.						
January	206	15	14	5	172	172	77	95	0.81
February	167	8	14	6	139	139	72	67	1.07
March	191	13	31	3	144	144	78	66	1.18
April	195	11	27	7	150	150	73	77	0.95
May	180	22	16	8	134	134	64	70	0.91
June	204	11	21	8	164	164	85	79	1.08
July	205	12	26	5	162	162	89	73	1.22
August	247	12	16	10	209	209	117	92	1.27
September	199	4	22	5	168	168	83	85	0.98
October	262	13	17	4	228	228	107	121	0.88
November	238	9	21	5	203	203	112	91	1.23
December	236	10	22	3	201	201	107	94	1.14
Total	2530	140	247	69	2074	2074	1064	1010	1.05

Marriage and Divorce

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

Figure 4.3: Age-specific Fertility Rates (per 1,000 women), Urban HDSS 2016

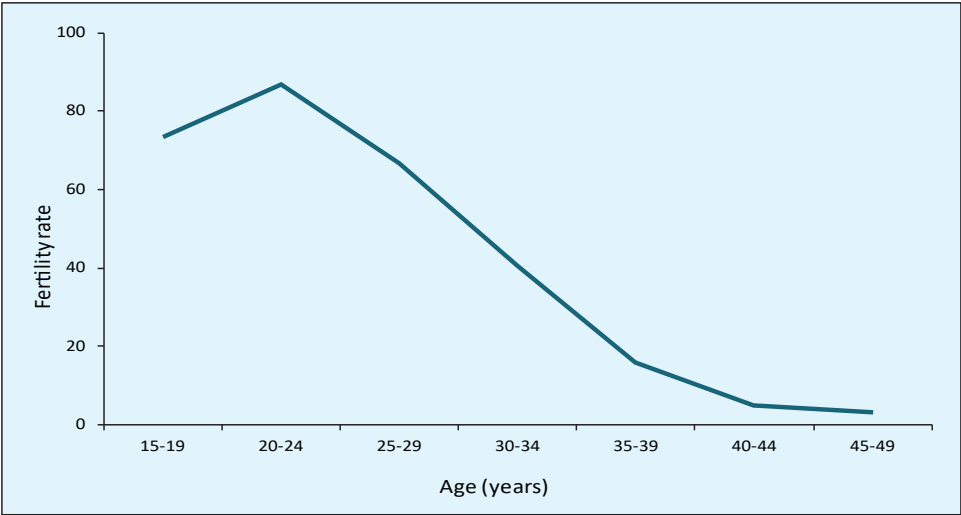
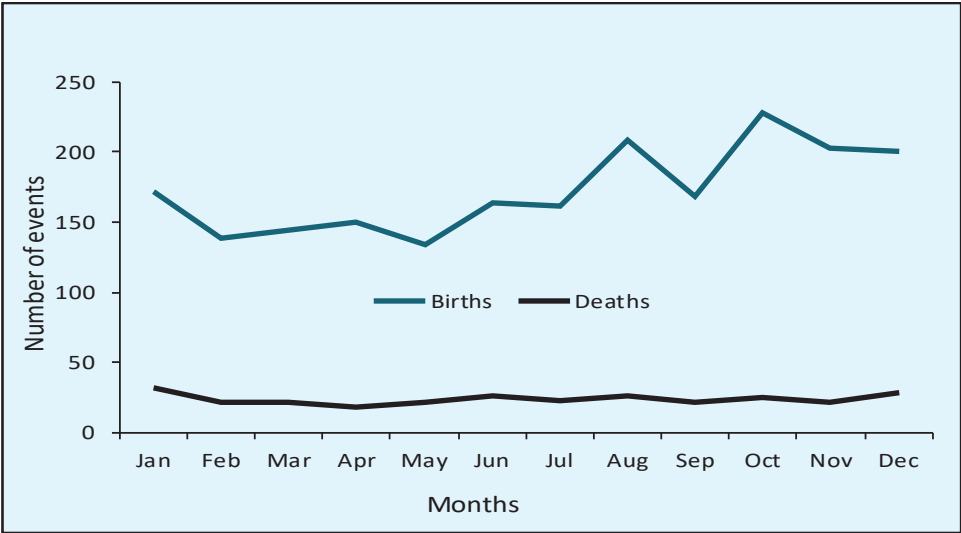


Figure 4.4: Number of Births and Deaths by Month, Urban HDSS 2016



The mean age at first marriage for brides was 17.5, which was 8.8% lower than the mean age at marriage recorded in the Matlab HDSS area (17.5 vs 19.2) (Table 4.13); and 45% of marriages took place before age 18 years. For grooms, the mean age at first marriage was 22.6, which was 16.9% lower than the mean age at marriage recorded in the Matlab HDSS area (22.6 vs 27.2) (Table 4.14); and 18% of all marriages registered in the surveillance system took place before age 20 years.

The mean age at divorce for brides was 21.6 (Table 4.15), and 51% per cent took place before age 20 years. For grooms, the mean age of divorce was 26.7 (Table 4.16), and 15% took place before age 20 years.

Table 4.13: Bride's Age at Marriage, Urban HDSS 2016

Age (years)	All bride	Previous marital status	
		Single	Ever married
10-14	8.4(144)	9.0(143)	0.8(1)
15-17	36.8(629)	39.2(621)	6.4(8)
18-19	36.9(631)	39.0(618)	10.4(13)
20-24	11.9(203)	10.4(165)	30.4(38)
25+	6.1(104)	2.5(39)	52.0(65)
Total	100.0(1711)	100.0(1586)	100.0(125)
Mean age at marriage		17.5(19.2*)	25.0

* Mean age at marriage in Matlab HDSS 2014 (1)

Table 4.14: Groom's Age at Marriage, Urban HDSS 2016

Age (years)	All groom	Previous marital status	
		Single	Ever married
15-19	18.1(309)	19.7(304)	3.0(5)
20-22	33.3(570)	35.9(555)	9.0(15)
23-24	11.9(204)	12.5(193)	6.6(11)
25-29	25.9(443)	26.0(402)	24.7(41)
30+	10.8(185)	5.9(91)	56.7(94)
Total	100.0(1711)	100.0(1545)	100.0(166)
Mean age at marriage		22.6(27.2*)	31.2

* Mean age at marriage in Matlab HDSS 2014 (1)

Table 4.15: Bride's Age at Divorce, urban HDSS 2016

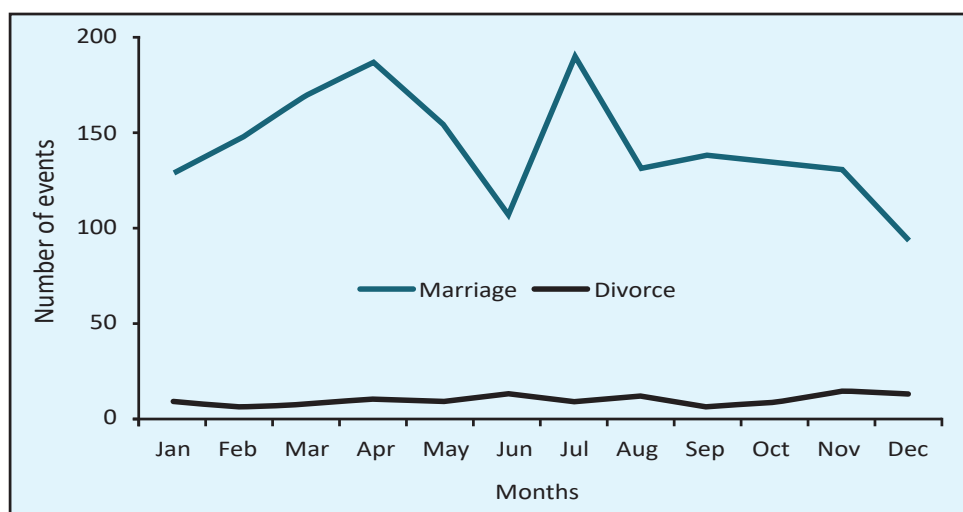
Age (Years)	Number	Percent
10-14	3	2.6
15-19	56	48.7
20-24	25	21.7
25-29	13	11.3
30+	18	15.7
Total	115	100.0
Mean age at divorce	21.6	-

Table 4.16: Groom's Age at Divorce, Urban HDSS 2016

Age (Years)	Number	Percent
<20	17	14.8
20-24	36	31.3
25-29	27	23.5
30+	35	30.4
Total	115	100.0
Mean age at divorce	26.7	-

Figure 4.5 shows the distribution of marriages and divorces by month. Marriages peaked in April and June, however no seasonal pattern was evident for divorce.

Figure 4.5: Number of Marriages and Divorces by Months, Urban HDSS 2016



Migration

During 2016, a total of 19,905 persons moved into the HDSS area resulting in in-migration rate of 159.5 and a total of 18,692 persons moved out of the HDSS area, resulting in out-migration rate of 149.8, while a total of 12,755 persons internally moved within the HDSS area resulting in internal-movement rate of 102.2 (per 1000 population).

Table 4.17 shows the distribution (per cent) of migrants by age, sex and direction. The highest incidence of in-migration (16.0%) occurred at age 15-19 while for out-migration, peak incidence occurred at age 25-29 (13.9%), and for internal-movement, peak incidence was among those aged 0-4 (13.7%). Overall, the incidence of in-migration, out-migration and internal-movement below age 30 varied between 8%-16%; however, over age 45 years incidence plummeted to between 0.7% and 3.1%).

Table 4.18 and Figure 4.6 show age-specific migration rates (per 1000 population) by direction. Overall, the highest rate of in-migration (230.9) occurred among those aged 20-24, however when disaggregated by sex, it was age 20-24 (257.7) for males and age 15-19 (281.1) for females. For out-migration, the peak rates also occurred in the 20-24 age group (192.9): for males it was age 25-29 (189.4), and for females it was age 15-19 (216.3). The height rate of internal-movement occurred at age 0-4 (133.1), which was consistent across males and females (136.7 vs 129.4). Figure 4.7 shows the number of population involved in in-migration, out-migration and internal-movement by sex and month. In fact, there is no systematic pattern of migration for each type by month, except low overall rates of migration in November and December.

In 43% cases, in-migration was a result of the decision to join family, followed by looking for work (41.2%) (Table 4.19). For out-migration, 47.5% of causes were due to joining family, followed by looking for work (25.6%) (Table 4.20); while for internal movement, 57.8% causes were due to marriage/joining family, followed by 'other' (33.8%) (Table 4.21).

Table 4.17: Distribution (per cent) of Migrants by Age, Sex and Direction, Urban HDSS 2016

Age (Years)	Both			Male			Female		
	In	Out	Internal	In	Out	Internal	In	Out	Internal
0-4	12.8	11.8	13.7	13.5	12.7	14.7	12.2	10.9	12.7
5-9	10.2	10.5	12.9	10.9	10.8	13.1	9.6	10.3	12.7
10-14	8.2	8.5	9.9	7.7	8.4	9.3	8.7	8.6	10.5
15-19	16.0	13.7	12.4	9.1	8.7	8.9	22.4	18.2	15.7
20-24	14.8	13.2	11.8	14.0	10.7	9.6	15.5	15.4	13.9
25-29	14.3	13.9	12.5	16.6	14.9	13.5	12.1	13.1	11.6
30-34	7.6	8.4	8.4	9.2	9.8	9.3	6.1	7.2	7.5
35-39	5.7	7.3	6.2	6.7	8.6	7.0	4.8	6.1	5.4
40-44	3.7	4.1	4.3	4.5	5.4	5.3	3.0	3.0	3.3
45-49	2.6	3.1	3.0	3.1	3.5	3.1	2.2	2.7	2.9
50-54	1.4	2.2	2.0	1.6	2.6	2.6	1.2	1.9	1.4
55-59	1.0	1.0	1.2	1.2	1.2	1.5	0.8	0.9	1.0
60-64	0.7	0.9	0.7	0.8	1.1	0.6	0.6	0.8	0.8
65+	1.0	1.3	1.0	1.1	1.6	1.4	0.9	1.0	0.6
Total(N)	19905	18692	12755	9561	8892	6200	10344	9800	6555

Table 4.18: Migration Rates (per 1,000 population) by Age, Sex and Direction, Urban HDSS 2016

Age (years)	In-migration			Out-migration			Internal-movement		
	M	F	Both	M	F	Both	M	F	Both
0-4	193.6	195.8	194.7	169.2	166.3	168.1	136.7	129.4	133.1
5-9	147.3	142.0	144.6	135.9	144.2	140.0	114.6	119.0	116.8
10-14	112.0	139.7	125.7	114.3	130.6	122.3	87.6	107.7	97.6
15-19	134.7	281.1	216.8	120.2	216.3	174.0	85.1	125.1	107.5
20-24	257.7	212.5	230.9	182.4	200.1	192.9	115.1	120.4	118.2
25-29	227.2	169.8	197.7	189.4	173.7	181.3	119.7	102.5	110.8
30-34	175.1	133.1	154.8	172.4	149.9	161.5	114.8	105.0	110.1
35-39	132.4	105.7	119.3	157.6	128.9	143.5	89.4	75.1	82.4
40-44	124.8	105.8	116.2	137.2	102.4	121.4	95.4	74.7	86.0
45-49	102.0	84.1	93.3	107.5	95.3	101.6	66.2	69.9	68.0
50-54	74.4	68.9	71.8	109.7	100.1	105.2	79.2	51.4	66.2
55-59	83.0	75.6	79.7	83.0	78.4	81.0	68.8	59.0	64.4
60-64	62.4	62.2	62.3	84.0	76.3	80.5	32.4	50.2	40.5
65+	58.6	74.7	65.4	82.7	77.8	80.6	50.5	33.0	43.1
Total	155.3	163.6	159.5	144.4	155.0	149.8	100.7	103.7	102.2

Note: M=Male, F=Female

Table 4.19: In-migration by Cause and Sex, Urban HDSS 2016

Cause of in -migration	Number			Percent		
	Both	Male	Female	Both	Male	Female
Looking for work	8197	4435	3762	41.2	46.4	36.4
To earn more money	1298	675	623	6.5	7.1	6.0
River erosion	441	219	222	2.2	2.3	2.1
To join family	8555	3707	4848	43.0	38.8	46.9
For children education	27	13	14	0.1	0.1	0.1
For own education	143	72	71	0.7	0.8	0.7
Marriage	592	111	481	3.0	1.2	4.7
Other	591	294	297	3.0	3.1	2.9
NA(since birth)	61	35	26	0.3	0.4	0.3
Total	19905	9561	10344	100.0	100.0	100.0

Table 4.20: Out-migration by Cause and Sex, Urban HDSS 2016

Cause of out-migration	Number			Percent		
	Both	Male	Female	Both	Male	Female
Looking for work	4777	2550	2227	25.6	28.7	22.7
To earn more money	588	319	269	3.1	3.6	2.7
To join family	871	4028	4843	47.5	45.3	49.4
For own education	168	72	96	0.9	0.8	1.0
Marriage	455	23	432	2.4	0.3	4.4
Divorce	51	15	36	0.3	0.2	0.4
Earning not sufficient	334	193	141	1.8	2.2	1.4
Others	3448	1692	1756	18.4	19.0	17.9
Total	18692	8892	9800	100.0	100.0	100.0

Note=Four transgender excluded

Table 4.21: Internal-movement by Cause and Sex, Urban HDSS 2016

Cause of internal - movement	Number			Percent		
	Both	Male	Female	Both	Male	Female
Work/economic	481	308	173	3.8	5.0	2.6
Marriage/join family	7377	3314	4063	57.8	53.5	62.0
Due to split	462	232	230	3.6	3.7	3.5
Merging family	121	51	70	0.9	0.8	1.1
Other	4314	2295	2019	33.8	37.0	30.8
Total	12755	6200	6555	100.0	100.0	100.0

Figure 4.6: Age and Sex-specific Migration Rates (per 1,000 population) by Direction, Urban HDSS 2016

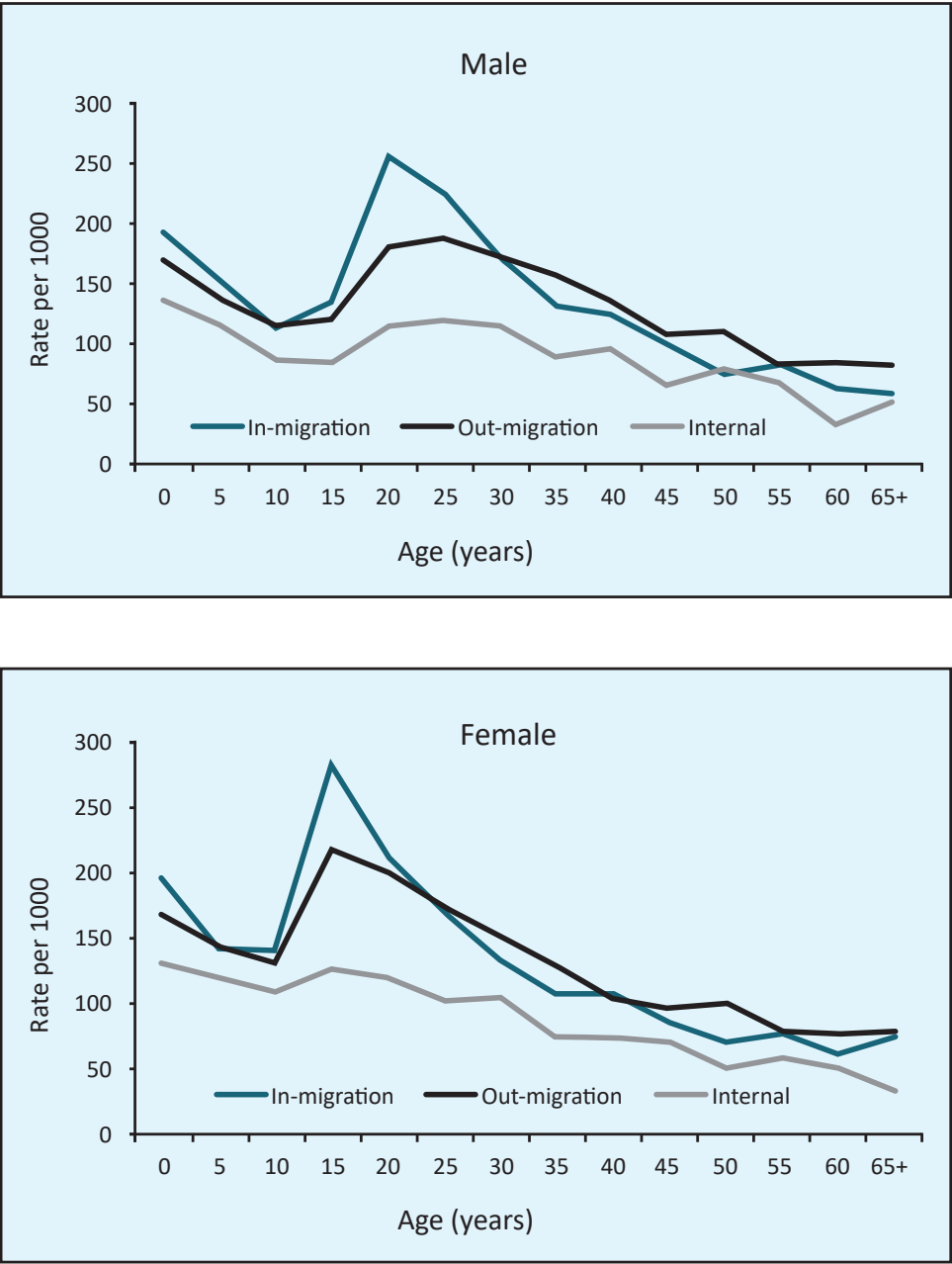
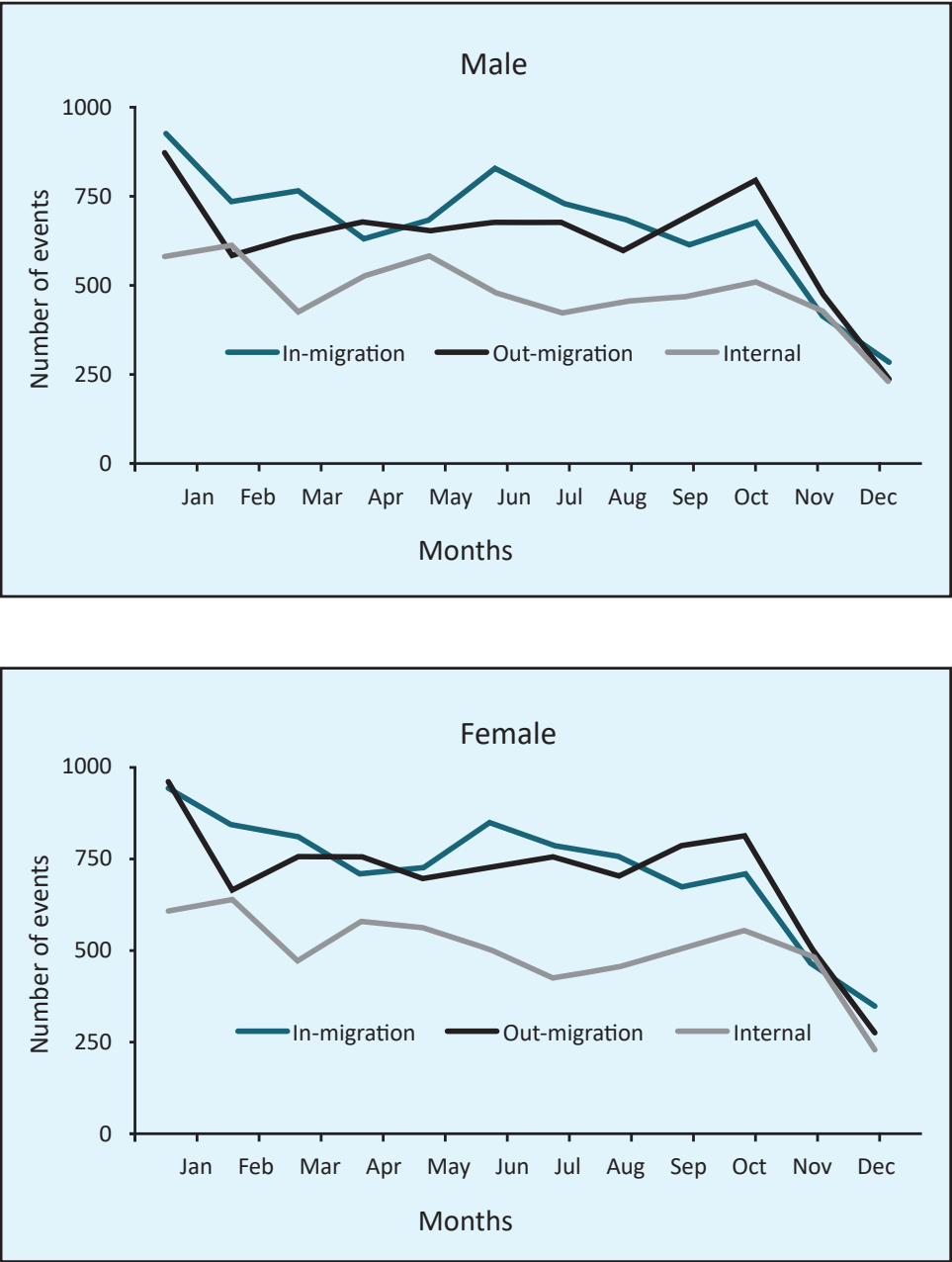


Figure 4.7: Number of In-migration, Out-migration and Internal-movement by Sex and Month, Urban HDSS 2016



Appendix 4.1: Mid-year Population by Age, Sex and Slum Location, Urban HDSS 2016

Age (years)	Karail		Mirpur		Dhalpur & Shampur		Tongi		Total
	Male	Female	Male	Female	Male	Female	Male	Female	
<1 year	427	402	243	241	175	159	375	410	2432
1	460	418	280	264	215	225	412	412	2686
2	457	457	256	233	196	154	385	371	2509
3	470	429	253	239	196	179	429	435	2630
4	435	414	228	219	207	173	405	400	2481
5 - 9	2577	2518	1423	1438	1001	1074	2374	2245	14650
10-14	2246	2062	1194	1274	895	921	2142	2177	12911
15-19	2156	2750	1227	1970	951	1091	2173	2864	15182
20-24	1920	2628	1041	1768	783	930	1738	2360	13168
25-29	2388	2372	1704	1639	930	917	2172	2394	14516
30-34	1682	1442	1052	934	600	639	1643	1615	9607
35-39	1529	1389	1004	940	624	608	1558	1550	9202
40-44	1084	909	707	520	469	361	1144	1030	6224
45-49	895	864	593	501	337	347	990	981	5508
50-54	639	523	331	271	274	229	729	728	3724
55-59	365	257	256	168	185	162	480	481	2354
60-64	328	230	179	127	184	137	451	473	2109
65-69	179	77	123	71	96	49	274	282	1151
70-74	137	82	60	23	102	42	293	274	1013
75-79	31	12	37	23	14	12	103	78	310
80-84	20	18	17	9	25	18	87	99	293
85+	17	10	8	7	5	12	38	60	157
Total	20442	20263	12216	12879	8464	8439	20395	21719	124817

Appendix 4.2: Death by Age and Slum Location, Urban HDSS 2016

Age (years)	Karail		Mirpur		Dhalpur & Shampur		Tongi		Total
	Male	Female	Male	Female	Male	Female	Male	Female	
<1 year	30	19	9	10	9	3	17	10	107
1	3	6	1	0	1	0	1	0	12
2	1	0	0	1	0	0	0	0	2
3	0	0	0	0	0	0	0	0	0
4	0	0	0	0	1	0	0	0	1
5 - 9	3	3	1	0	2	1	1	2	13
10-14	1	2	0	1	2	1	5	5	17
15-19	3	6	2	1	0	0	2	3	17
20-24	0	6	1	6	1	0	3	2	19
25-29	5	1	1	2	2	2	5	5	23
30-34	6	3	3	0	3	2	3	3	23
35-39	6	4	0	0	1	0	5	1	17
40-44	7	3	1	3	3	2	4	6	29
45-49	7	11	2	0	2	1	5	5	33
50-54	11	3	5	2	3	2	14	5	45
55-59	6	3	1	2	3	2	5	6	28
60-64	11	2	6	1	3	2	11	7	43
65-69	7	2	2	2	0	4	10	5	32
70-74	2	0	1	1	2	0	10	4	20
75-79	2	2	0	1	1	1	7	11	25
80-84	0	0	1	1	1	1	6	5	15
85+	2	1	0	0	1	3	6	9	22
Total	113	77	37	34	41	27	120	94	543

Appendix 4.3: Death by Month and Slum Location, Urban HDSS 2016

Months	Korail	Mirpur	Dhalpur & Shayampur	Tongi	Total
January	15	7	7	25	54
February	13	4	3	18	38
March	13	7	6	15	41
April	17	3	4	14	38
May	16	10	2	19	47
June	17	3	6	20	46
July	23	4	4	18	49
August	19	5	8	18	50
September	17	5	6	15	43
October	13	8	9	16	46
November	16	8	7	14	45
December	11	7	6	22	46
Total	190	71	68	214	543

Appendix 4.4: Pregnancy Outcome by Mother's Age and Slum Location, Urban HDSS 2016

Mother's age (Years)	Korail	Mirpur	Dhalpur & Shayampur	Tongi	Total
15-19	248	148	248	236	748
20-24	321	110	321	259	800
25-29	201	111	201	225	604
30-34	86	42	86	86	246
35-39	40	15	40	34	102
40-44	9	0	9	6	18
45+	5	5	5	2	12
Total	910	431	910	848	2530

Appendix 4.5: Pregnancy Outcome by Month and Slum Location, Urban HDSS 2016

Months	Korail	Mirpur	Dhalpur & Shayampur	Tongi	Total
January	60	33	60	84	206
February	49	35	49	61	167
March	59	32	59	69	191
April	69	30	69	72	195
May	81	27	81	60	180
June	81	30	81	61	204
July	86	26	86	65	205
August	84	45	84	84	247
September	80	36	80	53	199
October	87	43	87	89	262
November	82	40	82	80	238
December	92	54	92	70	236
Total	910	431	910	848	2530

Appendix 4.6: Marriage and Divorce by Month, Urban HDSS 2016

Months	Number		Per cent	
	Marriage	Divorce	Marriage	Divorce
January	130	9	7.6	7.8
February	147	6	8.6	5.2
March	169	7	9.9	6.1
April	187	10	10.9	8.7
May	154	9	9.0	7.8
June	106	13	6.2	11.3
July	190	8	11.1	7.0
August	131	11	7.7	9.6
September	138	6	8.1	5.2
October	134	9	7.8	7.8
November	131	14	7.7	12.2
December	94	13	5.5	11.3
Total	1711	115	100.0	100.0

Appendix 4.7: Number of In-migration, Out-migration and Internal-movement by Month and Sex, Urban HDSS 2106

Months	In-migration			Out-migration			Internal		
	Both	M	F	Both	M	F	Both	M	F
January	2024	994	1030	1918	912	1006	1057	518	539
February	1644	762	882	1275	595	680	1178	572	606
March	1631	794	837	1410	645	765	902	424	478
April	1406	660	746	1459	689	770	1117	531	586
May	1485	723	762	1433	698	735	1166	588	578
June	1817	896	921	1467	715	752	1007	492	515
July	1674	806	868	1527	721	806	895	446	449
August	1575	746	829	1408	658	750	980	488	492
September	1528	729	799	1651	775	876	1071	514	557
October	1839	883	956	1934	943	991	1194	567	627
November	1726	825	901	1549	737	812	1174	564	610
December	1556	743	813	1661	804	857	1014	496	518
Total	19905	9561	10344	18692	8892	9800	12755	6200	6555

M= Male, F=Female

Appendix 4.8: In-migration by Age and Slum Location, Urban HDSS 2016

Age (Year)	Korail	Mirpur	Dhalpur & Shayampur	Tongi	Total
0-4	815	831	478	427	2551
5-9	725	620	345	346	2036
10-14	557	537	275	263	1632
15-19	1067	986	533	595	3181
20-24	1077	956	457	454	2944
25-29	914	1012	396	521	2843
30-34	479	498	232	299	1508
35-39	328	401	183	225	1137
40-44	230	266	123	120	739
45-49	199	158	81	89	527
50-54	98	90	44	48	280
55-59	56	62	49	26	193
60-64	28	56	27	26	137
65+	43	64	37	53	197
Total	6616	6537	3260	3492	19905

Appendix 4.9: In-migration by Cause and Slum Location, Urban HDSS 2016

Cause	Korail	Mirpur	Dhalpur & Shayampur	Tongi	Total
Looking for work	3271	2870	1118	938	8197
To earn more money	84	387	599	228	1298
River erosion	25	396	10	10	441
For familial	2910	2575	1212	1858	8555
For chil dren education	8	8	9	2	27
For own education	22	49	22	50	143
Marriage	199	123	81	189	592
Other	97	128	186	180	591
NA(since birth)	0	1	23	37	61
Total	6616	6537	3260	3492	19905

Appendix 4.10: In-migration by Month and Slum Location, Urban HDSS 2016

Months	Korail	Mirpur	Dhalpur & Shayampur	Tongi	Total
January	616	739	326	343	2024
February	467	644	325	208	1644
March	526	581	235	289	1631
April	469	468	185	284	1406
May	595	468	199	223	1485
June	757	496	311	253	1817
July	691	530	267	186	1674
August	484	572	242	277	1575
September	495	594	186	253	1528
October	600	474	367	398	1839
November	446	545	342	393	1726
December	470	426	275	385	1556
Total	6616	6537	3260	3492	19905

Appendix 4.11: Out-migration by Age and Slum Location, Urban HDSS 2016

Age (Years)	Korail	Mirpur	Dhalpur & Shayampur	Tongi	Total
0-4	732	587	411	469	2199
5-9	554	596	375	446	1971
10-14	426	448	338	377	1589
15-19	579	761	525	689	2554
20-24	634	778	446	601	2459
25-29	647	879	445	637	2608
30-34	445	469	264	395	1573
35-39	353	421	249	344	1367
40-44	187	240	158	187	772
45-49	157	172	103	142	574
50-54	124	110	77	99	410
55-59	53	67	30	46	196
60-64	48	56	30	43	177
65+	63	52	54	74	243
Total	5002	5636	3505	4549	18692

Appendix 4.12: Out-migration by Cause and Slum Location, Urban HDSS 2016

Cause	Korail	Mirpur	Dhalpur & Shayampur	Tongi	Total
Looking for work	1420	2243	535	579	4777
To earn more money	212	90	135	151	588
Familial	2358	2137	1671	2705	8871
For own education	41	59	17	51	168
Marriage	112	98	62	183	455
Divorce	11	12	10	18	51
Could not earn sufficient money	230	5	12	87	334
Other	618	992	1063	775	3448
Total	5002	5636	3505	4549	18692

Appendix 4.13: Out-migration by Month and Slum Location, Urban HDSS 2016

Months	Korail	Mirpur	Dhalpur & Shayampur	Tongi	Total
January	599	589	274	456	1918
February	253	372	272	378	1275
March	402	383	229	396	1410
April	307	455	251	446	1459
May	436	395	264	338	1433
June	430	438	241	358	1467
July	382	526	297	322	1527
August	264	503	256	385	1408
September	311	502	417	421	1651
October	450	582	496	406	1934
November	476	432	251	390	1549
December	692	459	257	253	1661
Total	5002	5636	3505	4549	18692

Appendix 4.14: Internal-movement by Age and Slum Location, Urban HDSS 2016

Age (Years)	Korail	Mirpur	Dhalpur & Shayampur	Tongi	Total
0-4	425	511	358	450	1744
5-9	479	442	352	371	1644
10-14	343	391	216	317	1267
15-19	361	482	289	446	1578
20-24	372	452	293	390	1507
25-29	353	478	320	443	1594
30-34	317	330	176	249	1072
35-39	209	253	148	175	785
40-44	161	168	94	124	547
45-49	108	111	63	102	384
50-54	72	82	41	63	258
55-59	35	37	43	41	156
60-64	17	22	18	32	89
65+	24	24	28	54	130
Total	3276	3783	2439	3257	12755

Appendix 4.15: Internal-movement by Cause and Slum Location, Urban HDSS 2016

Cause	Korail	Mirpur	Dhalpur & Shayampur	Tongi	Total
Work/economic	315	42	5	119	481
Marriage/familial	1577	2727	1153	1920	7377
Other	1324	839	1129	1022	4314
Due to split	60	124	122	156	462
Due to Merge	0	51	30	40	121
Total	3276	3783	2439	3257	12755

Appendix 4.16: Internal-movement by Month and Slum Location, Urban HDSS 2016

Months	Korail	Mirpur	Dhalpur & Shayampur	Tongi	Total
January	262	308	227	260	1057
February	192	413	279	294	1178
March	229	284	181	208	902
April	298	317	209	293	1117
May	292	290	210	374	1166
June	286	322	187	212	1007
July	217	281	164	233	895
August	205	309	173	293	980
September	327	327	131	286	1071
October	282	323	294	295	1194
November	346	285	235	308	1174
December	340	324	149	201	1014
Total	3276	3783	2439	3257	12755

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Chapter 5

Slum Health in Motion: Migration and its Implications for Adult Health

Abdur Razzaque, Mohammad Nahid Mia, AHM Golam Mustafa, Razib Chowdhury, Mohammad Iqbal, SMA Hanifi, Shehrin Shaila Mahmood, Mohammad Zahirul Islam, Brian Chin & Abbas Bhuiya

Summary

This chapter explores the health outcomes of recent and long-term migrants living in the Urban Health and Demographic Surveillance area. Using the surveillance database, 1,100 respondents aged 18 years or more were selected randomly to examine whether long-term migrants are healthier than recent-migrants, and whether recent-migrants are healthier than the non-migrants.

Controlling for selected socio-demographic variables, the physical and mental health status of recent migrants was significantly better than long-term migrants, and for non-migrants compared to recent migrants. Moreover, the physical and mental health status of males was significantly better than females, for more educated compared to less educated, and for rickshaw puller/labourers versus 'other' occupations.

Introduction

Although international migrants typically face more formidable language and cultural challenges than do internal migrants, the adaptation required by internal migrants can be difficult, especially when they are undertaken outside one's usual social network. Migration impacts the place and household members left behind as well as the migrant's own well-being at their new destination. With respect to the effects on health, migration can induce stress (1) and the living circumstances of migrants might negatively impact health outcomes (2). Furthermore, moving to a different environment, e.g., an urban area with a different lifestyle and food consumption pattern, a higher elevation or a different climatic zone, can dramatically reduce or increase exposure to diseases (3). Migration might influence fertility, e.g., by stopping or reducing sexual intercourse between partners, or on the contrary, by exposing migrants to unprotected sex (4). So, the migration process and its consequences can affect migrants' health and well-being both positively and negatively.

There is evidence that international migrants of developed countries are not a random sample of their home country population (5, 6, 7).

Rather, research suggests that they are 'positively selected', that is of prime-aged, more educated, and in a better psychological and physical health than non-migrants (5, 6, 8). The 'healthy migrant hypothesis' postulates that migrants are typically a healthier subset of the population, compared to the average health status of their peers at both origin and destination (9, 10). These selection factors impede the attribution of post-migration differences in health status – when compared with non-migrant counterparts – to the effects of migration. However, barring a few exceptions, either weak support (11) or generally no support (12) for the 'healthy migrant hypothesis' has been documented.

Although a substantial number of studies have assessed health outcomes of immigrants in the developed world, much less attention has been paid to internal migrants of developing countries. However, with rapid urbanization, rural-urban migration is occurring in these contexts at even larger scales than international migration (13). Rural-urban migration has been documented to affect migrants' economic burdens and opportunities, present new environmental risks and benefits, provoke changes in cultural and social context, and provide access to resources (14). Based on longitudinal data from Thailand, Nauman et al. (14) supported the 'healthy migrant hypothesis' i.e., migrants are physically healthier than their non-migrant counterparts, both before and after moving to the city. However, Lu (15) reported that rural-urban labour migration increased the risk of psychological disorders and had little impact on physical health in the medium-term.

A two-stage relationship between health and migration has been proposed in the literature (14). Firstly, the health status of the population at origin may influence those who migrate and who stay – the aforementioned selection effects of health on migration. Secondly, during the migration process, new physical, social, and environmental conditions at the destination may impact migrants' physical and mental health status. This stage represents the effects of migration on health. It should be noted, however, that studies of the health effects of migration face methodological limitations, such as selection bias and lack of optimal comparison groups (15).

This study used Short Form-36 to assess the effects of rural-urban migration on perceived physical health and mental health of migrants aged 18 or more of selected slums of Dhaka (North & South) and Gazipur City Corporations. To examine whether long-term migrants are healthier than the recent-migrants (healthy-stay hypothesis), the

study compared the health status of recent-migrants with those of long-term migrants; while to examine whether recent-migrants are healthier than the non-migrants (healthy-migrants hypothesis), the study compared non-migrants with those of recent-migrants.

Methodology

Study Area

The data for this study come from selected slums of Dhaka (North & South), and Gazipur City Corporations that comprise icddr,b's Health and Demographic Surveillance System since 2016. In the baseline population and socioeconomic census of 2015, 121,912 people were living in 31,577 slum households in three locations (for details, see chapters 2 and 3). In these slums, 30% of household heads migrated-in within the previous 10 years, 24% of household heads migrated-in 10-19 years previous, 35% household heads migrated-in 20 or more years ago and 8.6% of household heads were born in Dhaka or Gazipur city. Most household heads migrated to the slum for work (62.4%), while 20% of household heads migrated to join family (for details, see Chapters 3 and 4).

Data

Using the database of icddr'b's urban HDSS, 1,100 respondents aged 18 years or more were selected randomly (550 males and 550 females) for this study. Data were collected by fifteen female Field Workers who were also involved in routine HDSS data collection. Each team consisted of a supervisor and five field workers; in most cases, Field Workers possessed a Bachelor's degree.

For the migration-health survey, Field Workers were trained for five days: three days in office (training on questionnaires, mock interview, and use of portable electronic data collection device), and two days for field practice. They were trained on questionnaire content and delivery, use of data collection devices, as well as interviewing skills and how to administer the consent form.

Data were collected using portable devices (tablets) equipped with data collection software. Consistency checks were incorporated into the software, and some logical checks were performed after loading/merging data files.

To identify households, Field Workers carried printouts of the household listing. Once a sample household was identified, Field Workers entered the slum name, area name, and household number into the tablet, and verified records. Field Workers explained objectives of the study and obtained a signed informed consent form if the respondent agreed to participate in the study.

Each day a Field Worker completed 4-5 interviews in addition to her regular job of routine HDSS data collection (3-month cycle). As many of the respondents work outside the home, Field Workers had to visit these households during lunch-time or in the evening. Data were collected between July-August 2016.

Questionnaires

Two types of questionnaires were used. The first focused on the background characteristics of respondents such as age, sex, marital status, education, occupation, and history of migration, while the second collected data on perceived physical and mental health status using Short Form-36 (SF-36). The SF-36 is derived from the Medical Outcomes Study (16, 17), which is a widely-used instrument for assessing functional health and well-being. Designed for use in clinical practice and research, health policy evaluations, and for monitoring the health of general populations, it includes one multi-item scale that assesses eight health concepts (Table 5.1): i) limitations in physical activities because of health problems; ii) limitations in social activities because of physical or emotional problems; iii) limitations in usual role activities because of physical health problems; iv) bodily pain; v) general mental health (psychological distress and well-being); vi) limitations in usual role activities because of emotional problems; vii) energy and fatigue; and viii) general health perceptions. These data provide a concise method for individuals to express their views about health outcomes that are important to them (17).

Scores: Physical health and mental health statuses

The study followed two-step scoring rules for physical and mental health status as per the RAND 36-item health survey 1.0 (17, 18). First, numeric values were recorded so that a high score indicates a better health state; scores represent the percentage of total possible score achieved. Then, items in the same scale were averaged to create 8-scale scores. Analyses of 8 different composite scales showed that reliability of these health measures were high except for mental health (Table 5.1).

These 8-scale scores were grouped into two summary health measures. The first, a mean physical health measure, consisted of five scales (physical functioning, role of physical health, bodily pain, general health perceptions, and energy/fatigue). The second summary which provides a mean mental health measure, consisted of three scales (social functioning, role of emotional health, and mental health). These summary measures ranged from 0 to 100 and were computed such that higher scores indicated better health outcomes.

Table 5.1: Reliability Analysis of Eight Different Composite Scales

Health status	Description	Cronbach's α	
		Urban HDSS	Matlab* HDSS
Physical functioning	Limitations in physical activity because of health problems; 10 items	0.86	0.85
Role-physical	Role limitations due to physical health problems; 4 items	0.89	0.96
Bodily pain	Bodily pain; 2 items	0.74	0.92
General health	General health perceptions; 5 items	0.85	0.78
Energy/vitality	Perceptions of energy and fatigue; 4 items	0.68	0.59
Social functioning	Limitations in social activities; 2 items	0.74	0.73
Role-emotional	Role limitations due to emotional problems; 3 items	0.86	0.94
Mental health	Positive and negative emotional states; 5 items	0.62	0.81

Note: *Ahmed et al. 2002 (19).

Statistical Analyses

Both bivariate and multivariate analyses were applied to measure the effects of migration on physical and mental health status, and to compare the status of recent, and long-term migrants, as well as recent migrants and non-migrants.

For bivariate analyses, mean scores of physical and mental health status were compared between recent-migrants and long-term migrants as well as between non-migrants and recent-migrants. Then, multiple linear regression models were applied to assess the effects of migration on physical as well as mental health. The outcome variables, mean physical health score and mean mental health score, were treated as continuous. The independent variable was migration status (recent-migrants, medium-term, long-term and non-migrants), while control variables were age, sex, marital status, education and occupation. Except for age, all other explanatory variables in the multivariate analyses were treated as dummies. Three models were fitted to see the effect of migration without control (Model I), effect of migration with only age as control (Model II), and effect of migration controlling for selected socio-demographic variables (Model III).

5.3 Results

Descriptive Results

Table 5.2 shows the distribution (per cent) of migrants and non-migrants by socio-demographic characteristics. Out of 1,017 respondents, 49.5% were male and 50.5% were female. Among the respondents, 23.8% were recent-migrants, 25.5% were medium-term migrants, 37.7% were long-term migrants, and 12.8% were non-migrants. The distribution of recent-migrants and long-term migrants differed significantly ($p < 0.05$) for age, sex, and education, but not for marital status and occupation; recent-migrants were older, had more females, and had more education. When comparing recent-migrants with non-migrants, the distribution differed significantly ($p < 0.05$) for each of the variables, i.e., age, sex, marital status, education and occupation; recent-migrants were older, had more females, had more married, had less education, and were more involved in occupations of rickshaw-puller/labourer.

Table 5.2: Distribution of Migrants and Non-migrants (per cent) by Socio-demographic Characteristics

Factors	Migration status					
	Recent migrants (n=242) (a)	Medium-term (n=261) (b)	Long-term (n=384) (c)	Non-migrant (n=130) (d)	p-values	
					axc	axd
Age (yrs)						
18-29	52.5	47.1	10.9	68.5		
30-49	32.2	35.8	37.3	26.9		
50+	15.3	17.1	51.8	4.6	p<0.05	p<0.05
Sex						
Male	41.3	45.6	55.5	56.2		
Female	58.7	44.4	44.5	43.8	p<0.05	p<0.05
Marital status						
Currently married	87.6	85.8	85.9	71.5		
Not currently married	12.4	17.2	14.1	28.5	ns	p<0.05
Education (yrs)						
<5	56.6	63.2	68.5	34.6		
5+	43.4	36.8	31.5	65.4	p<0.05	p<0.05
Occupation						
Service/business	27.7	29.9	27.9	39.2		
Labor/rickshaw puller	23.5	21.8	23.2	14.6		
Other	48.8	48.3	48.9	46.2	ns	p<0.05

Note: Recent-migrants= migrated within 10 years; Medium-term= Migrated between 10-19 years; Long-term= Migrated 20 or more years ago; Non-migrant= Born in city (Either in Dhaka or Gazipur); ns= not significant

Table 5.3 shows the physical and mental health status of recent, medium and long-term migrants, and non-migrants. Comparing recent-migrants to long-term migrants, measures of both physical health (63.1 vs 52.1) and mental health (64.4 vs 57.9) status were significantly better ($p<0.01$) for recent-migrants than long-term migrants. When comparing recent-migrants with non-migrants, measure of both physical health (63.1 vs 72.5) and mental health (64.4 vs 71.1) status were significantly better ($p<0.01$) for non-migrants than recent-migrants. In summary, both physical and mental health status was significantly better for recent-migrants than long-term migrants, and for non-migrants than recent-migrants.

Table 5.3: Physical and Mental Health Status⁺ of Migrants of Different Duration and Non-migrants

Health status	Migration status					p-values	
	Recent-migrants (n=242) (a)	Medium-term (n=261) (b)	Long-term (n=384) (c)	Non-migrant (n=130) (d)		axc	axd
Physical health	63.1±21.4	61.5±22.5	52.1±23.7	72.5±21.7		$p<0.01$	$p<0.01$
Mental health	64.4±17.3	63.3±17.9	57.9±19.4	71.1±17.2		$p<0.01$	$p<0.01$

Note: ⁺Mean scores; higher score indicates better health (range: 0-100); ns= not significant

Table 5.4 shows the physical and mental health status of recent, medium and long-term migrants, and non-migrants, disaggregated by age. When comparing recent-migrants and long-term migrants, physical health was slightly better for each age group of recent-migrants than long-term migrants. When comparing recent-migrants with non-migrants, non-migrants had significantly better physical health ($p<0.01$) than recent-migrants for age group 18-29, but slightly better health for age groups 30-49 and 50 or more. For mental health status, measures appeared also somewhat better for each age group of recent-migrants compared to long-term migrants, but achieved statistical significance ($p<0.01$) only for migrants aged 50 or more years. Compared to recent-migrants, non-migrants had significantly better mental health ($p<0.01$) for age group 18-29, but slightly better health for age groups 30-49 and 50 or more. In summary, when comparing the physical and mental health status of different age groups, measures were slightly better for recent-migrants than long-term migrants, and also slightly better for non-migrants than recent-migrants.

Table 5.3 shows the physical and mental health status of recent, medium and long-term migrants, and non-migrants. Comparing recent-migrants to long-term migrants, measures of both physical health (63.1 vs 52.1) and mental health (64.4 vs 57.9) status were significantly better ($p<0.01$) for recent-migrants than long-term migrants. When comparing recent-migrants with non-migrants, measure of both physical health (63.1 vs 72.5) and mental health (64.4 vs 71.1) status were significantly better ($p<0.01$) for non-migrants than recent-migrants. In summary, both physical and mental health status was significantly better for recent-migrants than long-term migrants, and for non-migrants than recent-migrants.

Table 5.3: Physical and Mental Health Status⁺ of Migrants of Different Duration and Non-migrants

Health status	Migration status					
	Recent-migrants (n=242) (a)	Medium - term (n=261) (b)	Long-term (n=384) (c)	Non-migrant (n=130) (d)	p-values	
					axc	axd
Physical health	63.1±21.4	61.5±22.5	52.1±23.7	72.5±21.7	p<0.01	p<0.01
Mental health	64.4±17.3	63.3±17.9	57.9±19.4	71.1±17.2	p<0.01	p<0.01

Note: ⁺Mean scores; higher score indicates better health (range: 0-100); ns= not significant

Table 5.4 shows the physical and mental health status of recent, medium and long-term migrants, and non-migrants, disaggregated by age. When comparing recent-migrants and long-term migrants, physical health was slightly better for each age group of recent-migrants than long-term migrants. When comparing recent-migrants with non-migrants, non-migrants had significantly better physical health ($p<0.01$) than recent-migrants for age group 18-29, but slightly better health for age groups 30-49 and 50 or more. For mental health status, measures appeared also somewhat better for each age group of recent-migrants compared to long-term migrants, but achieved statistical significance ($p<0.01$) only for migrants aged 50 or more years. Compared to recent-migrants, non-migrants had significantly better mental health ($p<0.01$) for age group 18-29, but slightly better health for age groups 30-49 and 50 or more. In summary, when comparing the physical and mental health status of different age groups, measures were slightly better for recent-migrants than long-term migrants, and also slightly better for non-migrants than recent-migrants.

Table 5.5: Physical and Mental Health Status⁺ of Migrants of Different Duration and Non-migrants Disaggregated by Sex

Health status	Migration status					
	Recent-migrants (a)	Medium-term (b)	Long-term (c)	Non-migrant (d)	p-values	
					axc	axd
Male						
	(n=100)	(n=119)	(n=213)	(n=73)		
Physical health	65.5±20.2	66.1±22.5	57.1±22.8	78.6±18.8	p<0.01	p<0.01
Mental health	65.6±15.6	66.8±17.8	60.9±18.8	73.7±16.3	p<0.05	p<0.01
Female						
	(n=142)	(n=142)	(n=171)	(n=57)		
Physical health	61.3±21.9	57.5±21.8	45.9±23.3	64.6±22.7	p<0.01	ns
Mental health	63.4±18.4	60.2±17.4	54.2±19.5	67.8±17.8	p<0.01	ns

Note: ⁺Mean scores; higher score indicates better health (range: 0-100)

Table 5.6 shows the physical and mental health status of recent, medium and long-term migrants, and non-migrants disaggregated by marital status. Physical health was significantly better ($p<0.01$) for recent-migrants than long-term migrants for the currently married, and was slightly better for those currently unmarried. When recent-migrants were compared with non-migrants, non-migrants had significantly better physical health ($p<0.05$) for each marital status group. For the currently married, mental health was significantly better ($p<0.01$) for recent-migrants than long-term migrants and only slightly better for not currently married. Compared to recent-migrants, non-migrants had significantly better mental health ($p<0.05$) for each marital status group. In summary, measures of physical and mental health were usually significantly better for recent-migrants than long-term migrants, and for non-migrants than recent-migrants irrespective of marital status.

Table 5.7 shows the physical and mental health status for recent, medium and long-term migrants, and non-migrants disaggregated by education. Physical health was significantly better ($p<0.01$) for each education group of recent-migrants compared to long-term migrants. Non-migrants had significantly better physical health ($p<0.01$) than recent migrants among those reporting less than 5-years schooling, but slightly better health among those with 5-years or more schooling. Mental health was significantly better ($p<0.01$) for each education group of recent-migrants compared to long-term migrants. Compared to recent-migrants, non-migrants had significantly better mental health ($p<0.01$) among those reporting less than 5-years schooling and slightly better mental health for those with 5-years or more

schooling. In summary, measures of physical and mental health were usually significantly better for recent-migrants than long-term migrants, and for non-migrants than recent-migrant across education groups.

Table 5.6: Physical and mental health status⁺ of migrants of different duration and non-migrants disaggregated by marital status

Health status	Migration status					
	Recent migrants (a)	Medium-term (b)	Long-term (c)	Non-migrant (d)	p-values	
					axc	axd
Currently married						
	(n=212)	(n=224)	(n=330)	(n=93)		
Physical health	64.1±20.7	61.4±21.9	52.9±23.4	69.3±21.6	p<0.01	p<0.05
Mental health	65.4±16.9	63.6±17.2	58.6±19.5	69.5±18.1	p<0.01	p<0.05
Not currently married						
	(n=30)	(n=37)	(n=54)	(n=37)		
Physical health	55.5±24.2	61.3±26.3	47.1±24.6	80.5±20.1	ns	p<0.01
Mental health	56.4±18.4	60.9±21.5	54.1±18.4	75.0±14.1	ns	p<0.01

Note: ⁺Mean scores; higher score indicates better health (range: 0-100); ns= not significant

Table 5.7: Physical and Mental Health Status⁺ of Migrants of Different Duration and Non-migrants Disaggregated by Education

Health status	Migration status					
	Recent-migrants (a)	Medium - term (b)	Long-Term (c)	Non-migrant (d)	p-values	
					axc	axd
Schooling less than years						
	(n=137)	(n=165)	(n=263)	(n=45)		
Physical health	57.3±22.0	58.9±22.3	49.1±23.2	71.1±22.4	p<0.01	p<0.01
Mental health	61.8±17.7	62.1±18.2	55.3±18.8	71.6±17.8	p<0.01	p<0.01
Schooling 5 or more years						
	(n=105)	(n=96)	(n=121)	(n=85)		
Physical health	70.5±17.9	65.7±21.6	58.6±23.5	73.2±22.4	p<0.01	ns
Mental health	67.6±16.2	65.3±17.2	63.6±19.3	70.8±16.9	p<0.09	ns

Note: ⁺Mean scores; higher score indicates better health (range: 0-100); ns= not significant

Table 5.8 shows the physical and mental health status for recent, medium and long-term migrants, and non-migrants disaggregated by occupation. Physical health was significantly better ($p<0.01$) for each occupation group of recent-migrants compared to long-term migrants except for the rickshaw-puller/labourer category which was only slightly better. Non-migrants had significantly better physical health ($p<0.05$) than recent-migrants for each occupation group. Mental health was significantly better ($p<0.01$) for each occupation group of recent-migrants compared to long-term migrants, except for the rickshaw-puller/labourer category which was only slightly better. Compared to recent-migrants, non-migrants had significantly better mental health ($p<0.01$) for each occupation group except for service/business, which was only slightly better. In summary, measures of physical and mental health status were usually significantly better for recent-migrants than long-term migrants, and for non-migrants than recent-migrants for each occupation group.

Table 5.8: Physical and Mental Health Status⁺ of Migrants of Different Duration and Non-migrants Disaggregated by Occupation

Health status	Migration status				p-values	
	Recent - migrants (a)	Medium - term (b)	Long - term (c)	Non - migrant (d)	axc	axd
Service/business						
	(n=67)	(n=78)	(n=107)	(n=51)		
Physical health	68.7±20.9	64.3±22.2	58.2±23.0	75.1±20.9	$p<0.01$	$p<0.05$
Mental health	67.4±17.9	65.7±18.7	62.5±19.6	71.9±17.3	$p<0.09$	ns
Rickshaw puller/labor						
	(n=57)	(n=57)	(n=89)	(n=19)		
Physical health	63.9±18.4	65.7±20.3	61.5±20.7	81.0±15.0	ns	$p<0.01$
Mental health	64.5±15.4	66.1±16.5	63.0±17.1	76.1±10.3	ns	$p<0.01$
Others						
	(n=118)	(n=126)	(n=188)	(n=60)		
Physical health	59.4±22.3	57.7±23.0	44.2±22.7	67.6±23.1	$p<0.01$	$p<0.05$
Mental health	62.5±17.7	60.4±17.6	53.0±19.1	68.8±18.6	$p<0.01$	$p<0.05$

Note: ⁺Mean scores; higher score indicates better health (range: 0-100); ns= not significant

Multivariate Results

Table 5.9 shows the effect of migration status on physical health status using three models: 1) without control variable (Model I), 2) only age as control (Model II), and 3) controlling for all variables in the model (Model III). Model I shows that physical health status was significantly worse ($p<0.01$) for long-term migrants than recent-migrants.

Controlling for age, Model II shows that physical health status was slightly worse ($p<0.20$) for long-term migrants than recent-migrants, while Model III shows that physical health status was significantly worse for long-term migrants than recent-migrants ($\beta=-2.90$, $p<0.10$) controlling for all variables in the model. When considering comparisons between recent and non-migrants, Models I and II show that non-migrants had significantly ($p<0.01$) better health than recent-migrants. This association prevails even when controlling for all variables in Model III, which indicates that non-migrants had significantly better health than recent-migrants ($\beta=4.37$, $p<0.05$).

Table 5.9: Effect of Rural-urban Migration on Physical Health, Controlling for Socio-demographic Characteristics

Factors	Model I (β , 95% CI)	Model II (β , 95% CI)	Model III (β , 95% CI)
Constant	63.09** (60.2, 65.9)	82.74** (78.4, 87.0)	76.67** (69.1, 84.2)
Age of respondent (cont)		-0.61** (-0.7, -0.5)	-0.63** (-0.7, -0.5)
Migration status			
Long-term (ref=recent-migrants)	-10.95** (-14.5, -7.3)	-2.55 ⁺ (-6.2, 1.1)	-2.90 ⁺ (-6.4, 0.65)
Medium-term (ref=recent-migrants)	-1.62 (-5.5, -2.3)	-0.58 (-4.3, 3.1)	-0.61 (-4.1, 2.95)
Non-migrants (ref=recent-migrants)	9.41** (4.5, 14.2)	6.45** (1.8, 11.0)	4.37* (-0.1, 8.8)
Sex			
Male (ref=Female)			8.19** (4.7, 11.6)
Marital status			
Currently marr (ref=Not currently married)			0.93 (-2.5, 4.4)
Education (years of schooling)			
Five or more yrs (ref=Less than five yrs)			4.07** (1.3, 6.8)
Occupation			
Service/busin (ref=Rickshaw puller/labor)			-1.22 (-4.8, 2.4)
Others (ref=Rickshaw puller/labor)			-6.05** (-10.2, -1.8)
Regression - sum of square (df)	46853.62 (3)	105852.43 (4)	149901.9 (9)
R ²	0.08	0.19	0.26

Note: * $p<0.01$; ** $p<0.05$; + $p<0.10$; ++ $p<0.20$

Model III also shows that physical health status significantly worsened with increasing age group ($\beta=-0.63$, $p<0.05$), and was significantly better for males versus females ($\beta=8.19$, $p<0.05$), the more educated versus less educated ($\beta=4.07$, $p<0.05$), and in occupation rickshaw-puller/labourers versus other groups ($\beta=-6.05$, $p<0.05$).

In summary, multivariable modelling confirmed that physical health status was significantly better for recent-migrants than long-term migrants, and for non-migrants than recent-migrants. It also showed that physical health status was significantly better for males than females, for more educated than less educated, and for the rickshaw puller/labourer compared to the 'other' occupation category. It should also be noted that the variance (R^2 value) in physical health status was explained and increased from 8% in Model I to 19% in Model II when age was included, and finally to 26% when all socio-demographic variables were included (Model III).

Table 5.10 shows three models testing the effect of migration status on mental health status: 1) without control variable (Model I), 2) only age as control (Model II), and 3) controlling for all variables (Model III). Model I shows that mental health status was significantly worse ($p<0.01$) for long-term migrants than recent-migrants. Model II shows that mental health status was slightly worse ($p<0.20$) for long-term migrants than recent-migrants, while Model III shows that mental health status was slightly worse for long-term migrants than recent-migrants ($\beta=-2.17$, $p<0.20$). Models I and II show that non-migrants had significantly ($p<0.01$) better mental health than recent-migrants, while Model III shows that non-migrants had significantly better health than recent-migrants ($\beta=4.28$, $p<0.05$).

Model III also shows that mental health status deteriorated significantly with increasing age group ($\beta=-0.32$, $p<0.01$), but was significantly better for males than females ($\beta=4.35$, $p<0.01$), for the more educated than less educated ($\beta=2.69$, $p<0.05$), and for rickshaw-puller/labours versus 'other' occupation groups ($\beta=-3.64$, $p<0.05$).

In summary, mental health status was significantly better for recent-migrants than long-term migrants, and for non-migrants than recent-migrants. Moreover, mental health status was significantly better for males than females, for the more educated than less educated, and for rickshaw puller/labourer versus the 'other' occupation category. For Model I, 5% of the variance (R^2 value) in mental health status could be explained. This was increased to 9% when age was included in this model (Model II), and to 14% when all socio-demographic variables were included (Model III).

Table 5.10: Effect of Rural-urban Migration on Mental Health, Controlling for Socio-demographic Characteristics

Factors	Model I (β , 95% CI)	Model II (β , 95% CI)	Model III (β , 95% CI)
Constant	64.36** (62.0, 66.6)	74.54** (70.9, 78.1)	68.79** (62.3, 75.2)
Age of respondent (cont)		-0.32** (-0.4, -0.2)	-0.32** (-0.4, -0.2)
Migration status			
Long-term (ref=recent-migrants)	-6.37** (-9.3, -3.4)	-2.02 ⁺ (-5.1, 1.0)	-2.17 ⁺ (-5.2, 0.8)
Medium-term (ref=recent-migrants)	-1.07 (-4.2, 2.1)	-0.54 (-3.6, 2.5)	-0.50 (-3.5, 2.5)
Non-migrants (ref=recent-migrants)	6.77** (2.8, 10.6)	5.23** (1.4, 9.0)	4.28* (0.4, 8.1)
Sex			
Male (ref=Female)			4.35** (1.3, 7.3)
Marital status			
Currently marr (ref=Not current married)			2.41 (-0.5, 5.4)
Education (years of schooling)			
Five or more yrs (ref=Less than five years)			2.69* (0.3, 5.0)
Occupation			
Service/busin (ref=Rickshaw puller/labor)			-0.08 (-3.2, 3.0)
Others (ref=Rickshaw puller/labor)			-3.64* (-7.2, -0.1)
Regression - sum of square (df)	18519.45 (3)	34344.10 (4)	50729.62 (9)
R ²	0.05	0.09	0.14

Note: *p<0.05; **p<0.01; +p<0.10; ++p<0.20

Discussion and Conclusion

Studies measuring the effects of migration on health suffer due to selection bias as well as lack of an optimal comparison group. The 'healthy migrant hypothesis' suggests that migrants are healthier before they move compared to those who stay at origin. To overcome the issue of selection bias, a longitudinal study design is required that would compare the health condition of pre-migrants (origin) and post-migrants (destination) with adequate control variables. Our cross-sectional study did not include a pre-migration measure, but rather focused on the long-term effects of migration (healthy stay) by comparing recent-migrants with long-term migrants. To shed further light on the 'healthy migrant hypothesis', the study also compared recent-migrants with non-migrants with a similar socioeconomic background.

After controlling for selected socio-demographic characteristics, our study consistently documented better measures of both physical and mental health status among recent-migrants compared to long-term migrants. This finding demonstrates that as migrants stay longer in the slum; their physical health and mental health worsens. This could be due to stress, the nature and duration of work, adverse exposures due

to inadequate housing and water-sanitation, or to differences in socio-cultural context. Supporting this hypothesis are previous studies documenting increased risk of psychological disorders with rural-urban labour migration (15). While migration improved physical health in the immediate-term, it is likely that the accumulation of work-related stresses, barriers to health care utilization and the high cost of urban living take their toll, especially given that substantial remittances are often sent to left-behind family members.

Our results also show that both physical and mental health status of non-migrants were better than those of recent-migrants. These findings contradict previous findings on US immigrants (6), and rural-urban migration in Thailand (14), where pre-migration health was better for recent-migrants than those of non-migrants at destination, but correspond to some extent with findings from Indonesia (15). These differences may be a function of the different socioeconomic context of migrants in this study, but warrant further exploration.

This study further documents that measures of both physical and mental health status were better for males, the more educated, and rickshaw-puller/labourers compared to females, the less educated, and 'other' occupational categories. Higher morbidity for females than males among the adult population has also been documented in the Matlab HDSS area in rural Bangladesh (20). As regards the health effect of education, while the adoption of western lifestyles that often accompany greater educational opportunity may increase susceptibility to non-infectious disease (21), greater awareness about health promotion and disease prevention are conducive to better health outcomes. The comparatively better health status of rickshaw-pullers/labourers versus the "other" occupation category may be a function of their need for good health as their earnings depend on it.

The observation that the health status of recent-migrants is worse than non-migrants and gets worse as they live longer in the slum, has important implications for the urban health care delivery system. Currently, public systems of primary care are limited in urban areas, and largely focused on maternal, child health, and family planning. It is therefore recommended that health care services be expanded to meet the needs of all migrants, including both males and females and all age groups.

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Chapter 6

Non-communicable Disease Risk Factors in Urban Slums

Abdur Razzaque, Razib Chowdhury, AHM Golam Mustafa, Mohammad Iqbal, SMA Hanifi, Shehrin Shaila Mahmood, Md. Abdul Hakim Majumder, Mohammad Zahirul Islam & Brian Chin

Summary

This chapter explores non-communicable disease risk factors in poor urban settlements using the WHO STEPwise approach to surveillance (STEPS). Based on a random sample of 2,200 respondents aged 25-64 living in the Urban Health and Demographic Surveillance area, study results indicated that smoking was very high among males (65.3%), negligible for females (1.9%) and decreased with age. Consumption of smokeless tobacco was higher for females than males (41.8% vs 36.7%) and also decreased with age. Exercise (4.4% vs 4.4%) and alcohol consumption (4.0% vs 0.5%) were low for both males and females. Vigorous physical activity (work) was higher for males than females (51.8% vs 21.2%), but moderate physical activity was similar (79.8% vs 79.3%). Consumption of vegetables (average days per week) was high for both males and females (6.5 vs 6.7) but consumption of fruit (average days per week) was low (2.3 vs 2.3). Both blood pressure (20.1% vs. 10.7%) and diabetes (7.5% vs. 5.0%) were more prevalent among females than males and increased with age. Smoking decreased with greater education for males, but increased for females, and tended to decrease with increasing household wealth. Smokeless tobacco consumption decreased with increasing education and wealth. High blood pressure increased with education for males but not for females. Diabetes was usually higher for educated and wealthier households than their less educated and poorer counterparts.

Introduction

The human, social and economic consequences of NCD risk factors are being experienced in populations worldwide, but their impact is particularly severe in low- and middle-income countries. Globally, a total of 56 million people died from all causes in 2012; 38 million (68%) of these deaths were attributable to chronic diseases (1). More than 40% of them (16 million) were premature deaths under age 70 years. Almost three-quarters of all non-communicable deaths (28 million) and the majority of premature deaths (82%) occurred in low- and middle-income countries. In fact, many developing countries are struggling with both old and new infectious disease epidemics and also having to confront an emerging epidemic of NCDs.

The rise in NCDs is largely due to four behavioral risk factors: tobacco use, unhealthy diet, insufficient physical activity, and harmful use of alcohol (2). Nearly 80% of the world's one billion smokers live in lower middle income countries that account for 3.4 million deaths, and these are projected to double by 2030 (3). Globalization and urbanization are making processed foods– high in refined starch, sugar, salt and unhealthy fats– cheaply available to consumers and encouraging sedentary lifestyles in these regions (4). This has given rise to escalating rates of overweight and obesity in the developing world (5). World Economic Forum estimates that by 2030, the global cost for NCDs will reach \$47 trillion dollars, confirming that their threat to both global health and the global economy is among our greatest twenty-first century challenges (6).

Although the burden of common NCDs is increasing, risk factors such as smoking, alcohol use, high blood pressure, and overweight/obesity are highly preventable⁹. It has been documented that at least 80% of heart diseases, stroke, and type-2 diabetes, and 40% of cancers could be avoided through healthy diet, regular physical activity, and avoidance of tobacco (7); studies have also reported that overweight/obesity poses a major risk for chronic diseases (8).

Like many developing countries, Bangladesh is also going through a rapid demographic and epidemiological transition. Hospital records (9) as well as data from the Health and Demographic Surveillance System of Matlab (10), Chakaria (11) and urban slum areas under icddr's surveillance system (12) indicate that deaths due to NCDs are increasing; however to anticipate an epidemic of NCDs, risk factor data should be collected at regular intervals (13).

The NCD risk factor survey was designed to collect baseline information on the major risk factors among slum population in the urban HSSD area using the WHO STEPS. The objective of the study was to examine the prevalence of major risk factors of chronic diseases (smoking, smokeless tobacco, alcohol, exercise, diet, physical activity (work), high blood pressure and diabetes) and to examine some of these risk factors by selected socio-demographic variables.

⁹Among the modifiable risk factors such as unhealthy diet, physical inactivity, alcohol and tobacco use are categorized as primary risk factors; while overweight, raised blood pressure, raised total cholesterol levels and raised blood glucose are categorized as intermediate risk factors.

Data and Methods

Study Area

The data for this study come from selected slums of Dhaka (North & South), and Gazipur City Corporations, where icddr,b has been operating a Health and Demographic Surveillance System since 2016. In the baseline population and socioeconomic census of 2015, 121,912 people were living in 31,577 slum households in three locations (for details, see Chapters 2 and 3).

Data

A sample of 2,200 respondents aged 25-64 years (1,100 each, male and female) were selected randomly from the urban HDSS database and 1,986 respondents were interviewed successfully. Three attempts to reach absentees were made, and if unsuccessful, they were excluded from the study.

Field Workers involved in survey administration received training over five days: three days in office (training on questionnaires, mock interview, and use of portable Android-based Tablet), and two days for field practice. Training focused on data collection instrument, data collection device, and on interviewing skills and administering the consent form.

Data were collected using the Tablet equipped with data collection software. Once a household was identified, Field Workers entered the slum name, area name and household number into the Tablet and verified records. After respondents were identified and confirmed, Field Workers explained objective of the NCD study and requested that an informed consent form be signed, if he/she agreed to provide information.

Each day a Field Worker completed 3-4 interviews in addition to her routine HDSS data collection. Data were collected during January-February 2017. About 2% of the sample was checked by the Supervisors, and feedback was given to the respective Field Workers to improve ongoing data quality.

Defining Risk Factors

Tobacco Use: Data were collected on smoking and consumption of smokeless tobacco (tobacco leaf, goul, noshi and zorda). Respondents were asked whether they knew that smoking and consumption of smokeless tobacco is harmful to health. They were asked whether they smoke and/or consume smokeless tobacco daily, occasionally, ex-smoker/consumer and never smoked/ consumed. We considered here daily and occasional smoker/ consumer as a current smoker/ consumer.

Alcohol Consumption: Respondents were asked whether they knew that alcohol consumption is harmful to health. Alcohol consumption was measured by asking respondents whether they consumed alcohol daily, occasionally, were a previous consumer or never consumed. We considered daily and occasional alcohol consumers as a current consumer.

Diet (Vegetable and Fruit): Respondents were asked how important it is for them to eat vegetables and fruit every day. Then they were asked how many days they ate vegetables and fruit in a typical week.

Physical Exercise: Respondents were asked whether they do exercise, and if yes, how many days they do exercise in a typical week.

Physical Activity (Work related): Physical activity was defined as any bodily movement that requires energy expenditure. Physical activity was categorized into vigorous and moderate activity. A vigorous-intensity activity was defined as any activity that causes a large increase in breathing or heart rate if continued for at least 10 minutes every day (e.g. running, carrying or lifting heavy loads, digging or construction work). Moderate-intensity activity was defined as any activity that causes a small increase in breathing or heart rate if continued for at least 10 minutes every day (brisk walking or carrying light loads).

High Blood Pressure (Reported): Respondents were asked whether they knew anything about blood pressure and the categories were 'knew nothing', 'something', and 'very familiar'. To estimate the prevalence of high blood pressure, respondents were asked whether a health professional had diagnosed them with high blood pressure. If yes, the respondent was asked whether s/he was taking any medicine to control blood pressure and the source of that medicine. If diagnosed but not taking medicine, the respondent was asked about the reasons for this decision.

Diabetes (Reported): Respondents were asked whether they knew anything about diabetes and the categories were 'knew nothing', 'something', and 'very familiar'. For identifying the prevalence of diabetes, respondents were asked whether health professional ever told that s/he had diabetes. If yes, then asked whether s/he was taking any medicine to control diabetes and also asked the reason for not taking, and the source of the medicine.

Analyses

Both bivariate and multivariate analyses were carried out. In bivariate analyses, percentages were calculated to examine levels of outcome variables. Multivariate logistic regression was used to model the associations between the outcome variables and selected socio-demographic factors.

In multivariate analyses, the dependent variables were currently smoking, consumption of smokeless tobacco, high blood pressure, and diabetes; these variables were treated as dummies. The independent variables included age, education, occupation, and household wealth quintile. Individuals were grouped into 4 age categories (25-34, 35-44, 45-54, and 55-64 years). Level of education was determined by the reported number of years a respondent completed in any educational institution run under the national curriculum, and grouped into 3 categories: no education/illiterate, 1-5 years, and 6 or more years of schooling. Occupation of the respondent was an open-ended question and later recoded. Male respondents employed in laborious work; for example, skilled and unskilled labour, were classified into one group; those engaged in government and non-government job or engaged in business were treated as another group. A total of 4 categories were applied: labourer, rickshaw puller, service/ business, and others. For females, the categories included labourer, housewife, service/business, and others.

Household economic status was indicated by constructing a wealth index using asset ownership as validated by Filmer and Pritchett (14). This wealth index was calculated based on ownership of the number of consumer items, like television, watch, etc. and were categorized into quintiles with 1st quintile as the poorest and 5th quintile as the wealthiest.

Results

Bivariate Analyses

Table 6.1 shows the socio-demographic characteristics of respondents by sex. The distribution of males and females did not differ by age and household wealth quintile, but varied significantly by education and occupation category. About 43% of males were illiterate, compared to 55% of females. Among males, 46.2% were engaged in service/ business, followed by labourer (29.5%), rickshaw puller (16.1%) and 'other' (8.2%) categories, while 51.6% of females were house-wives, followed by service/business (34.1%), 'other' (8.6%) and labourer (5.7%) categories.

Table 6.1: Distribution of Respondents (per cent) by Socio-demographic Characteristics

Variables	Male Per cent (n)	Female Per cent (n)	Total Per cent (n)
Age (yrs)			
25 -34	36.5 (325)	42.1 (466)	39.8 (791)
35 -44	31.9 (283)	29.4 (324)	30.6 (607)
45 -54	19.3 (173)	17.5 (190)	18.3 (363)
55 -64	12.3 (104)	11.0 (121)	13.3 (225)
Education (yrs)			
None	42.8 (378)	55.0 (590)	48.9 (968)
1 -5	30.8 (272)	31.0 (344)	31.1 ((616)
6 or more	26.4 (233)	14.0 (162)	20.0 (395)
Occupation			
Labor	29.5 (260)	5.7 (62)	16.3 (322)
Rickshaw puller	16.1 (142)	-	7.2 (142)
Service/business	46.2 (408)	34.1 (387)	40.3 (795)
House -wife	-	51.6 (549)	27.8 (549)
Others	8.2 (68)	8.6 (98)	8.4 (166)
Household wealth quintile			
Lowest	21.0 (174)	23.2 (226)	20.2 (400)
Second	23.6 (197)	19.2 (213)	20.6 (410)
Middle	21.9 (189)	20.4 (217)	20.4 (406)
Fourth	20.4 (192)	19.2 (232)	21.4 (424)
Highest	13.1 (133)	18.0 (213)	17.4 (346)
Total	100.0 (885)	100.0 (1101)	100.0 (1986)

Note: Number may vary due to missing cases. Distribution of male and female did not vary significantly by age and household wealth, but the distribution varied by education and occupation.

Table 6.2 shows selected NCDs risk factors by sex: their harmfulness/-familiarity/importance, whether medication was being used and its source. Two-thirds of males were current smokers (65.3%), compared to just under 2% for females; however, almost all male and female respondents reported that smoking was harmful to health (97.2% vs 97.8%).

Consumption of smokeless tobacco was 14.1% higher among females than males (41.8% vs. 36.9%); and over 95% of male and female respondents reported that smokeless tobacco consumption was harmful to health (95.4% vs 97.5%).

About 10% of males smoked as well as consumed smokeless tobacco. Taking both forms of tobacco into account, over 75% of males either smoked or consumed smokeless tobacco.

Alcohol consumption was low, 4% for males and almost nil for females (0.5%); however, almost all male and female respondents reported that alcohol consumption was harmful to health (98.5% vs 98.9%).

The level of exercise was low and similar for both males and females (4.4% vs 4.4%).

Consumption of vegetables was high for both males and females (6.5 vs 6.7 - days per week), while consumption of fruit was low (2.3 vs 2.3 - days per week). However, 72.7% male and 69.8% female respondents reported that consumption of vegetable was good for health, while the comparable figures for consumption of fruits were low, 50.3% and 50.9%.

Slightly over 50% males and 1/5th of females were involved in vigorous physical activities (work-related), while about 4/5th of males and females were involved in moderate physical activity.

Reports of high blood pressure were 86% higher for females than males (20.1% vs 10.7%). A higher percentage of females than males also reported that they were very familiar with blood pressure (47.6% vs 38.6%). Among those who had high blood pressure, a higher percentage of females than males reported that they were taking medicine (72.8% vs 68.1%); about 93% of them were getting medicine from a pharmacy or drug shop.

The prevalence of reported diabetes was higher for females than males (7.5% vs 5.0%). A higher percentage of females than males also reported that they were very familiar with the term diabetes (44.4% vs 40.8%). Among those who had diabetes, a higher percentage of males than females reported that they were taking medicine (74.4% vs 67.9%); about 93% of them were getting medicine from a pharmacy or drug shop.

Table 6.2: Selected Non-communicable Disease Risk Factors (per cent) by Sex and Perceived Harmfulness/Familiarity/Importance, Use and source of Medication

Risk factors	NCD Risk Levels			Harmfulness/ Familiarity/ Importance		Under medication		Medi- cine from phar- macy
	M	F	All	M	F	M	F	
Currently smoking	65.3	1.9	30.1	97.2*	97.8*	-	-	-
Smokeless tobacco use	37.1	41.8	39.7	95.4*	97.5*	-	-	-
Either smoke/Smokeless tobacco	76.2	42.6	52.8	-	-	-	-	-
Drink alcohol	4.0	0.5	2.2	98.5*	98.9*	-	-	-
Exercise	4.4	4.4	4.4	-	-	-	-	-
Vegetable***	6.5	6.6	6.6	72.7**	69.8**	-	-	-
Fruit***	2.3	2.3	2.3	50.3**	50.9**	-	-	-
Vigorous physical activity (work)	51.7	21.2	34.7	-	-	-	-	-
Moderate physical activity (work)	79.8	79.3	77.7	-	-	-	-	-
High blood pressure (reported)	10.7	20.2	16.0	38.6 ⁺	47.6 ⁺	68.1	72.8	92.7
Diabetes (reported)	5.0	7.5	6.4	40.8 ⁺	44.4 ⁺	74.4	67.9	92.5

Note: *Harmful to health; ⁺Very familiar; **Very important to eat fruit/ vegetable
***Consume (mean) number of days in a week;

Table 6.3 shows selected NCDs risk factors (per cent) by socio-demographic characteristics for males and females. For males, the prevalence of smoking varied significantly by education and household wealth quintile, while smoking varied significantly by occupation for both males and females.

Smokeless tobacco consumption, irrespective of sex; varied significantly by age, education, occupation and household wealth quintile.

High blood pressure, irrespective of sex; varied significantly by age and education. On the other hand, it varied by household wealth quintile for males, and varied significantly by occupation for females.

Diabetes varied significantly by age for both males and females, and while it varied by household wealth quintile for males, it varied by education and occupation for females.

Table 6.3: Selected Non-communicable Disease Risk Factors (per cent) by Socio-demographic Characteristics for Males and Females

Variables	Currently Smoking		Smokeless tobacco consumption		High blood pressure (reported)		Diabetes (reported)	
	M	F	M	F	M	F	M	F
Age (years)								
25-34	67.4	1.7	26.5	26.7	5.5	10.9	1.2	2.8
35-44	68.9	1.2	38.2	48.6	7.8	21.8	3.2	5.8
45-54	60.7	1.6	51.2	54.2	15.6	33.7	8.1	15.3
55-64	57.7	2.5	42.3	62.0	26.0	31.4	15.4	19.0
Significance level	ns	ns	p<0.01	p<0.01	p<0.01	p<0.01	p<0.01	p<0.01
Education (years)								
None	71.2	1.0	44.0	53.5	8.5	24.2	4.5	9.8
1-5	66.5	2.3	35.4	29.9	10.7	16.6	5.2	4.4
6 or more	54.5	2.5	26.6	23.6	14.2	13.0	5.2	6.2
Significance level	p<0.01	ns	p<0.01	p<0.01	p<0.08	p<0.01	ns	p<0.01
Occupation								
Service/business	60.5	1.8	30.1	41.9	12.2	17.3	5.9	3.9
Labor	66.9	3.2	41.9	53.2	8.3	11.3	3.8	3.2
Rickshaw puller	80.3	-	42.9	-	8.4	-	2.1	-
House-wife	-	0.7	-	38.4	-	22.4	-	9.1
Others	57.3	5.2	45.6	52.1	14.7	24.0	8.8	15.6
Significance level	p<0.01	p<0.05	p<0.01	p<0.05	ns	p<0.10	ns	p<0.01
Household wealth quintile								
Lowest	74.7	0.9	41.6	48.7	10.3	17.7	2.9	4.4
Second	73.6	2.8	43.1	48.8	7.1	15.9	2.0	6.6
Middle	64.0	1.8	35.4	45.8	5.8	21.7	5.3	9.2
Fourth	59.4	1.3	30.4	32.3	14.6	21.5	5.7	9.5
Highest	51.9	1.4	33.1	33.5	17.3	24.9	9.8	8.4
Significance level	p<0.01	ns	p<0.05	p<0.01	p<0.01	ns	p<0.01	ns

Note: ns = not significant

Multivariate Analyses

Table 6.4 shows the odds ratios (logistic regression) of selected NCDs risk factors by socio-demographic characteristics for males and females. After controlling for selected socio-demographic variables, multivariate results largely corresponded with bivariate results.

Smoking decreased significantly with age for males, but not for females. For males, smoking decreased significantly with education, but for females, smoking increased significantly. For males, smoking decreased significantly with household wealth quintile, but not for females. For males, compared to service/business; smoking was significantly higher among rickshaw pullers, while for females, smoking was higher in the 'other' occupational category.

Consumption of smokeless tobacco, irrespective of sex, increased significantly with age, but decreased significantly with education and household wealth. For males, compared to service/business; smokeless tobacco consumption was significantly higher among 'labourer' and 'other' occupation category; while for females, smokeless tobacco consumption did not vary by occupation.

High blood pressure, irrespective of sex, usually increased significantly with age, education and household wealth; while for males, it increased with education, but for females, it decreased.

The prevalence of diabetes, irrespective of sex, increased significantly with age. For females, compared to the 'service/ business occupational category, diabetes was higher among housewives.

Table 6.4: Odds Ratios (logistic regression) by Socio-demographic Characteristics for Selected Non-communicable Disease Risk Factors for Males and Females

Variables	Currently Smoking		Smokeless tobacco consumption		High blood pressure (reported)		Diabetes (reported)	
	M	F	M	F	M	F	M	F
Age (years)								
25-34	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
35-44	0.97	0.93	1.57**	2.27**	1.56	2.10**	2.78	2.17*
45-54	0.64*	0.84	2.73**	2.45**	3.77**	3.79**	7.75**	5.77**
55-64	0.72	0.94	2.18**	3.59**	6.44**	3.49**	13.37**	7.16**
Education (years)								
None	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1-5	0.80	2.44	0.81	0.52**	1.41	0.83	1.19	0.72
6 or more	0.53**	3.98*	0.63**	0.51**	2.16**	0.65	1.25	1.16
Occupation								
Service/business	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Labor	1.09	2.17	1.53*	1.17	0.84	0.67	0.79	0.87
Rickshaw puller	1.89**	-	1.49	-	1.13	-	0.66	-
Housewife	-	0.66	-	0.95	-	1.21	-	2.13*
Others	0.88	4.61*	1.61*	0.88	0.88	0.81	0.93	1.96
Household wealth quintile								
Lowest	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Second	1.02	1.67	0.99	0.99	0.61	0.87	0.61	1.54
Middle	0.65	0.97	0.74	0.91	0.46	1.22	1.74	2.00
Fourth	0.60*	0.60	0.56*	0.51**	1.05	1.34	1.43	1.97
Highest	0.48**	0.89	0.66	0.60*	1.29	1.54*	2.44	1.59

Note: *p<0.05; **p<0.01

Discussion and Conclusion

In this study of slum populations, consumption of tobacco¹⁰ was higher than previous reports in Bangladesh (9, 15, 16, 17). Consistent with earlier studies, however, higher tobacco use was documented among lower versus higher wealth groups/ quintiles (15, 16, 18). In poor families reliant on cash income for food and shelter, the use of scarce resources on tobacco products is cause for concern. Indeed, it has been estimated that if poor people did not smoke, 10.5 million fewer people would be malnourished in Bangladesh (19).

In recent years, the main causes of death in Bangladesh have shifted from communicable to non-communicable (10, 12). Moreover, many deaths due to NCDs such as cancers, and respiratory and circulatory diseases (12), are related to tobacco consumption (20). The harmful effects of smoking during or after pregnancy to both mother and child are well documented (21), as is the fact that lower socioeconomic groups are less aware of the risks of exposure to environmental tobacco (passive smoking). Considering these realities, study findings are most concerning. They imply that slum populations are at the latter stage of the smoking epidemic (22), and that considerable mortality and morbidity can be expected in the coming decades, if Lopez's smoking epidemic model is applied (23).

Although the Government of Bangladesh has signed the WHO Convention on Tobacco Control, investments in control programmes have largely been ineffective due to a lack of political will. Encouragingly, over 95% of the study population knew that tobacco consumption was harmful to health yet strong traditions around tobacco consumption in Bangladeshi culture may impede behaviour change (24). On a hopeful note, given findings that tobacco consumption is lower among the more educated populations living in slums, and that levels of education are progressively raising, tobacco consumption may also start to decline (25).

Like this study, concerning rates of elevated blood pressure have also been reported elsewhere in Bangladesh (16, 17, 26), as well as India (27), Indonesia (28), and Vietnam (29). Of particular note in this study were slightly higher reported blood pressure levels among females than males. This may be an artefact of more frequent diagnosis especially among women of reproductive age due to visits to health professionals for antenatal checkups, however, further examination is needed. Likewise, the association between socioeconomic status and

¹⁰Tobacco consumption for males was about 10% and for females it was about 20% higher than earlier reports

high blood pressure may be due to higher prevalence of obesity/overweight (30), and higher salt intake among more wealthy socioeconomic groups (31), but this too requires additional investigation.

Reports of high blood pressure were also found to be very high among the elderly. Given that the number of elderly is increasing rapidly in Bangladesh, the issue could soon become a major public health problem (32). The reported prevalence of high blood pressure was found to be much higher among females than males (16), for reasons that need to be explored more rigourously. Also of concern was the finding that half of the study population was not very familiar with the symptoms of high blood pressure, suggesting that under-diagnosis and reporting may be occurring. Awareness-building to check blood pressure, promote mental health, and healthy diet is therefore recommended as part of routine healthcare.

The prevalence of diabetes (high blood sugar) was higher than reports from earlier studies (17). As might be expected, diabetes was found to increase with age and was higher among more educated/well-off households than less educated/poor households. However, given that 60% of the population were not very familiar with diabetes, levels might be even greater as under-reporting may have occurred. Also concerning were the large numbers of individuals identifying as diabetic who were not using medicine to control blood sugar. These findings emphasize the importance of diagnosis in routine health care. They also emphasize the importance of nutrition and physical activity both in terms of prevention and healthy lifestyle for those living with diabetes. In this regard, an awareness-building programme to monitor diabetes and to maintain a healthy lifestyle is highly recommended.

The study documented a high prevalence of NCD risk factors in the slum population under study, with identifiable socio-demographic characteristics. As current health care delivery in the study area is largely focused on maternal, child health, and family planning, there is a need to provide basic NCD services (screening and healthy lifestyle promotion) to reduce future burden of these diseases.

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Chapter 7

Women's and Children's Health and Well-being in Urban Slums

*Mohammad Nahid Mia, Shehrin Shaila Mahmood, Razib Chowdhury,
AHM Golam Mustafa, Abdur Razzaque & Mohammad Iqbal*

Summary

This chapter considers findings from three cross-sectional surveys in the HDSS surveillance area that examine the health and safety of women and children, including maternity care, immunization coverage, HIV/AIDS/STDs, women's empowerment, violence, family planning, and the sexual and reproductive knowledge, perception and attitude of adolescents.

Antenatal Care (ANC): Eighty-five per cent of women surveyed received antenatal care (ANC) at least once from a provider but less than 50% reported four or more antenatal care visits. Women from the richest quintile were twice as likely to receive four or more visits compared to the poorest. Women from households in the wealthiest quintile were also 2 times more likely to receive ANC from a qualified doctor. The NGO sector was the leading source for ANC (50.5%), followed by the private (22.4%) and public (4.8%) sectors, however public-sector facilities largely serviced women from poorer households while private sector facilities catered to the relatively wealthy.

Facility-based Delivery: Almost 70% of women in the highest wealth quintile gave birth at a facility, compared to 37% in the lowest quintile. Further, women with 10 or more years of schooling (2.8 times) and the highest socioeconomic position were (4 times) more likely to be assisted by a medically trained provider than poorer and less educated women.

Caesarean Section (CS): More than 25% percent of deliveries were caesarean sections, with elevated rates among higher educated women (47%), lower livebirth order (31%) living in households with highest socioeconomic status (44%).

Childhood Immunisation: Overall, 98% percent of children aged younger than 24 months were ever vaccinated as reported by mother, with lower coverage rates indicated on vaccination cards (75%). The level of coverage for BCG, three doses of pentavalent and polio were 77% or higher.

Children's Health Seeking Behaviour: Over 50% of children experienced illness in the previous two weeks including fever, cough, diarrhoea and rapid or difficulty breathing. Among the sick children, 86% were seeking healthcare where rates were slightly higher for boys than girls.

HIV/AIDS and Sexually Transmitted Diseases (STDs): Seventy-five percent of women aged 15-49 years heard about HIV/AIDS. Knowledge on HIV/AIDS was much higher among higher educated (98.6%) and much lower among uneducated women (57.9%). Overall, 7.1% and 9.2% of ever-married women aged between 15 and 49 years responded that they had either Syphilis or Gonorrhoea respectively.

Women Empowerment and Violence against Women: Just over a quarter of women who earned cash reported that they decided on how their earnings would be used. Violence against women was prevalent in slums, with over 46% of women suffering from at least one form of abuse in their conjugal life, and 54% percent having experienced some form of violence during their lifetime. A higher proportion of lower educated women (44.4%) were pushed or thrown by their husband than higher educated women (17.2%). Slapping, arm-twisting and punching were also more prevalent behaviours among the less educated. Little variation was observed comparing age or socioeconomic groups.

Family Planning: Nearly seventy-two percent of married women used any method of contraception, and 69% used modern methods. Contraceptive use varied little according to education or socioeconomic position. The pill was the most prevalent form of family planning, followed by injectables and other methods. Almost 75% of women reported obtaining contraceptives through the private sector, especially drug shops, followed by NGOs.

Adolescent Sexual and Reproductive Health: Information about puberty and sexual and reproductive health was largely conveyed to adolescents by parents, and although 68% were aware of HIV/AIDS, misperceptions were widespread.

Conclusion: The findings revealed significant socio-demographic differentials in maternity care, child immunisation coverage, family planning, and knowledge on HIV/AIDS/STDs within the context of slums. Reducing poor-rich inequalities in professional facility-based delivery are essential to achieving the SDG target for maternal health. Equity-oriented policy and programs are needed to facilitate integrated reproductive, maternal, new-born and child health services including better referral and quality of care.

The results of the adolescent study revealed the low level of knowledge of SRH issues as well as gender and socioeconomic differences that warrant attention. Efforts to increase SRH information and services among adolescents living in slums include mass media campaign, school-based sex education, and social media.

Introduction

Women's health and well-being is critical to the welfare of children and families, and to the larger goals of equity and prosperity. To facilitate women's contribution, systems must exist that support maternal and child health and family planning that protect them from HIV, and enable their empowerment and safety. It is also important to offer these supports starting from adolescence, so that early marriage and childbearing are delayed, and opportunities for education and optimal health and nutrition are availed. Current realities in Bangladesh signal the importance of building and strengthening such systems. This is particularly urgent in the context of rapid urbanization, where public provision is weak and oversubscribed.

Of particular focus in this chapter is the situation of women in slums as regards their access and utilization of maternal and child health and family planning services. It is well known that the healthcare a woman receives during pregnancy, at the time of delivery, and soon after delivery, is important for the survival and well-being of both the mother and the child (1). Family planning is also important for the health of a mother, her children, and the household economy. In Bangladesh, the use of any method of contraception has increased from 20% in 1980 to 60% in 2014 (2); and 60% of ever-married women used any modern method (2). The government sector is the major provider of contraception, catering to 49% of users (2). Less is known about family planning practises among slum dwellers, which may be important in understanding future fertility patterns and demand for contraception. Vulnerability to HIV is another area of concern. In Bangladesh, the number of HIV-positive people increased from 1,207 in 2007 to 3,674 in 2014, a more than three-fold increase over seven years (3). Although, Bangladesh is still considered a low-prevalence country, in light recent trends in HIV prevalence, the extent of HIV knowledge in slum settings is important to assess (4).

Women's economic empowerment in slums is fourth area of focus. Important dimensions of empowerment that need to be assessed are women's access to resources, their ability to exercise choice and control over their own lives and earnings. Violence is a further issue affecting women's health and safety that warrants attention. Approximately

30% of women in Bangladesh suffer from any kind of violence by their husband or other family members or relatives (2), however this figure may be even greater in slum environments where poverty and insecurity concentrate.

Finally, the situation of adolescents in slums is considered given the particular challenges they face, and risks they take, amidst a period of rapid physical, intellectual, and emotional development. The health behaviours and sexual and reproductive choices occurring during adolescence may have long-lasting consequences affecting adulthood and subsequent generations. Bangladesh recognizes the importance of adolescent sexual and reproductive health, however, the particular circumstances of those living in slum settlements is insufficiently understood.

Study Objectives

- To assess maternal and child health in slum settlements, including antenatal care, assistance at delivery, new-born care, immunisations, and prevalence and treatment of diarrhoea and other diseases, and hospitalization among children younger than 24 months.
- To measure family planning practices of currently married women in slums.
- To explore knowledge and attitudes of women about sexually transmitted infections (STIs) and HIV/AIDS.
- To consider measures of women empowerment and violence against women.
- To examine the knowledge, attitude, and perceptions of SRH among adolescents in slum areas of Dhaka, Bangladesh.

Materials and Methods

Study Area and Data

Data are furnished by a cross-sectional study conducted between October and December 2016 in five slums in Dhaka (South and North) and Gazipur City Corporation that constitute icddr's Health and Demographic Surveillance System (HDSS). To carry out this study three different samples were drawn. For maternal and child health, a total of 1,200 women aged between 15 and 49 years having a child younger than 24 months were randomly chosen from HDSS database to collect information on maternity care, childhood immunization, child sickness, HIV/AIDS, STDs and women's attitude towards violence. For family planning, 3,500 women of reproductive aged were randomly chosen from the same database to collect information on use and sources of contraception. In the final survey, a total of 1,000 adolescents

aged between 10 and 19 years were randomly selected for interview to capture the knowledge and attitudes sexual and reproductive health. Fifteen female Field Workers having at least 10 years of schooling formed the data collection team with three experienced supervisors. Data were collected using a Tablet device (Samsung Galaxy Tab 4 SM-T231). To ensure the quality of data, a supervisor revisited 2% of the respondents chosen randomly, within two days of data collection by the Field Workers. Later, the Field Workers and Supervisors identified and resolve any inconsistencies in the collected data. A final sample of 1,063 women of childbearing age having a child younger than 2 years, 3,086 women for family planning and 863 adolescents, were successfully interviewed.

Data Analysis

Maternity care, childhood immunization, child sickness, HIV/AIDS, STDs and women's attitude towards violence, knowledge and attitude toward adolescent sexual and reproductive health were considered as dependent variables. On other hand, socioeconomic and demographic information of children and women were considered as independent variables. These included women's age (15-19, 20-24, 25-29, 30-34, 35-49), education (years of schooling: None, 1-5 years, 6-9 years, 10-11 years, ≥ 10 years), marital status (currently married, divorce/separated/widowed), age at birth (<20 years, 20-24 years, 25-29 years and ≥ 30 years), livebirth order (1, 2-3 and ≥ 4), membership of any nongovernmental organization (yes, no) and wealth index (lowest, second, middle, fourth and highest). Household socioeconomic status was indicated by a wealth index computed from ownership of a standard set of household items observed by the interviewers using principal components analysis (5). The wealth index was then used to categorise individuals into five equal groups (quintiles) where the first quintile is the poorest 20% of households, and the fifth quintile is the wealthiest 20% of households. Bivariate statistical analysis was performed to explore the outcome variables and various socio-demographic characteristics. For family planning, 228 currently pregnant women were excluded from the analysis. Chi-Square tests were conducted to ascertain the relationship between independent and dependent variables.

Results

Table 7.1 shows the selected socio-demographic characteristics of 1,063 women aged between 15 and 49 years and with a child younger than 24 months. More than one-third of women (34.4%) were aged between 20 and 24 years. Among the respondents, 28.8% were the aged between 25 and 29, and 16.8% were aged below 20 years. About one-fourth (23.8%) of them were illiterate, less than half (45.2%) of them completed primary education, and the rest of them had more than primary education (31.0%). Thirty-five percent of women were delivered their birth at the age of 20-24 whereas 27.2% women were delivered before reaching the 20th birthday. One half of respondents' households reported some form of NGO membership.

Table 7.1: Socio-demographic Characteristics of Women Aged 15-49 years that Gave Birth in the Previous Two Years

Characteristics	Number	Per cent
Age (in years)		
15-19	178	16.8
20-24	365	34.4
25-29	306	28.8
30-34	127	12.0
35-49	86	8.0
Education (years of schooling)		
None	252	23.8
1-5 years	480	45.2
6-9 years	257	24.2
≥10 years	72	6.8
Age at birth (in years)		
<20	289	27.2
20-24	371	34.9
25-29	244	23.0
≥30	158	14.9
Birth order		
1	454	42.7
2-3	505	47.5
≥4	104	9.8
Marital status		
Currently married	1,033	97.2
Divorced/separated/widowed	30	2.8
NGO membership		
Yes	429	40.4
No	634	59.6
Wealth index		
Lowest	234	22.0
Second	209	19.7
Middle	212	19.9
Fourth	201	18.9
Highest	207	19.5
Number of women	1,063	100.0

Maternal and Child Health

Table 7.2 shows the percentage of women with a livebirth in the two years preceding the survey who received ANC for the most recent birth. Eighty-five per cent of women received antenatal care (ANC) at least once from a provider and among these, only 47.2% received four or more ANC visits. (Table 7.2). While there was little socio-demographic differentiation between women in terms of receiving at least one ANC visit, this was not the case for four or more ANC visits. The likelihood of receiving four or more ANC increased with women's education and their socioeconomic position. For example, coverage of four or more ANC ranged from 36.9% among illiterate women to 70.8% among those completing 10 or more years of schooling and those from the richest quintile (67.6%) were two-fold more likely to receive four or more ANC as compared to their poorest quintile counterparts (32.0%). The coverage of four or more ANC also decreased with birth order.

Table 7.2: Antenatal Care (ANC) Coverage by Selected Socio-demographic Characteristics

Characteristics	Number	One or more ANC (%)	Four or more ANC (%)
Education (years of schooling)			
None	252	83.3	36.9
1-5 years	480	82.5	44.8
6-9 years	257	92.2	55.3
≥10 years	72	90.3	70.8
Age at birth (in years)			
<20	289	85.5	44.3
20-24	371	88.4	50.1
25-29	244	84.0	48.8
≥30	158	81.0	43.0
Birth order			
1	454	87.9	50.9
2-3	505	84.6	45.4
≥4	104	79.8	40.4
Marital status			
Currently married	1,033	85.5	47.5
Divorced/separated/widowed	30	86.7	36.7
NGO membership			
Yes	429	85.1	54.1
No	634	85.8	42.6
Wealth index			
Lowest	234	79.1	32.5
Second	209	81.3	35.9
Middle	212	88.2	47.6
Fourth	201	90.6	54.7
Highest	207	89.4	67.6
Number of women	1,063	85.5	47.2

The provider of ANC service and the place where a woman received ANC are presented in Table 7.3. Among those who received any ANC during their last pregnancy, about one-half of them (46.6%) received it from skilled birth attendant (SBA) from the NGO sector, and the remaining half (53.4%) from medically trained provider, e.g., a qualified doctor (29.5%), nurse/ midwife/paramedic (22.1%) and FWA/HA/BDS/SBA (Govt.) (1.8%). Women from the highest socioeconomic quintile had a 2.3 times higher prevalence of receiving ANC from qualified doctor compared to those from the poorest quintile. It should be noted, however, that women tended to visit multiple facilities so that categories are not mutually exclusive and did not sum to 100 percent. The NGO sector was the leading source of ANC (50.5%), followed by the private sector (22.4%) and the public sector (4.8%). Results show that public sector facilities disproportionately serviced women from the lowest position, and private sector facilities disproportionately serviced those from wealthier socioeconomic groups. About twenty-two per cent of women received ANC at home.

Table 7.3: Provider and Place of Antenatal Care (ANC) by Women's Household Socio-economic Position

Variables	Lowest	Second	Middle	Fourth	Highest	All
Provider of antenatal care						
MBBS doctor	17.8	28.2	32.1	28.6	40.5	29.5
Nurse/midwife/paramedic	19.5	22.4	26.2	23.1	19.5	22.1
SBA (NGO)	59.5	47.7	39.0	47.2	40.0	46.6
FWA/HA/BDS/SBA (Govt.)	3.2	1.7	2.7	1.1	0.0	1.8
Place of antenatal care						
Home	21.6	23.5	23.5	17.6	24.8	22.3
Public sector	8.1	8.8	4.8	1.7	1.1	4.8
Private sector	15.7	17.7	24.1	23.0	31.4	22.4
NGO sector	54.6	50.0	47.6	57.7	42.7	50.5
Number of Women	185	170	187	182	185	909

Table 7.4 examines the socio-demographic characteristics of women based on where they delivered their last live birth in the two years preceding the survey. A slightly higher proportion (52.4%) of births were delivered in a health facility within the public (7.0%), private (19.4%) and NGO sector (26.0%) compared to those delivered at home (47.4%). When considering the determinants of facility-based delivery (not presented here), mother's education and their household socioeconomic position were significant predictors. Women with 10 or more years of schooling were 1.8 times more likely to give birth at facility compared to women with no schooling. A higher portion of women (69.1%) from the highest socioeconomic position gave birth at facility, followed by fourth (61.7%), middle (47.4%), second (49.0%) and the lowest quintiles (37.2%).

Table 7.4: Place of Delivery during Last Livebirth of Women by Selected Socio-demographic Characteristics

Characteristics	No. of birth	Home	Facility	Public facility	Private facility	NGO facility
Education (years of schooling)						
None	252	53.6	46.4	6.8	12.7	27.0
1-5 years	480	48.5	51.5	8.0	17.2	26.4
6-9 years	257	44.7	55.3	5.8	24.5	24.9
≥10 years	72	30.6	69.4	5.6	40.3	23.6
Age at birth (in years)						
<20	289	47.4	51.9	8.0	18.8	25.4
20-24	371	49.3	50.7	6.2	17.8	26.7
25-29	244	43.4	56.6	7.8	22.1	26.6
≥30	158	49.4	50.6	5.7	20.3	24.7
Birth order						
1	454	45.1	54.9	7.7	21.5	25.7
2-3	503	49.3	50.7	6.3	18.4	25.9
≥4	104	50.0	50.0	6.7	15.4	27.9
Wealth index						
Lowest	234	62.8	37.2	7.7	7.3	22.2
Second	209	51.0	49.0	7.7	14.9	26.4
Middle	199	52.6	47.4	6.2	16.6	24.6
Fourth	201	38.3	61.7	9.0	29.9	22.9
Highest	207	30.9	69.1	4.4	30.4	34.3
Number of women	1,063	47.5	52.3	7.0	19.4	26.0

Table 7.5 shows the percent distribution of all livebirths in the two years preceding the survey by type of assistance received during delivery. About 31% of deliveries were assisted by a MBBS doctor, followed by nurse/paramedic /SBA/FVW/SACMO (16.4%), TTBA (21.5%), TBA (25.5%) and family member/relative/other (6.0%). Women with 10 or more years of schooling (2.6 times) and those in the highest wealth quintile were (4 times) more likely to be assisted by a medically trained provider compared to their counterparts.

Table 7.5: Assistance during Last Pregnancy of Women by Selected Socio-demographic Characteristics

Characteristics	No. of birth	MBBS doctor	Nurse/ paramedic/ SBA/ FWV/ SACMO	Trained TBA	TBA	Family members/ relatives/ others
Education (years of schooling)						
None	252	21.4	19.8	23.0	29.4	6.4
1-5 years	480	28.1	16.5	21.9	27.3	6.3
6-9 years	257	37.4	16.3	20.6	22.6	3.1
≥10 years	72	55.6	11.1	18.1	11.1	4.2
Age at birth (in years)						
<20	289	32.5	16.6	18.0	27.3	5.5
20-24	371	30.7	15.9	20.2	27.8	5.4
25-29	244	32.0	18.9	24.6	20.1	4.5
≥30	158	27.5	17.1	23.9	27.5	6.3
Birth order						
1	454	35.7	16.1	19.4	23.8	5.1
2-3	503	27.9	17.4	22.8	26.7	5.2
≥4	104	21.2	18.3	25.0	27.9	7.7
Wealth index						
Lowest	234	12.8	17.5	23.9	36.3	9.4
Second	209	25.4	15.8	22.0	32.1	4.8
Middle	199	24.1	19.8	25.0	25.0	6.1
Fourth	201	42.8	18.4	15.9	20.4	2.5
Highest	207	50.7	13.0	20.3	12.6	3.4
Number of women	1,063	30.6	16.9	21.6	25.5	5.4

Note: TBA = Traditional Birth Attendant; TTBA = Trained Traditional Birth Attendant; FWV = Family Welfare Visitor; SACMO = Sub-assistant Community Medical Officer; SBA = Skilled Birth Attendant.

Table 7.6 presents the mode of delivery during the last livebirth by selected socio-demographic characteristics. The percentage of caesarean section (CS) births is sometimes considered to be a proxy indicator of women's access to skilled care for complicated delivery. Results show that 25.6% of livebirths in the two years preceding the survey were delivered by CS—4 in every 10 births. CS delivery was highest among first born children (30.8%), more educated mothers (47.2%) and those from wealthier households (44.0%).

Table 7.6: Mode of Delivery during Last Livebirth of Women by Selected Socio-demographic Characteristics

Characteristics	No. of births	Normal	C-section
Education (years of schooling)			
None	252	81.8	18.3
1-5 years	480	76.3	23.8
6-9 years	257	69.7	30.4
≥10 years	72	52.8	47.2
Age at birth (in years)			
<20	289	72.7	27.3
20-24	371	74.9	25.1
25-29	244	72.1	27.9
≥30	158	79.8	20.1
Birth order			
1	454	69.2	30.8
2-3	503	77.0	23.0
≥4	104	84.6	15.4
Wealth index			
Lowest	234	87.6	12.4
Second	209	80.4	19.6
Middle	199	80.7	19.3
Fourth	201	65.2	34.8
Highest	207	56.0	44.0
Number of women	1,063	74.4	25.6

Childhood Immunization

Table 7.7 presents information on vaccination coverage by vaccine card and mother's report. Nearly 98% of children less than 24 months of age were ever vaccinated according to mother's report. Coverage as indicated by vaccine card was only 75%, most probably due to the loss of card or other reasons. BCG coverage, including three doses of pentavalent vaccine, and three doses of polio vaccine was 76.9% or higher. The coverage of MR-2 was low (37.9%). Only 2% of children were reported to have never received any vaccinations.

Table 7.7: Vaccination Coverage of Children Under Two Years of Age

Vaccine	Per cent	Per cent with a vaccination card seen
Ever received vaccinations	97.8	75.0
No vaccinations	2.2	25.0
All basic vaccinations		
BCG	84.8	66.7
Pentavalent -1	85.1	65.3
Pentavalent -2	82.3	63.7
Pentavalent -3	76.9	58.8
Polio -1	83.9	64.6
Polio -2	81.0	62.5
Polio -3	76.0	58.7
Measles and Rubella -1	62.4	47.7
Measles and Rubella -2	37.9	27.4
Pneumococcal Conjugate Vaccine (PCV1)	51.9	42.1
Pneumococcal Conjugate Vaccine (PCV2)	49.8	40.3
Pneumococcal Conjugate Vaccine (PCV2)	42.3	34.4
Number of children	1063	

Children Health Seeking Behaviour

Table 7.8 presents the healthcare seeking practices for children experiencing illness in the previous two weeks. More than one-half of children in the sample were sick in the last two weeks, with a slightly higher percentage reported for girls than for boys. Among these children, 86.3% sought healthcare. However, the percentage was slightly higher for boys than for girls. Fourteen per cent of children experienced diarrhoea, followed by fever (44.2%), cough (38.3%) and rapid or difficult breathing (12.0%). Among all children in the sample, 3.9% were hospitalised in the 6 months preceding the survey, with slightly higher rates reported among boys than girls.

Table 7.8: Child Illness and Hospitalization

Indicators	All % (n)	Boy % (n)	Girl % (n)
Sickness during last 14 days	53.3 (567)	51.6 (281)	55.1 (286)
Seeking healthcare for sickness in last 14 days	86.3 (485)	89.6 (251)	83.0 (234)
Has the child had diarrhoea last 2 weeks	14.3 (152)	14.2 (77)	14.5 (75)
Has the child been ill with a fever in last 2 weeks	44.2 (470)	42.1 (229)	46.4 (241)
Has the child been ill with a cough in last 2 weeks	38.3 (407)	36.4 (198)	40.3 (209)
Had breathe faster, rapid or difficult breathing	12.0 (127)	12.7 (69)	11.2 (58)
Hospitalization during last 6 months	3.9 (41)	5.0 (27)	2.7 (270)

Table 7.9 indicates the type of provider that was contacted when seeking healthcare for child illness experienced in the last 2 weeks. Thirty-six per cent of children were taken to a health facility or a medically trained provider, and slightly more boys than girls received this kind of care. An informal and/or unqualified doctor (56.3%) treated the majority of children.

Table 7.9: Healthcare Provider Contacted for Seeking Care for Children Experiencing Illness

Provider	All	Boys	Girls
MBBS doctor	35.9	36.5	35.3
Informal/unqualified doctor	56.3	55.3	57.3
Traditional doctor	2.5	3.3	1.7
Others	5.3	4.9	5.6
Number of Provider	476	244	232

HIV/AIDS and Sexually Transmitted Diseases (STDs)

Table 7.10 shows that about 75% of ever-married women aged 15 to 49 years had heard about HIV/AIDS. Knowledge on HIV/AIDS varied little according to age. Awareness of HIV/AIDS was highest among the richest quintile (89.9%), women aged 25-29 years (78.8%), and households having NGO membership (82.3%) compared to their counterparts. Knowledge also increased with education: only 57.9% of illiterate women had knowledge about HIV/AIDS followed by women having 1-5 years of schooling (73.8%), women having 6-9 years of schooling (86.0%) and women having 10 or more years of schooling (98.6%).

Table 7.11 presents knowledge of women regarding HIV/AIDS prevention methods. Among the women who previously knew about HIV/AIDS, 34.8% said that HIV infection could be prevented by avoiding sex with sex workers. Nearly 35% of women mentioned the use of condom as a method of preventing HIV/AIDS, followed by limiting sex within marriage (21.7%), avoiding sex with persons who inject drugs (13.0%), avoiding unsafe blood transfusions (24.6%), and avoiding sex with HIV infected persons (25.4%) and others (2.1%).

Table 7.10: HIV/AIDS Knowledge Among Women by Selected Background Characteristics

Characteristics	Number	Per cent
Age (in years)		
15-19	178	68.0
20-24	365	76.4
25-29	306	78.8
30-34	127	73.2
35-49	86	68.6
Education (years of schooling)		
None	252	57.9
1-5 years	480	73.8
6-9 years	257	86.0
≥10 years	72	98.6
Marital status		
Currently married	1,033	74.7
Divorced/separated/widowed	30	73.3
NGO membership		
Yes	429	82.3
No	634	69.6
Wealth index		
Poorest	234	56.8
Poor	209	72.3
Middle	199	73.9
Rich	201	83.1
Richest	207	89.9
Number of women	1,063	74.7

Table 7.11: Knowledge About HIV/AIDS Prevention Methods

Methods	Per cent*
Use condoms	34.8
Limit sex within marriage	21.7
Avoid sex with sex worker	35.3
Avoid sex with persons who inject drugs	13.0
Avoid unsafe blood transfusions	33.3
Avoid sharing razors/blades	24.6
Avoid sex with HIV infected person	25.4
Other	2.1
Number of women	785

*Multiple response was recorded

Sexually Transmitted Diseases (STDs) and STD Symptoms

Respondents who ever had sex were asked if they had contracted a disease through sexual contact in the previous 12 months, or if they had experienced either of two symptoms associated with sexually transmitted diseases (STDs), e.g., a bad-smelling or abnormal genital discharge, or a genital sore or ulcer. Self-reported prevalence of sexually transmitted diseases (STDs) and STD symptoms are presented in Table 7.12. Overall, 7.1% and 9.2% of ever-married women aged between 15 and 49 years responded that they had either Syphilis or Gonorrhoea respectively. The rates were much higher as compared to the 2014 Bangladesh Demographic and Health Survey (BDHS). This difference may be due to disproportionate vulnerability of the slum population being sampled, or underreporting in BDHS data. Women who reported STD symptoms were somewhat more likely to say they had itching or irritation in vaginal area with discharge (24.7%) than a genital sore and/or ulcer (3.5%).

Table 7.12: Self-reported Prevalence of Sexually Transmitted Disease (STDs) and STD Symptoms

Sexually Transmitted Disease (STD) and STD symptoms	Per cent
STD	
Syphilis	7.1
Gonorrhoea	9.2
STD symptoms	
Any itching or irritation in vaginal area with discharge	24.7
A bad odour along with a discharge	5.9
A severe abdominal pain with discharge not related to menstruation	9.5
A fever along with a discharge	5.1
A genital sore and/or ulcer	3.5
Problem with pain and/or burning or difficulty urinating	11.5
Any other problem with a urethral discharge	1.6
Number of women	1,063

Women's Empowerment and Violence against Women

Table 7.13 shows the percent distribution of currently married women who received cash earnings in the past 12 months, according to the person who mainly decides about the use of these earnings.

Twenty-two per cent of currently married women who earn cash reported that they themselves mainly decide how their cash earnings will be used; 59.9% reported that they decide jointly with their husbands, and 12.1% reported that their husbands alone decide how their earnings will be used. A very low percentage of women reported that other people participate in the decision on how their earnings will be used.

Table 7.13: Control Over Women's Cash Earnings

Who makes the decision	Per cent
Mainly wife	26.1
Wife and husband jointly	59.9
Mainly husband	12.1
Someone else	1.9
Number of women	207

Violence against Women

A woman's attitude towards wife beating is sometimes considered a proxy for women's status. A lower score on the "number of reasons wife beating is justified" suggests a greater sense of entitlement, self-esteem, and reflects positively on perceptions of empowerment. Table 7.14 presents information on the proportion of married women in the sample who agreed that a husband is justified in hitting or beating his wife for specific reasons. The most widely accepted reason for wife beating was visiting family/friends without permission (31.9%), followed by neglecting children (25.4%), and conjugal arguments (25.8%). About 14% of women agreed that failure to provide food on time and refusal of sexual intercourse (9.2%) were acceptable excuses for a husband to beat his wife. Overall, 46.2% women experienced spousal violence for one of the above reasons. Interestingly, there was little variation in attitudes towards wife beating by socioeconomic status.

Table 7.15 shows the prevalence of women suffering from violence during their lifetime and over the previous year. About 54% women reported that they experienced any form of violence, and 36.6% reported a violent event sometime during the previous year. About half of women reported experiences of slapping or arm-twisting, followed by pushing/shaking/throwing (40.0%), punching (27.0%), kicking or dragging (18.5%), and attempted strangulation, burning or killing (6.2%).

The most significant factor associated with violence was education. Uneducated women suffered a much higher level of violence, and experienced the most physically abusive forms compared to educated women. For example, a higher proportion of less educated women (44.4%) reported being pushed or thrown by their husband than higher educated women (17.2%). Slapping or arm-twisting was also more prevalent among less educated women (58.3% versus 37.8% among the higher educated), as was punching (23.0% versus 3.5%), kicking and dragging (24.0% versus 0.0%). These patterns differed little by age or socioeconomic status.

Table 7.14: Women's Attitudes Toward Wife Beating by Selected Socio-demographic Characteristics

Characteristics	Number	Husband is justified in hitting or beating his wife if she					Refuses sexual intercourse	Per cent who agree with at least one specified reason
		Neglects children	Argues with husband	Fails to provide food on time	Visits her family/friends without permission			
Age (in years)								
15-19	178	20.8	25.8	12.9	33.2	8.4	46.6	
20-24	365	25.8	25.5	13.4	32.6	10.1	48.0	
25-29	306	29.1	26.8	13.7	30.4	8.5	45.8	
30-34	127	24.4	23.6	16.5	33.1	14.2	43.3	
35-49	86	22.1	26.7	14.0	30.2	10.5	44.2	
Education (in years schooling)								
None	252	26.2	29.8	14.7	31.4	9.1	44.1	
1-5 years	480	30.0	25.8	15.0	34.4	11.3	50.6	
6-9 years	257	19.5	22.6	14.0	30.0	9.0	41.3	
≥10 years	72	13.9	23.6	2.8	25.0	6.9	43.1	
Marital status								
Currently married	1,033	25.6	25.9	13.8	31.8	9.8	46.1	
Divorced/ separated/ widowed	30	20.0	23.3	13.3	36.6	13.3	50.0	
NGO membership								
Yes	429	23.5	24.0	13.3	30.3	8.7	43.6	
No	634	26.7	27.0	14.2	33.6	10.6	48.0	
Wealth index								
Poorest	234	26.1	21.4	14.1	29.5	7.3	44.0	
Poor	209	30.6	30.6	17.2	36.4	12.0	50.7	
Middle	199	21.7	28.3	13.2	30.7	11.3	47.6	
Rich	201	26.4	27.4	13.4	29.9	10.0	42.8	
Richest	207	22.2	21.7	11.1	33.3	9.2	45.9	
Number of women	1063	25.4	25.8	13.8	31.9	9.9	46.2	

Table 7.15: Prevalence of Women Experiencing Different Forms of Violence by Selected Background Characteristics

Characteristics	Act of violence													
	Number	Pushing, shaking or throwing		Slapping or arm twisting		Punching with fist or hitting with object		Kicking or dragging		Attempted strangulation, burning or killing		Suffered at least one form of violence		
		At any time	Last years	At any time	Last years	At any time	Last years	At any time	Last years	At any time	Last years	At any time	Last years	
Age (in years)														
15-19	178	27.0	18.5	44.9	33.2	19.7	15.2	14.6	11.2	6.2	4.5	48.3	35.4	
20-24	365	35.9	25.2	50.1	35.6	25.5	17.0	18.1	12.1	4.7	3.0	54.5	39.5	
25-29	306	36.9	23.2	51.3	33.3	30.7	20.6	19.3	14.4	8.5	6.9	54.9	35.6	
30-34	127	37.8	23.6	51.2	31.5	32.3	19.7	25.2	14.2	5.5	3.2	55.1	35.4	
35-49	86	46.5	22.1	59.3	31.4	27.9	14.0	16.3	8.1	5.8	2.3	61.6	32.6	
Education (years of schooling)														
None	252	44.4	26.2	58.3	35.7	36.5	23.0	24.2	14.3	7.1	4.4	62.7	39.3	
1-5 years	480	35.8	23.8	50.0	33.8	25.8	17.9	18.8	14.0	5.4	4.0	53.3	36.5	
6-9 years	257	31.5	21.8	48.6	35.0	24.5	15.6	16.7	10.9	7.0	5.1	52.1	37.4	
≥10 years	72	22.2	13.9	34.7	23.6	11.1	6.9	4.2	2.8	5.6	4.2	40.3	27.8	
Marital status														
Currently married	1,033	35.7	23.1	50.6	33.9	26.7	17.7	18.4	12.4	5.8	4.2	54.5	36.9	
Divorced/ separated/ widowed	30	40.0	23.3	46.7	30.0	36.7	20.0	23.3	16.7	20.0	10.0	46.7	30.0	
NGO membership														
Yes	429	34.7	22.6	49.9	32.2	24.7	16.3	18.9	13.1	8.2	3.6	52.9	35.0	
No	634	36.6	23.5	51.0	34.9	28.6	18.8	18.3	12.2	4.9	3.5	55.2	37.8	
Wealth index														
Poorest	234	36.3	24.4	53.4	34.2	27.4	16.7	17.5	12.8	6.4	3.4	57.7	38.9	
Poor	209	36.8	24.9	53.6	35.4	28.2	17.7	19.6	13.9	7.7	4.8	56.5	38.3	
Middle	199	38.9	23.6	50.8	35.9	25.0	17.5	18.9	11.8	5.2	3.3	55.2	38.7	
Rich	201	34.3	20.4	48.3	33.3	27.4	18.9	15.9	11.0	5.0	4.5	50.0	34.8	
Richest	207	35.8	22.2	46.4	30.0	27.1	18.4	20.8	13.0	6.8	5.8	51.7	32.4	
Number of women	1063	38.8	23.1	50.5	33.8	27.0	17.8	18.5	12.5	6.2	4.3	54.2	36.6	

Family Planning

Table 7.16 shows women's current use of family planning methods. About 72% of women used any method of contraception and 69% used modern methods. The pill was by far the most widely used method (33.4%), followed by injectable (21.0%), condom (6.6%), implant (3.9%), female sterilisation (2.9%), and others (1.1%). Only 2.6% used any traditional method of which periodic abstinence and withdrawal were the most prevalent. About 28.2% of women did not use any method.

Current use of contraception varies by age, reaching a peak of 77.1% among women aged 20-24 years, followed closely by adolescent women (76.1%). Women aged 35 years or more were less likely to use any family planning method. The oral pill is the most widely used method among all age groups and injectables are the second most widely used family planning choice.

There is a very little variation in contraceptive use by women's education or household socioeconomic status. Some variations in method choice were observed. Women with 10 or more years of schooling were more likely to use any modern method than women without any education. Similar trends were apparent for women living in higher socioeconomic households.

Table 7.17 displays the sources of contraceptive methods used by married woman. The private sector (73.2%), especially pharmacies and drug shops (69.0%), was the most mentioned source of contraceptive method, followed by the NGO sector (21.3%) and public sector (5.4%). Among the NGO sector, NGO static clinics (16.7%) were the major source.

Table 7.16: Women’s Current Use of Contraceptives by Selected Socio-demographic Characteristics

Characteristics	Number	Any method	Modern method						Traditional method				Not currently using		
			Any modern method	Pill	Inject-ables	Condoms	Female sterilization	Male sterilization	IUD	Implants	Any traditional method	Periodic abstinence		With- drawal	Other
Age (in years)															
15 - 19	368	76.1	75.0	39.7	15.0	14.1	0.0	0.3	0.5	5.4	1.1	0.8	0.3	0.0	23.9
20 - 24	624	79.0	77.1	38.3	22.6	9.0	0.5	0.3	0.8	5.6	1.9	1.6	0.2	0.2	21.0
25 - 29	675	78.8	76.9	40.4	24.2	4.6	2.5	0.7	0.3	4.2	1.9	1.5	0.2	0.3	21.2
30 - 34	398	76.6	73.9	31.2	26.9	6.8	5.0	1.3	0.3	2.3	2.8	2.3	0.5	0.0	23.4
35 - 49	792	55.2	50.9	21.8	16.8	2.8	5.4	0.8	0.1	2.5	4.3	3.2	0.6	0.5	44.8
Education (years of schooling)															
None	1082	63.0	59.7	27.9	20.2	2.7	4.0	0.9	0.3	3.4	3.3	2.7	0.3	0.4	37.0
1 - 5 years	1027	76.1	74.3	35.8	24.0	5.6	2.5	0.8	0.5	4.8	1.9	1.5	0.2	0.2	23.9
6 - 9 years	590	78.3	75.3	39.2	17.8	11.9	2.0	0.2	0.5	3.6	3.1	2.0	0.9	0.2	21.7
≥10 years	159	76.1	75.5	34.0	18.2	19.5	0.6	0.0	0.0	3.1	2.6	0.6	0.0	0.0	23.9
Wealth index															
Poorest	562	72.8	71.2	34.2	23.7	3.7	2.5	1.1	0.5	5.3	1.6	1.6	0.0	0.0	27.2
Poor	577	70.9	68.0	35.6	23.9	4.3	1.4	0.5	0.2	1.8	2.9	2.0	0.5	0.4	29.1
Middle	581	71.1	67.5	31.3	21.2	6.0	2.6	1.0	0.2	4.8	3.6	2.6	0.3	0.7	28.9
Rich	589	74.5	71.0	34.6	20.4	8.0	3.1	0.5	0.2	4.2	3.6	2.9	0.5	0.2	25.5
Richest	569	68.7	67.5	31.5	15.8	10.7	4.9	0.2	0.9	3.3	1.2	0.9	0.4	0.0	31.3
Number of women	2,858	71.6	69.0	33.4	21.0	6.6	2.9	0.7	0.4	3.9	2.6	2.0	0.4	0.2	28.4

Table 7.17: Sources of Modern Contraceptive Methods

Sources	Number	Per cent
Public sector	107	5.4
Medical college hospital/district hospital	61	3.1
Upazila Health Complex	12	0.6
Union Health & Family Welfare Centre	16	0.8
Satellite clinic/EPI outreach	4	0.2
Community Clinic	14	0.7
Private sector	1445	73.2
Private hospital/clinic	36	1.8
MBBS Doctors Chamber	6	0.3
Informal/unqualified doctor chamber	21	1.1
Pharmacy	1361	69.0
Other	21	1.1
NGO sector	421	21.3
NGO facility supported by UPHCSDP	62	3.1
NGO satellite clinic	27	1.4
NGO static clinic	330	16.7
Maternal child and welfare centre	2	0.1
Number of women	1,973	100

Adolescent Sexual and Reproductive Health

A randomly chosen sample of 826 adolescents were successfully located and interviewed. Of these respondents, 52.8% were female and 47.2% were male. About 16% of adolescents were married, and 31.2% were currently working. A significant number of study participants had access to television, a moderate number used internet and a relatively small number reported reading a newspaper (Table 7.18).

Table 7.18: Socio-demographic Characteristics of Adolescents Aged 10-19 Years

Characteristics	Number	Per cent
Sex		
Male	390	47.2
Female	436	52.8
Age in years		
10-13	297	35.7
14-16	237	28.6
16-19	297	35.7
Education (years of schooling)		
None	49	5.9
1-5 years	417	50.5
6+ years	360	43.6
Marital status		
Ever married	131	15.9
Never married	694	84.1
Currently working		
Yes	258	31.2
No	568	68.8
NGO membership		
Yes	338	40.9
No	488	59.1
Ever smoked		
Yes	70	8.5
No	756	91.5
Ever chewed smokeless tobacco		
Yes	20	2.4
No	806	97.6
Ever used drug		
Yes	19	2.3
No	807	97.7
Reading newspaper		
Yes	315	38.1
No	511	61.9
Has access to satellite television		
Yes	769	93.1
No	57	6.9
Has access to internet		
Yes	394	47.7
No	432	52.3
Number of adolescents	826	100.0

The most important sources of information about the physical and psychological changes that accompany puberty (51.4%) and sexual and reproductive health were parents (41.5%), followed by friends (16.2% and 21.2% respectively), other family members (15.3% and 16.7% respectively), school teachers (11.6% and 8.3% respectively), books/magazine/film (2.2% and 3.6% respectively), and doctors (1.6% and 4.8% respectively) (Table 7.19).

Table 7.19: Percentage Distribution of Adolescent’s Important and Preferred Sources of Information on Puberty and Sexual and Reproductive Health

Source	Puberty			Sexual and Reproductive Health		
	Most important	Second most important	Preferred	Most important	Second most important	Preferred
School teacher	11.6	6.9	6.5	8.3	4.4	5.8
Parents	51.4	29.5	14.3	41.5	27.6	11.2
Other family members	15.3	34.9	41.0	16.7	37.3	39.7
Friends	16.2	19.7	25.7	21.2	19.1	25.9
Books/films/magazines	2.2	6.5	8.6	3.6	6.5	9.5
Doctor	1.6	0.8	2.2	4.8	3.0	5.3
Other	1.7	1.7	1.8	3.9	2.1	2.6
Number of adolescents	810	780	742	805	758	723

Reproductive Health Knowledge

Reproductive physiology

Adolescents’ knowledge of reproductive health issues varied widely, but misperceptions were common (Table 7.20). About 27% of respondents knew that a woman can get pregnant at the time of first intercourse, and 19% were aware that pregnancy is most likely to occur in mid-cycle. Surprisingly, more than 60% of adolescents claimed that they knew nothing.

Condom

About 44% of adolescent respondents knew that condoms are effective for preventing pregnancy and 29.3% knew that condoms cannot be reused. More than two-thirds knew that condoms provide effective protection against HIV/AIDS and STIs, and nearly one-half of respondents knew that unmarried couples should use during sexual intercourse.

STDs and AIDS

Nearly 68% of adolescents had heard about HIV/AIDS. Among them, 24% believed that it is possible to cure. Only 18% of adolescents were aware of other sexually transmitted diseases (STDs), and familiarity with the signs and symptoms of STDs was poor; few knew that the likely symptoms of STIs in men include discharge from the penis (7.7%), pain during urination (11.5%), and ulcers/sores in the genital area (10.8%). Knowledge of signs and symptoms among female respondents was even lower.

Table 7.20: Percentage Distribution of Adolescent Knowledge Regarding Sexual and Reproductive Health

Aspect	Yes	No	Don't know
Reproductive physiology			
A woman can get pregnant at first intercourse	26.9	12.5	60.8
Pregnancy is most likely to occur in mid-cycle	18.6	10.2	71.2
Condoms			
Condoms are an effective method of preventing pregnancy	44.2	2.1	53.7
Condoms can be used more than once	10.2	29.3	60.5
Condoms are an effective way of protecting against STIs	44.4	1.3	54.2
Condoms are an effective way of protecting against HIV/AIDS	41.7	1.3	57.0
Condoms should be used if unmarried couple want to have sexual intercourse	48.7	2.2	49.2
It possible to cure AIDS	23.9	53.9	22.2
A person with HIV always looks emaciated or unhealthy in some way	50.2	16.1	33.7
People can take a simple test to find out whether they have HIV	50.5	25.8	23.8
Discharge and blood from the genitals are a sign of an STI in a man	7.7	59.6	32.7
Pain during urination is a sign of an STI in a man	11.5	6.8	81.7
Ulcers/sores in the genital area are a sign of an STI in a man	10.8	7.5	81.7
Discharge and blood from the genitals are a sign of an STI in a woman	16.6	6.3	77.1
Pain during urination is a sign of an STI in a woman	12.9	10.0	77.1
Ulcers/sores in the genital area are a sign of an STI in a woman	13.2	9.7	77.1

Conclusions and Policy Recommendations

Despite remarkable progress in health and development in Bangladesh, rapid unplanned urbanization is challenging these gains as evidenced in the worrisome state of slum health indicators discussed in Chapter 4. Considering the swelling numbers of urban poor living in slum settlements, actions are needed to address the adverse social determinants of health and to enhance access to needed healthcare services. Results from this study indicate that pregnant women in slums do not receive WHO's recommended four or more ANC check-ups, and many births remain unattended by a qualified healthcare professional. The situation is particularly bleak for the poorest and most disadvantaged women – only one third of whom accessed a full course of ANC and only 31% had their last delivery attended by a qualified professional. Equally concerning is that almost 26% of deliveries resulted in caesarean sections (CS) well above WHO recommended guidelines; CS rates constituted 44% of deliveries among the richest quintile, while among the poorest quintile, rates were as low as 14%, suggesting that needed emergency obstetric care may not always be availed. On an encouraging note, levels of contraceptive use among women living in slums was consistently high, irrespective of socio-demographic status, although most of the contraceptive supply was furnished from drug shops that are poorly regulated in terms of issues of quality and price.

The dignity and economic empowerment of women living in slums remains fragile. Study findings reveal that less than one-third of women have control over their earnings, and almost half agreed that some forms of spousal violence are justified, i.e., in instances of child neglect. These views are common to women irrespective of their socioeconomic position and educational attainment. Interestingly, substantial knowledge on HIV/AIDS exists, potentially due to non-governmental Organization (NGO) activities on creating awareness on this issue. However, adolescent knowledge of puberty and sexual and reproductive health remains rudimentary, pointing to the need to engage parents and schools more fundamentally around prevention and health promotion activities.

Access to primary healthcare is limited in urban slums in Bangladesh, with service provision mainly driven by NGO. Efforts by the Local Government Division to deliver urban primary care services by contracting out NGOs has had modest success, however, is insufficient to serve the full spectrum of health needs from maternal and child health, to NCD prevention and care, to adolescent health and HIV/STD services. Secondary and tertiary health care services provided by the

Ministry of Health and Family Welfare are equally inadequate. Therefore, to ensure the universal access to healthcare by 2030, it is crucial that Government take a stewardship role in strengthening urban health governance and affordable health care for all citizens. To fulfil SDGs 3 and 5 on health and gender equality respectively, the following policy recommendations are proposed:

- i. Programmes and policies supporting maternal and child health and should be designed to target the most disadvantaged sections of the urban population especially slum dwellers.
- ii. It is essential to promote sexual and reproductive health education in marginalised populations, especially adolescent slum dwellers, to prevent early marriage and childbearing and promote healthy sexual and reproductive health behaviours conducive to long-term health and well-being.
- iii. To ensure safe motherhood practices in slum populations, immediate action is required to increase facility-based delivery among the poorest population including those living in slums, and ensure that births are delivered by a healthcare professional.
- iv. Policies should be designed to provide needed emergency obstetric care for all slum dwellers, yet to minimize overuse of these services.
- v. Sexual education especially around HIV/AIDS and Sexually Transmitted Diseases (STDs) must be tailored for and promoted among vulnerable populations especially poorest, the least educated and adolescent boys and girls.
- vi. Policy and programmes should be designed to increase awareness of the rights of women to health and dignity, to decry and punish violence against women and promote women's empowerment.

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Chapter 8

Coping with Ill Health in Urban Slums- Health Seeking and Healthcare Expenditure

Shehrin Shaila Mahmood, Asiful Haidar Chowdhury, Mohammad Nahid Mia, Razib Chowdhury, Mohammad Iqbal, AHM Golam Mustafa, Abdur Razzaque & SMA Hanifi

Summary

The burden of rapid urbanization on existing physical, financial and other resources, together with limited municipal capacity to regulate, plan, or provide basic services, have contributed to growing disparities in urban health and nutritional status. These disparities are particularly stark comparing urban slum and non-slum areas. Lack of access to affordable health services for the slum population, their limited knowledge of available services and misconceptions around accessing healthcare, contribute to these disparities.

Currently, national out-of-pocket (OOP) health expenditure constitutes around 67% of total health expenditure in Bangladesh, with estimates that around 3.5% of the population is pushed under the poverty line as a result of catastrophic healthcare costs. This burden is particular onerous for the urban poor and disadvantaged, yet poorly documented. To address the paucity of data on out-of-pocket expenditures in urban slum populations, a health expenditure survey was conducted on individual treatment-related expenditures for acute illness, and coping mechanisms provoked by health-related financial shocks.

Care Seeking

Acute Illness: Among the 4,203 individuals surveyed, 40.4% reported experiencing illness during the four weeks preceding the survey. Among those ill, 93.3% sought some sort of care. The majority (66.1%) went to unqualified/informal healthcare providers, and only 28% sought care from a qualified (i.e. MBBS) medical doctor. The remainder sought care from a combination of traditional healthcare providers, homeopathic doctors, paramedics, religious healers and home treatment. Three quarters of those experiencing acute illness sought healthcare from pharmacies and only 6.2% went to public sector facilities. Use of UPHCSDP supported primary care clinics was very low at around 0.5% in areas where they provided services.

Hospitalization: Only 2.6% of individuals surveyed were admitted to hospital in the last 6 months before the survey for a variety of reasons (19.1% for infectious and parasitic disease; 17.3% for pregnancy and

child birth; 15.5% for injury and accident; 10.9% for gastro-intestinal tract disease; 7.3% for neurological disease; 5.5% for musculoskeletal disease; 4.6% for cardiovascular disease and rest for other reasons). Almost a third of patients chose public hospitals and the rest sought treatment from private hospitals or NGO clinics.

Chronic Illness: 23.6% of individuals surveyed reported some sort of chronic illness, of which 93% sought care for their illness. Fifty percent of chronic illness cases consulted MBBS doctors. Dyspepsia was reported to be the most common chronic illness (49.2% of all responses). Fifteen percent reported blood pressure issues. Other notable reported chronic illnesses were arthritis, diabetes, asthma, TB, heart disease, kidney disease and cancer.

Healthcare Expenditure: The median expenditure for treatment of acute illness during last four weeks preceding the survey was BDT 280, with medicine accounting for the largest share (71%) of total cost, followed by diagnostics (13%) and consultation fees (10%). Median treatment expenditure at private hospitals and clinics (BDT 1,100) was more than double that of public hospitals or clinics (BDT 570). Most paid for treatment in cash (96%) and some paid in instalments (4.7%). The median expenditure for any hospitalization occurring in the previous six months was BDT 11,110. Again, medicine accounted for a major share of the expenditure (21%), followed by room rent (13%) and diagnostic tests (12%). Private hospital expenditure was twice that of public hospitals and mainly paid with cash. About 38% of patients had to borrow money to pay these bills, and only 1.8% of hospitalized patients had their fees waived. Around 10% received donations from friends and family, and less than 1% was forced to sell assets to pay for hospital costs.

Reasons for not Seeking Care: The major reason for not seeking healthcare was lack of funds: 64% of the patients suffering from acute illness in last 4 weeks reported not seeking care due to lack of money.

Health-related Shocks and Coping Mechanisms: 15.1% of household heads reported experiencing a health-related shock. In almost 50% of cases, this health-related shock was linked to a fall in income. More than one-third (36.1%) of those experiencing a health-related shock reported a fall in food consumption and 11% had to sell assets to cope with the shock.

Recommendations: Results suggest the need to popularize use of public healthcare services among slum dwellers to increase access to

affordable quality care. Studies that elicit reasons for poor utilization are therefore needed. Investments in insurance mechanisms for slum dwellers offer promise as a means of buffering health-related financial shocks. Leveraging existing cooperative groups might also contribute to a mandatory health insurance scheme that is partially supported by the government, however, pilots are needed to establish their effectiveness. It is also recommended that facilities be established that help patients in slum areas manage chronic illness, thus reducing the burden of illness and related treatment expenses. Side by side, lifestyle modification strategies related to food habits, physical activity etc. can be designed and implemented to assist people at risk of developing NCDs through existing primary care facilities, and support group approaches.

Background

Rapid urbanization and the steady influx of rural populations into urban areas is exerting an extra burden on the physical, financial and other resources of towns and cities in Bangladesh (1). Estimates indicate that about eight million people (over 20%) of the 40 million urban population of Bangladesh live below the poverty line of US\$ 2 a day, the majority of whom live in urban slums (2). The capacity of governments to regulate, plan, or provide basic services in urban areas cannot keep pace with the rate of population growth (3). Although on average health and nutritional outcomes are better in urban versus rural areas of Bangladesh (4), stark differentials exist between urban slum and non-slum areas (5-7). A recent study, for example, showed that treatment seeking for acute respiratory illness was lower in slum areas compared to non-slum areas (5). This disparity is due to lack of access to affordable health services, limited knowledge of available services and misconceptions around accessing healthcare (8, 9) .

The health systems of urban areas differ substantially from those in rural areas of Bangladesh where the public health service delivery system of the Ministry of Health and Family Welfare (MoHFW) covers the spectrum of primary, secondary and tertiary care free of charge. In urban areas, the Ministry of Local Government, Rural Development and Cooperatives are responsible for primary health care provision. Due to lack of capacity, the large majority of primary care services are outsourced to non-government organizations (NGO) projects such as NGO Health Service Delivery Project (NHSDP) and Urban Primary Health Care Project. These projects mainly aim to improve health and nutrition of the urban poor, with a particular focus on improving access to quality maternal health services. Usually, these NGOs charge nominal

fees or subsidized rates for the provision of health services. Secondary and tertiary levels of MoHFW health care centres are present at Thana and District Municipalities of urban Bangladesh.

By far the biggest supplier of healthcare services in urban areas is the private health sector, which, unlike the public sector, charges fees for services provided. The mushrooming of private medical colleges since the 1990s, saw a rapid increase in private medical practice inclusive of pharmacies, diagnostic centres, clinics and hospitals. The share of non-formal private providers and traditional healers has also increased (7, 10, 11). In addition, the estimate for national level out-of-pocket (OOP) health expenditure stands as one of the highest in the world constituting around 67% of total health expenditure (12). Catastrophic health expenditures are estimated to push 3.5% of the population in Bangladesh under the poverty line (13). Costs and quality of health care has thus become a major concern for urban population, particularly for those with limited ability to pay.

Given the lack of data on healthcare expenditure in urban slums, a health expenditure survey was nested within the broader surveillance system to investigate out-of-pocket expenses for healthcare among slum households, and their financial consequences. Survey data was collected on individual treatment-related expenditures and coping mechanisms that households adopt when facing health-related financial shocks. This chapter reports on the major findings from this survey, taking advantage of the demographic and socioeconomic data furnished by the larger surveillance system, to investigate the equity aspect of healthcare expenditure.

Methodology

Study Area and Sample: From the broader urban demographic surveillance sample of 30,000 households comprising five slum areas in Dhaka and Gazipur City Corporations, a total of 1,200 households were randomly chosen for this study. Among these 1,200 households, 119 households migrated out and another 8 were absent, leaving a final sample of 1,023 households.

Respondents: Data were collected from the household head or an adult responsible household member able to provide information for the whole household. In case of children, their mothers provided the information.

Data collection, Supervision and Data Analysis: A cross sectional survey was implemented to collect information from all household members included in the sample during May-June 2016. A team of 16 Field Workers with a minimum of 12 years of schooling carried out the data collection under the guidance of three experienced supervisors. Data were collected using a Tablet (Samsung Galaxy Tab 4 SM-T231). To detect any anomalies in the data, the supervisors re-visited 5% of households (chosen randomly) within two days of data collection. Inconsistencies in the data were promptly addressed by supervisors and relevant Field Workers. Data analysis performed using STATA 13.1(v).

Definition of Variables

Household: A unit comprising a single individual or a group of related or unrelated individuals who live in the same compound and share food from common cooking pot and can identify one member as head of the household. Individuals who live outside the household but spend at least one night every month at the household are also considered members of the household.

Health Related Shock: Healthcare-related expenditure that creates financial stress on households in terms of reduced income from workdays lost, difficulty in paying for food expenses, and selling of assets to fund healthcare.

Acute Illness: Illnesses with rapid onset and short duration are considered acute illness. Information on acute illness was collected for the period of 4 weeks preceding the survey.

Chronic Illness: Any chronic illness diagnosed by a qualified healthcare provider was recorded, as were cases of reported illness with a duration of more than 3 months. Information on chronic illness was collected for the period of 6 months preceding the survey. Hospitalization: Information on any hospitalization was collected if it occurred in the six-month period preceding the survey.

Hospitalization: Information on any hospitalization was collected if it occurred in the six-month period preceding the survey.

Healthcare Expenditure: Median expenditures were reported due to the wide standard deviations apparent in these data. Category of healthcare expenditure include consultation fees, bed charge, OT charge, medicine, diagnostic, transportation, expenses for accompanying person, tips and other expenses.

Findings

Selected Demographic Characteristics of the Study Population

Among the study participants, there was an almost equal gender-distribution (49% males vs. 51% females). The majority of the population (59.6%) were from the active age group of 18-60 years. Under-five children represented around 11% of the population, while 4% was comprised of persons over 60 years of age. The average age of the population was 25.7 years. Average household size was 4.1 members: 52% of households had 3-4 members and 34.6% had 5 or more members. Almost three-quarters of the population aged 15 years or more were married and 18% were not married (Table 8.1).

Table 8.1: Selected Descriptive Statistics of Study Participants

Variables	Category	Per cent (n)
Sex (n=4203)	Male	48.92 (2,056)
	Female	51.06 (2,146)
	Transgender	0.02 (1)
Age category (n=4133)	0-5 years	11.32 (468)
	6-10 years	11.20 (463)
	11-17 years	14.15 (585)
	18-60 years	59.62 (2464)
	60+ years	3.7(153)
Household size category (n=1023)	1-2 members	13.49 (138)
	3-4 members	51.91 (531)
	5+ members	34.60 (354)
Marital status (among 15+ years) (n=2873)	Currently married	74.2 (2,135)
	Separated	2.1 (61)
	Divorced	0.8 (24)
	Widowed	5.2 (150)
	Unmarried	17.6 (506)

Health Seeking for Acute Illness

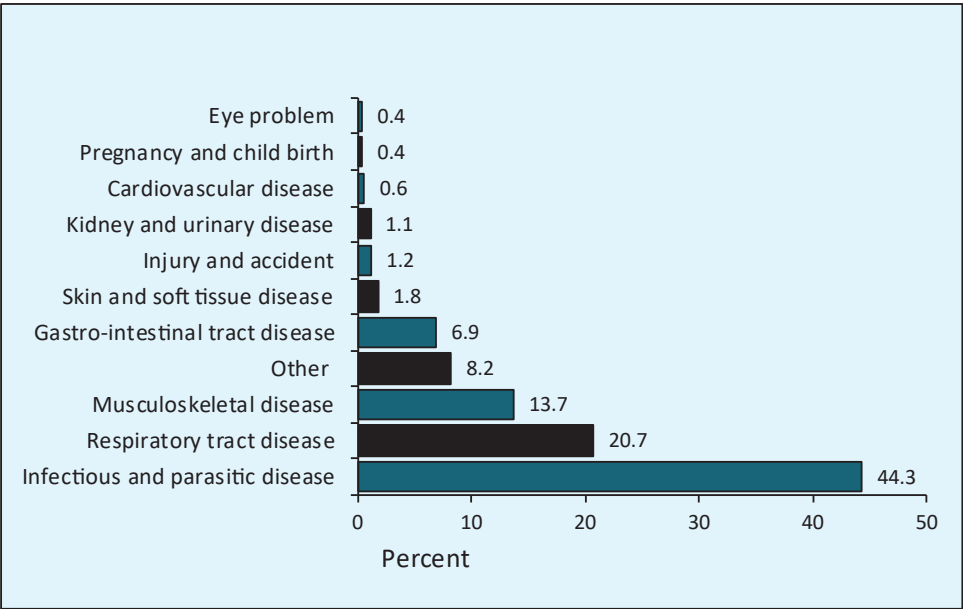
Of the total 4,203 participants in the study, 40.4% (n=1698) reported experiencing an acute illness in the preceding 4 weeks (Table 8.2). Infectious and parasitic diseases were the most common reported illness (44.3%), followed by respiratory tract disease (20.7%), musculoskeletal disease (13.7%), and gastro-intestinal tract disease (6.9%) (Figure 8.1). Almost all patients (93.3%) sought some form of care, be it self-treatment, home remedy or treatment from a healthcare provider. However, only 28% sought healthcare from a qualified healthcare provider (Table 8.4). Another 66% sought treatment from unqualified or informal healthcare providers practicing

modern medicine. Interestingly, 74% of the patients reported that they had sought care from local drug stores/pharmacies. Only 6.2% sought care from public health facilities (Table 8.4). The overall use of UPHCSDP supported facilities was low at around 0.2%, however this increased to 0.5% in areas that fell within the program’s coverage area.

Table 8.2: Percent of People Reporting Acute Illness and Seeking Treatment

Indicators	Per cent (n)
Individual suffering from acute illness	40.4(4,203)
Individual seeking healthcare for acute illness	93.3(1,695)
Individual getting hospitalized	2.6 (4,203)
Individual with chronic illness	23.6(4,199)
Individual with chronic illness seeking care	93.3(992)
Househol d experiencing health related shock	15.1 (1,000)

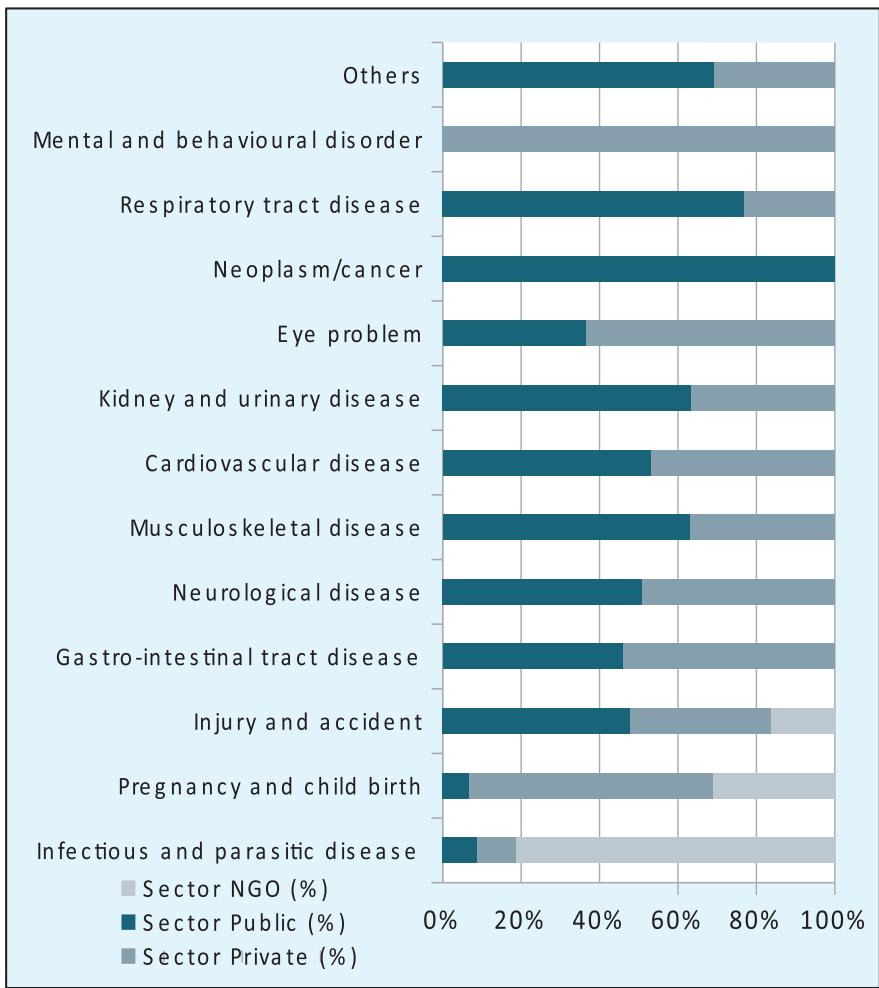
Figure 8.1: Type of Acute Illness



Hospitalization

Only 2.6% of the population (110 patients) were hospitalized in the 6 months preceding the survey (Table 8.2), with an average stay of 6.5 days. Of these cases, 19.1% were hospitalized to treat Infectious and parasitic disease, 17.3% for pregnancy and childbirth, 15% for injury and accidental, 10.9% for gastro-intestinal tract disease, 7.3% for cancer, and 4.6% for cardiovascular disease-related treatment. Public hospitals treated a comparatively higher share of complicated cases such cancer-related illness, accidents and injury and kidney disease (Figure 8.2). In total, around one-third of cases were admitted into public hospitals and about 1.6% was admitted to facilities supported by UPHCSDP (in areas where they provide services) and the rest were admitted into private hospitals or NGO clinics (Table 8.4).

Figure 8.2: Reason for Hospitalization by Type of Facility



Chronic Illness

A total of 992 individuals (23.6% of the population) reported suffering from a chronic illness, 93% of whom sought care for their illness at some point (Table 8.2). A higher proportion of those suffering chronic illness (50.4%) received treatment from formal, qualified doctors (MBBS) compared to those with acute illnesses (28.1%) (Table 8.3). Dyspepsia, commonly known as gastric/ulcer among the slum, was the most common chronic illness reported (78.3%), followed by high blood pressure (24%), arthritis (16.4%), diabetes (12.1%) and asthma (10.3%) (Figure 8.3). Information on place of seeking care was not collected for chronic illness given the tendency to use different sources for different episodes.

Figure 8.3: Type of Chronic Illness

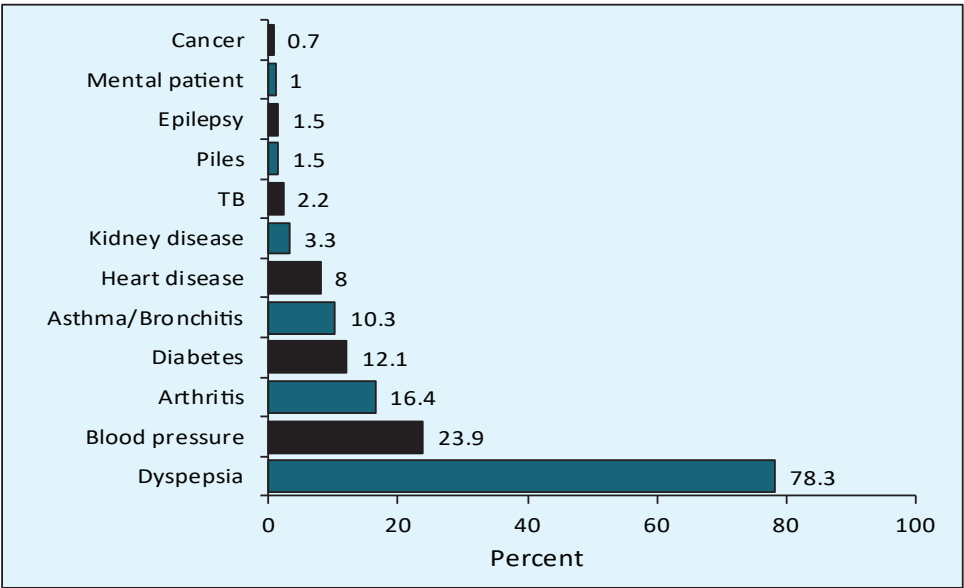


Table 8.3: Type of Healthcare Provider Consulted for Treatment of Acute and Chronic Illness

Type of provider	Reported sickness (%) in last 4 weeks (n=1582)	Chronic illness % (n=926)
MBBS	28.1	50.4
Informal/unqualified healthcare providers	66.1	45.5
Kabiraj/traditional healthcare providers	1.3	0.6
Homeopath	2.7	0.7
Paramedic/SACMO/BDS/MA	1.1	1.6
Religious healer	0.2	0.1
Home treatment	0.6	2.5

Table 8.4: Type of Healthcare Facility Visited for Hospitalization and Treatment of Acute Illness

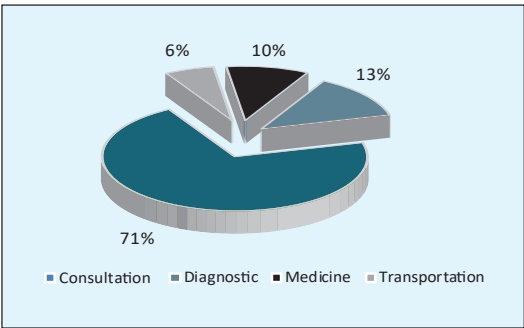
Facility Type	Hospital % (n=110)	Acute illness % (n=1602)
Public sector	31.8	6.2
Private sector	54.6	16.4
NGO Sector	12.7	1.6
NGO facility supported by UPHCSD	0.9 (1.6 in coverage area)	0.2 (0.5 in coverage area)
Pharmacy	-	74.0
Traditional practitioners place	-	1.5
Tele medicine/Phone	-	0.1

Healthcare Expenditure

Acute Illness

The median expenditure on treatment for acute illness was BDT 280 (Table 8.5). Medicine accounted for the largest share of total expenditure (71%), followed by diagnostics (13%) and consultation (10%). Transportation costs accounted for 6% of total expenditure (Figure 8.4, Table 8.6). The median expenditure for treatment at private hospitals or clinics (BDT 1100) was more than double the expenditure at public hospitals or clinics (BDT 570) (Table 8.7). However, the median cost of treatment at informal facilities like pharmacies and doctor’s chambers were lower ranging from BDT 200 to BDT 250 (Table 8.7). Most patients paid for treatment in cash (96%) and 4.7% paid in instalments. Only 1% of patients were exempted from payment and an even smaller proportion (0.1%) had insurance coverage to pay for health expenditure (Table 8.8). The large majority (86%) of patients paid medical bills directly while 9.6% reported having to borrow (Table 8.9).

Figure 8.4: Type of Spending as a Proportion of Total Expenditure on Acute Illness

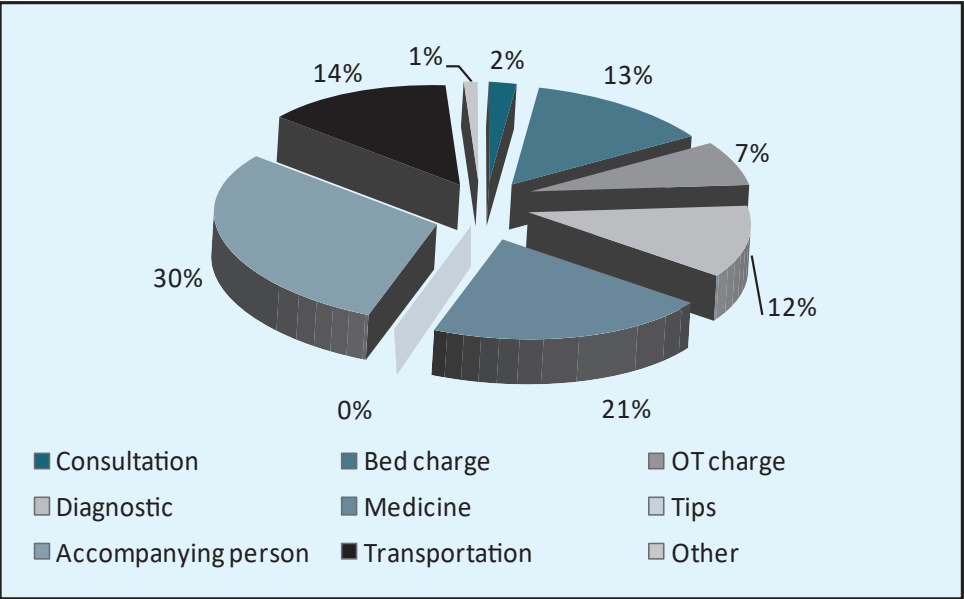


Hospitalization

The median expenditure for hospitalization was BDT 11,110 among those admitted to hospital in the 6 months preceding the survey (Table 8.5). This decreases to BDT 10,740 if the high costs of cancer treatment are omitted. Although many patients were unable to disaggregate hospitalization costs in terms of OT charge, bed charge, medicine, consultation, diagnostics etc., it appears that the majority share of expenditures supported the living costs of the person who accompanied the patient (30%), followed by the costs of medicine (21%), bed charges (13%) and diagnostic costs (12%)(Figure. 8.5). Healthcare expenses in private hospitals/clinics were more than double that of public hospitals (Table 8.7).

When asked about the mode of payment for hospital bills, 94% of patients reported paying hospital bills in cash, and 3.5% paid in instalments. Fees were waived by 1.8% of patients, and no insurance coverage was reported (Table 8.8). When asked about the source of funds, 38% of patients reported borrowing money to pay for the hospital bills. 10.4% received donations from relatives and friends, and 0.6% sold assets to pay for the hospital costs (Table 8.9).

Figure 8.5: Type of Spending as a Share of Total Expenditure on Hospitalization



Chronic Illness

Average monthly spending on treatment for chronic illness expressed as median expenditure, was BDT 255 (Table 8.5).

Table 8.5: Average Healthcare Expenditure

Cost	Median in BDT (range)
Hospitalization (n=110)	11110 (50-230000)
Hospitalization (excluding cancer cases (n=107)	10740 (50-92500)
Acute illness (n=1588)	280 (2-22000)
Average monthly expenses for chronic illness (n=887)	255 (10-6500)

Table 8.6: Average Healthcare Expenditure Disaggregated by Type of Service

Expenditure	Hospitalization cost (BDT) (n=110)	Healthcare expenditure for acute illness (BDT) (n=1588)
Consultation	49.0	59.5
Bed charge	369.1	-
OT charge	181.8	-
Medicine	603.2	428.5
Diagnostic	344.2	77.5
Transport	380.5	21.9
Tips/ Other	7.7	17.8
Accompanying person	848.4	-

Table 8.7: Average Expenditure for Hospitalization and Acute Illness by Type of Facility

Facility type	Median expenditure for hospitalization in BDT (range) (n=110)	Median expenditure for acute illness in BDT (range) (n=1568)
Public (Public sector hospital + UPHCSDP supported NGO clinic)	6800 (950-230000) n = 36	570.0 (10-20000) n = 99
Private (Private sector hospital/ clinic)	15250 (300-62300) n = 60	1100 (20-22000) n = 263
NGO (NGO sector hospital/ clinic)	720 (160-11500) n = 14	215.0 (40-4060) n = 24
Pharmacy	-	200.0 (2-5004) n = 1158
Traditional practitioner	-	250.0 (60-5000) n = 23
Telemedicine/ phone	-	130.0 (130-130) n = 1

Table 8.8: Method of Payment for Treatment*

Payment Type	Hospitalization % (Number)	Acute illness % (Number)
Cash	93.9 (107)	93.3 (1515)
Waived/exempted	1.8 (2)	0.9 (15)
Paid in kind	0	0.1 (1)
Instalment/credit	3.5 (4)	4.6 (75)
Insurance	0	0.1 (1)
Others	0.9 (1)	0.9 (16)
Total	100 (114)	100 (1623)

*Multiple responses were recorded

Table 8.9: Source of Funds for Hospital Bill Payment and Treatment of Acute Illness

Source of fund	Hospitalization % (Number)	Acute illness % (Number)
Own cash	48.6 (79)	86 (1453)
Borrowed money	38 (62)	9.6 (162)
Sold assets	0.6 (1)	-
Donation (friend, relatives)	10.4 (17)	1.5 (26)
Insurance	0.0	0.2 (4)
Others	0.6 (1)	1.6 (27)
Was exempted	1.8 (3)	1 (17)
Total	100 (163)	100 (1689)

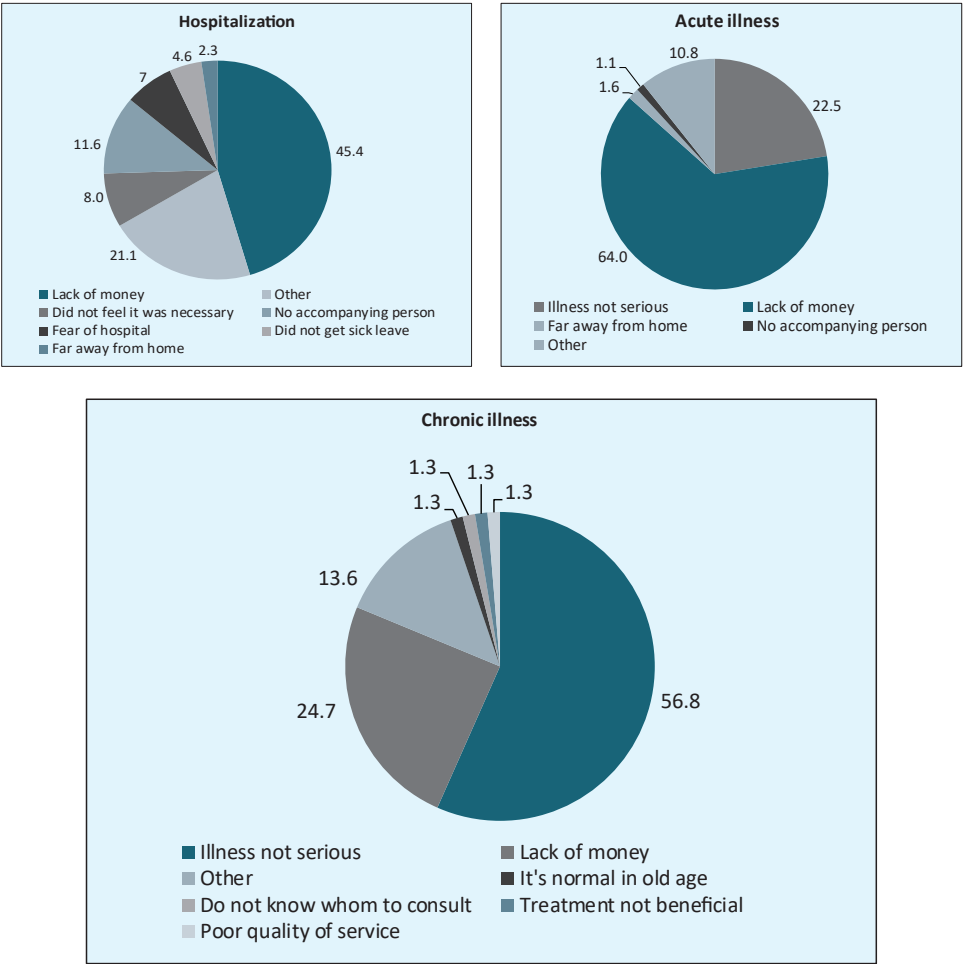
Reasons for not Seeking Healthcare

For acute illness, lack of money was the major reason for not seeking care (64%) followed by illness not being perceived as serious or needing treatment (22.5%) (Figure 8.6).

Although 176 individuals felt the need for hospitalization during the 6 months preceding the survey, only around 62% of them were admitted. Multiple reasons were provided for not getting admitted even when the need was felt. The most common was lack of money (45.4 %), followed by lack of people to accompany the patient (11.6%), because the doctor at the hospital did not feel it was necessary (8.0%), 'fear of hospital' (7.0%), not getting leave from work (4.6%) and distance from the facility (2.3%) (Figure 8.6).

For chronic illness patients, the majority did not think their illness was serious enough to be treated (56.8%). However, 25% of patients stated that they could not seek care due to lack of funds (Figure 8.6).

Figure 8.6: Reasons for Not Seeking Healthcare

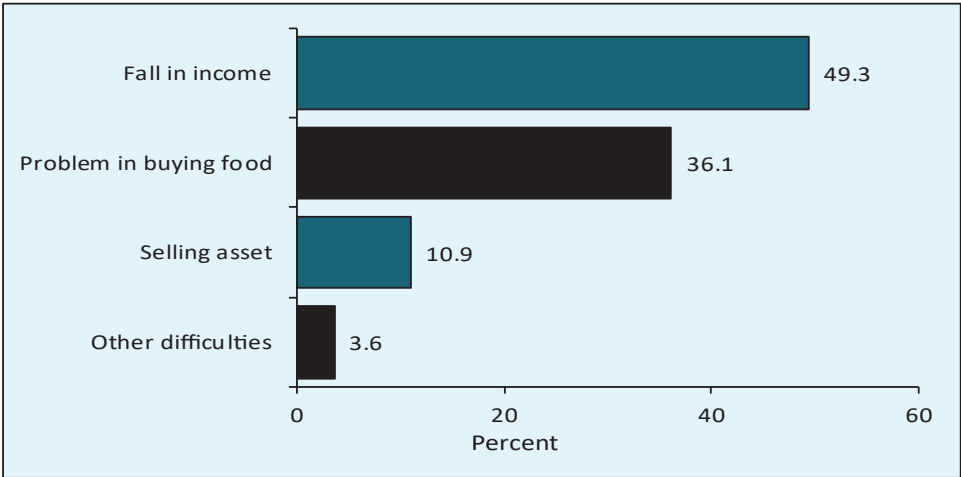


Health-related Shocks and Coping Mechanisms

About 15% of household heads (151 of 1,023 surveyed), reported experiencing health-related shocks, defined here as healthcare-related expenditures that provoke financial stress due to reduced income from workdays lost, difficulty in paying for food expenses, and asset sale to fund healthcare etc.

Multiple effects of health-related shocks due to illness were experienced, the most common of which was a fall in income (49.3%). Problems in buying food for the household (36.1%), sale of assets (10.9%) and other difficulties (3.6%) were also reported such as cutting down on additional expenses which were not deemed necessary (like entertainment expenses) and borrowing or taking out loans from NGO savings programs (Figure 8.7).

Figure 8.7: Effects of Health-related Shocks on Household Welfare



Conclusions and Recommendations

Study findings highlight important aspects of healthcare seeking behaviour and related healthcare expenditures of slum dwellers in Dhaka and Gazipur city corporations. In general, the use of qualified healthcare, i.e. service from MBBS doctors, was low, particularly for treating acute illnesses (28%) that occurred in the last four weeks preceding the survey. The percentage of treatment-seeking from qualified doctors was comparatively higher (50.4%) for chronic illnesses. Local drug shops played a significant role in providing healthcare for acute illnesses (74%), eliciting concerns related to the sale of drugs without prescription and the irrational or inappropriate use of drugs as a result.

With regards to healthcare expenditure, most striking was the share of out-of-pocket expenditure in total health expenditure for households. Median expenditure for acute illness was higher in private hospitals and clinics (BDT 1100) as compared to public hospital or clinics (BDT 570). However, when all facilities in private sector are considered, median expenditure in private facilities is lower than public facilities. This is due to the fact that a large majority of the patients sought care from informal providers where the median expenditure was much lower (BDT 200-250). Further, it is also likely that only severe cases sought care from hospitals and clinics, treatment of which tend to be more costly. As expected Hospitalization-related costs, occupied the major share of healthcare expenditure for households. Most patients were admitted to private facilities, even though median expenses for hospitalization were twice that of public hospitals. What is striking is that despite spending such large amounts on healthcare out-of-pocket, many slum dwellers end up receiving poor or questionable quality of care from providers who are not formally trained to provide healthcare.

Lack of finances hindered health seeking for many as this was the major reason reported by respondents for not seeking healthcare. Further, high levels of OOP provoked health-related shocks for households in terms of lowering their income, forcing the sale of assets and cutting down on food and other household expenses. At a time when global development leaders are setting targets to achieve universal health coverage, study findings are alarming and demand urgent attention. Specifically, the following actions are recommended:

- i. Available local public sector facilities need to be popularized among slum dwellers in efforts to increase access to quality care.
- ii. In-depth research is needed to ascertain the reasons behind poor utilization of public sector health facilities in slum areas, including those supported by the urban primary healthcare service delivery project.
- iii. The development of insurance mechanisms that pool the risk of ill health among slum dwellers is proposed as a means of shielding slum dwellers from health-related financial shocks and being pushed further into poverty. An effectiveness trial that leverages existing cooperative groups around a mandatory health insurance scheme that is partially supported by the government is one of a variety of approaches that can be tested.
- iv. The development of chronic disease management centres in slum areas offer promise in reducing the burden of illness and its related expenses among affected patients. Side by side, lifestyle modification strategies related to food habits, physical activity etc. can be designed and implemented to assist people at risk of developing NCDs through existing primary care facilities, and support group approaches.

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Slum Health in Bangladesh

Insights from Health and Demographic Surveillance

"This book opens the eyes of researchers, students, faculty, policy-makers and the general public to the health and population dynamics of slum dwellers in Dhaka (North & South) and Gazipur City Corporations, Bangladesh. It has used a robust and well-tested research platform-the health and demographic surveillance system-which enabled the researchers to identify and quantify the key issues that should be included in planning and policy development for such populations. As low- and middle-income countries continue to grapple with the challenges of rapid urbanisation which often leads to the mushrooming of slum settlements, the Bangladeshi examples presented in this book would be found invaluable by other countries".

Dr. Osman A. Sankoh

Statistician General, Statistics Sierra Leone
Executive Director, INDEPTH Network of HDSS sites in Africa,
Asia and Oceania (October 2007-March 2018)

"During the last four decades, slums and slum dwellers of Dhaka have received attentions of researchers of many discipliners including geographers, economists, sociologists, anthropologists, urban planners and health scientists. icddr,b has also conducted several important research studies on slums of Dhaka city. The latest in the series is the present study on Slum Health in Bangladesh-insights from health and demographic surveillance. The study has applied a sound methodology.

Slum dwellers of Dhaka are overwhelmingly (more than 90% of heads of household) migrants from rural areas. Many of them have been able to adapt themselves with the urban way of life but have to struggle very hard to access minimum standard of shelter, health and other socio-economic services. The study has highlighted some such critical issues of slum life and living".

Professor Nazrul Islam

Urbanist and Honorary Chairman
Centre for Urban Studies (CUS), Dhaka

68, Shaheed Tajuddin Ahmed Sarani, Mohakhali, Dhaka 1212
T (88 02) 9827001-10, E info@icddr.org
GPO Box 128, Dhaka 1000, Bangladesh

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