

Factors Affecting the Performance of Delivery Centre

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Acronyms

ANC	Antenatal Care
ARI	Acute Respiratory Tract Infection
BDT	Bangladesh Taka
BHP	BRAC Health Programme
CHW	Community Health Worker
DC	Delivery Centre
EDD	Expected Date of Delivery
LBW	Low Birth Weight
MMW	Manoshi Midwife
MNCH	Maternal, Neonatal and Child Health
MWH	Maternity Waiting Home
NGO	Non-governmental Organization
PNC	Postnatal care
PO	Programme Organizer
SK	<i>Shasthya Kormi</i>
SS	<i>Shasthya Shebika</i>
TBA	Traditional Birth Attendent
TT	Tetanus Toxoid
UBA	Urban Birth Attendants
UPHCP	Urban Primary Health Care Project
WHO	World Health Organization
WSG	Women Support Group

Abstract

The study aimed to measure the performance of delivery centres (DC) and explore the factors related to performance of DCs. Data were collected using qualitative methods during December 2009 – January 2010 from six DCs in the slums of Dhaka city. Findings reveal that the DCs at Magbazar and Kamrangir Char performed 'well' due to availability of community health workers (CHW), their emotional support and caring attitude, regular antenatal care (ANC) visits, convenient location, cleanliness and free services of the DCs. The DCs at Madertek and Shyampur performed 'average' and Ramna and Kotwali DCs performed poor. Poor performance was largely due to lack of CHWs, less motivation, frequent dropout due to low remuneration, and recurrent slum demolition. As women reported, the reasons for not attending DCs was fear of being referred to the hospital which might compel them to have a caesarean delivery, lack of comprehensive services at DCs including doctor-assisted normal deliveries, medicines, and emergency case management. Neonatal mortality rate in poor performed DCs found to be high. The respondents suggested that instead of referring women for minor complications, DCs should be competent of providing supervised skilled service package with basic treatment during childbirth, tetanus toxoid during ANC and child immunizations and postnatal care.

The performance of delivery centre V

Executive summary

In January 2007, BRAC initiated intensive health interventions to reduce maternal, neonatal and child deaths under a maternal, neonatal and child health (MNCH) programme called Manoshi¹ customized for the urban poor of Dhaka city through domiciliary and facility approach using a cadre of community health workers (CHW) including Manoshi midwives (MMW), urban birth attendants (UBA), *Shasthya shebikas* (SS) and *Shasthya kormis* (SK) recruited from the local slum community. Expectant women are identified by SSs and SKs confirm and keep records and provide monthly antenatal care (ANC) in the community. Clean and safe delivery services are provided by UBAs and MMWs free of charge through easily accessible DCs (DC) established in slums. With maintenance of privacy SS accompanies birthing women and participates in birth event to assist UBAs. The activities are supervised by the programme organizers (PO). CHWs are responsible for detecting and referring maternal complications from DCs, soon after recognition they immediately inform referral POs placed in a teaching hospital and respective POs in the community. It is vital to measure the performance of DCs along with recognizing women's' expectations as well as provider's technical standard. The study aimed to measure the performance of DCs and explore the factors related to well and poor performance of DC in Dhaka city slums.

Methods

An exploratory qualitative study was carried out during December 2009 – January 2010 in six DCs in the slums under Dhaka City Corporation. In-depth interviews were carried out with 36 mothers who received care from DCs and who did not, and 35 informal discussions were carried out with CHWs such as UBA, SS, SK, MMW and PO using a check list. Women those were registered for ANC by CHWs were included in this study.

Operational definition of the performance of DC

In measuring the performance of the DCs, categorization of performing well or poor was done using composite score for each criterion. Scoring and grading performed based on the programme record of last one year from the date of data collection and responses from mothers. Nine parameters were worked out including availability of CHWs, homestead and delivery care at DCs, proportion of deliveries at home and DCs, proportion of referrals, CHWs' behaviour towards women, maternal and neonatal outcome, whom coded 0 to 3. The preference-ranking exercise (prepared priority inventory based on average score of listed component to explore reasons for attending or not attending DCs) helped identifying priority responses. Using these

¹ Manoshi is the abbreviation of some Bengali words - *Ma Nobajatak O Shishu*. These words talk about mother, newborn and child.

factors, a scale was composed ranging from 0–13 to assess the performance of selected DCs. Based upon prior assessment of CHWs performance by Alam *et al.* (2011) and assessing client perception in terms of awareness, satisfaction and service utilization by Banerjee (2003), we categorized 8–13 as “well” performed DC (grade A), 5–7 as “average” (grade B), and ≤ 4 as “poor” (grade C).

Thematic analysis along with the preference-ranking exercise, scoring and grading approach we used to identify priority responses where needed and gauged the performance of DCs.

Results

Findings reveal that DCs in Magbazar and Kamrangir Char were found to be performed well. Around 50% of deliveries took place at these DCs catchments. The reported reason behind performing well was the availability of community health cadres throughout the year and their behaviour towards women was reported well including existing services at home and at centre. Majority of the women in those areas received more than four ANC visits and attended EDD (expected date of delivery) meeting where they received health education. Most of the CHWs mentioned that routine home visits assist in building rapport with community people which help in motivating women to attend DCs for safe delivery. In addition, UBAs were recruited from neighbouring and familiar locally as trained traditional birth attendants (TBA) that made women comfortable during childbirth. Geographical distance was also convenient for the women to attend the DCs, on an average it was 7 to 15 minutes walk. Commonly rickshaw and tri-wheeler can be used to reach to or to refer women from those centres. The DCs at Madertek and Shyampur performed ‘average’ and DCs at Ramna and Kotwali performed ‘poor’. Unavailability or lack of CHWs had been a great challenge in poor performing DCs. Neonatal mortality rate in both Ramna and Kotwali were found to be high.

Majority of the women expressed the reasons for attending DCs in well and average performing areas. DCs were seemed to them more cleanly compared to their home, services offered were free. Also mentioned that CHWs paid regular home visits, and they communicated with mothers and shared information regarding health and nutrition during antenatal check-up. Furthermore, when they visited DCs for having childbirth, expressed their satisfaction primarily with the care received includes good behaviour of CHWs, received emotional support and caring attitude from CHWs.

In poor performing areas, the core reasons for not informing CHWs about labour pain and for having home deliveries were fear of being referred to the hospital which might compel women to have a caesarean delivery. Furthermore, expectation of women receiving comprehensive services from DCs including skilled services, medicines for labour induction and emergency case management attracted women to use DCs.

There are a number of challenges in poor performed areas including the CHWs (SS, SK and UBAs) were less motivation and frequent dropout of CHWs because of low remuneration and recurrent slum demolition. For this reason CHWs failed to

communicate and motivate women to receive services from DCs during childbirth. Collective referral of home and DC for maternal complications from home and DC found high in all areas catchments except Kamrangir Char. The identified reason was many government and non-governmental organizations (NGO) facilities were a stone throw distance to the slum dwellers.

Conclusion and recommendations

The study shows that Kamrangir Char and Magbazar DCs were found to be 'well' performed, Madartek and Shyampur DCs were performed 'average' and DCs in Ramna and Kotwali were performing 'poor'. Mothers suggested that instead of referring women for minor complications, DC should be competent of managing those patients including providing basic treatment during ANC and childbirth, tetanus toxoid (TT) in ANC and child immunizations. Programme may think about supervised skilled services during deliveries in DCs including labour induction.

Given the existing scenario, the programme needs to pay attention to the 'poor' performed DCs in Ramna and Kotwali in developing alternative strategies to enhance collaboration with existing health facilities. As the government and other NGO health facilities are functional in poor performing areas, Manoshi programme may provide more attention on community mobilization on ANC, safe delivery, PNC, and appropriate referral for obstetric and neonatal complications.

Introduction

An estimated 529,000 maternal deaths occur globally each year from complications during pregnancy and childbirth; among those Asia alone contributes 253,000 (WHO 2004). Over 70% of obstetric deaths both in high income and low income countries are due to direct maternal causes, such as haemorrhage, sepsis, complications of unsafe abortion, hypertensive disorder of pregnancy and obstructed labour (Fournier *et al.* 2009, Ziraba *et al.* 2009a, Nasreen *et al.* 2006, Khatun *et al.* 2000). Although maternal mortality ratio (MMR) declined from 3.20 to 1.94 per 1,000 live births (NIPORT, Measure Evaluation, UNC-CH, USA, ICDDR,B, 2011) obstetric deaths contribute 14% of deaths among women of reproductive age (Gill and Ahmed 2004, Islam *et al.* 2005, NIPORT, Measure Evaluation, UNC-CH, USA, ICDDR,B. 2011).

To prevent the overwhelming majority of maternal mortality from direct maternal causes, globally many strategies have been implemented (Lubbock and Stephenson 2008). In an attempt to make pregnancy and childbirth safer, women have to access continuum of life-saving obstetric care during complications (WHO 1996). Since the beginning of the 20th century, this concept led many western countries (Northern Europe, Canada and United States) establishing maternity homes for pregnant women serving in remote geographic areas. Bridging the geographical gap in obstetric care in rural and marginalized women in urban, in Eastern Nigeria in the 1950s the trial maternity waiting homes (MWH) were established which were known as 'maternity villages' (WHO 1996, Ministry of Health, Cambodia 2010). MWH is a residential facility, positioned near the well equipped medical facility where women with uncomplicated pregnancy can stay shortly before delivery and await labour (Lonkhuijzen *et al.* 2009, Eckermann 2008). Once labour starts, women move to health facility so they can be assisted by a skilled birth attendant (WHO 2004). Traditional and modern style huts with kitchen and toilet facility in Zimbabwe and Ethiopia; women are regularly visited by a nurse, midwife or doctor during the time of their staying (Lonkhuijzen *et al.* 2009). In Bangladesh, the World Mission Prayer League of LAMB Hospital, Dinajpur, has a small facility where identified high risk pregnant women are encouraged to come to await delivery at the hospital since 1990. It has the facility of antenatal check-up, health education on nutrition, and free board with meals. Hospital is only a stone's throw from the waiting facility so the women can access in case of complications (WHO 1996).

In urban slums, poor hygiene and overcrowding, lack of basic amenities (such as water and sanitation), and low availability and use of formal health services including maternity care make women highly vulnerable (UN 2004, Asghar 1999). Dhaka alone has 3.4 million slum population (Ahsan *et al.* 2008) and akin to other health indicators, maternal health status is very poor (Ziraba *et al.* 2009b, AbouZahr 2003, Magadi *et al.* 2001). Even though women living near the facilities with skilled care, 70% of women in urban slum give birth at home with no-medically trained providers,

The performance of delivery centre	1
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18% women were assisted by skilled personnel (Fronczak *et al.* 2007, NIPORT, ICDDR,B, ACP, and USAID/Bangladesh, 2008). Women face problem due to harmful practices in home deliveries includes: giving birth on a dirty surface, lack of hand washing by birth attendants, guarding the perineum with foot, frequent vaginal examination, introducing of oil into the vagina, traditional methods commonly used to stop bleeding such as - pressure on abdomen with hand, knee, putting stool and other objects into mouth to hasten delivery of the infant or expel the placenta (Fronczak *et al.* 2007, Goodburn *et al.* 1995). On the other hand, women's experiences of the health system in low income countries found unfavourable, especially in public hospital comprises tremendous cost, lack of privacy, treated badly by health staff, unavailability of doctors and other logistic supplies (Eckermann and Deodato 2008, Nasreen *et al.* 2006, Onah *et al.* 2006, Afsana 2004, Griffiths and Stephenson 2001). Traditional belief, sex of health worker, restricted mobility of women, young providers, delivery horizontally in the gynaecological position discourage women from seeking health services in low revenue countries (Amazigo 1996, Zhang 1996, Kalim *et al.* 2009, Nahar *et al.* 2011).

Considering this aspect and with the concept of MWH, in 2007 BRAC initiated an intervention named Manoshi²; maternal, neonatal and child health (MNCH) programme for the urban poor of Dhaka through domiciliary and facility approach. This is conducted by a cadre of community health workers (CHW) including urban birth attendant (UBA), *Shasthya Shebika* (SS) and *Shasthya Kormi* (SK) recruited from the local slum community. SSs, the community health volunteer, identify expectant women and SKs confirm and record it on registers and provide monthly antenatal check-up in the community. Clean and safe delivery services are provided by UBA and Manoshi midwives (MMW) with no charge through easily accessible DCs established in slums (BRAC 2008). The main constituent of Manoshi is the DC at the community setting, one for each 2,000 households (covering a population of 10,000-15,000), adhering to set standards of hygiene and supported by trained UBA and supervised by MMW and medical doctors. Women are allowed to have child birth both in horizontal and squatting position. DC provides special emphasis to assist clean and safe delivery with maintenance of privacy. Two trained UBAs are designated to work in DC and assist in clean delivery with the support of SS. They are also trained to provide essential newborn care which includes drying and wrapping the baby right way following delivery, putting the baby to mother's breast for initiation of breastfeeding. They are also trained in diagnosing and managing birth asphyxia. The birthing women are usually allowed to stay for 12 hours after the baby is born. All these activities are supervised by the programme organizer (PO). CHWs are responsible for detecting and referring maternal complications, soon after recognition they immediately inform referral PO placed in a teaching hospital and respective PO in the community. They help organize transport, generally it is 'Ad-Din' ambulance services (assigned by Manoshi) whereby Manoshi staff can call for quick transfer. In 2008, 241 MNCH committees and 241 women support groups (WSG) were formed in order to community empowerment, social advocacy to build

² Manoshi is the abbreviation of some Bengali words - *Ma Nqbajatak O Shishu*. These words talk about mother, newborn and child.

awareness regarding MNCH care and practices, creating emergency fund for immediate financial support, referring patients to hospital and help in social autopsy process (Manoshi 2008-2009).

Thus, it is important to assess the performance of DC based on availability of services and understand women's perception and expectations regarding the services of Manoshi. Quality assurance project describes measuring the performance of a facility is a multifaceted concept includes client expectations as well as provider's technical standard (Creel *et al.* 2002). A study in China measured quality of services of health facility depending on women perception (Lomoro *et al.* 2002) and some factors affect the performance of a health facility and influence the choice of place of delivery which includes promptness of care, availability of doctors, health education, 24 hours presence of doctors, team work among health workers (Onah *et al.* 2006). The study aimed to measure the performance of DCs and explore the factors related to well and poor performance of DC in Dhaka city slums.

Specific objectives are

1. To compare the availability and behaviour of CHWs (PO, MMW, SK, UBA and SS) towards women in well and poor performed DCs,
2. To identify the physical communication, services offered, and outcome of services,
3. To find out the reasons for receiving and not receiving the services provided by DCs and client satisfactions, and
4. Compare the proportion of deliveries and referral from the DCs and from its catchments.

The performance of delivery centre	3
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Methods

An exploratory study on factors responsible for well and less performance of DCs was carried out in Dhaka city slums during December 2009 – January 2010 using qualitative research techniques.

Study area

The study was implemented in three slum regions of Manoshi programme (Gulshan, Dhanmondi and Jatrabari). Among the 41 DCs, the study underwent in six purposively selected DCs from Magbazar, Madartek, Kamranginr Char, Ramna, Kotwali, and Shyampur branch offices. In the slums of Dhaka city, the people are predominantly Muslim (96%), currently married (99%) and unemployed (83%). The housing, ventilation, water and sanitation, garbage cleaning and drainage, health and education of children are poor. The household population are mostly young (< 30 years) and population pyramid is wide, showing that more than a quarter of population is under five years of age. Educational attainment in terms of ever attending school is 66%. In 2009, around 42% pregnant women in Manoshi areas received four or more ANC visits and approximately half of them received message regarding diet, rest, not to lift heavy items, and measured blood pressure and weight. In intervention areas institutional delivery accounted for 50% in which half of them were delivered at DC; mostly assisted by BRAC midwives (14.3%). Furthermore, 91 % newborn received colostrums feeding within one day and 55% of the mothers received at least one postnatal visit (Alam *et al.* 2010).

Study population

Study population included women who received care from DCs during child birth and women who did not, one month before data collection in November 2009. We purposively selected 36 women from SK registers who received antenatal care from Manoshi (June-October 2009). Among them, we interviewed three mothers who received delivery care from DCs and three who did not, from each DC catchments. Respondents were identified in the community with the help of key informants. Furthermore, 35 informal discussions were carried out with CHWs such as UBAs, SS, SK, MMW and PO based upon their availability in the aforementioned areas (Table 1). Women those were registered for ANC by CHWs were included in this study.

Table 1. Distribution of types of respondent

Respondents	Type of interview	Magbazar	Kamrangir Char	Madartek	Shyampur	Ramna	Kotwali	Total
Received care from DC	In-depth	3	3	3	3	3	3	18
Did not receive care from DC	Do	3	3	3	3	3	3	18
SS	Informal discussion	2	2	2	2	2	2	12
SK	Do	1	1	1	1	1	-	5
UBA	Do	1	1	1	1	1	1	6
MMW	Do	1	1	1	1	1	1	6
PO	Do	1	1	1	1	1	1	6

Study instruments

Different types of checklists were prepared to collect relevant information from the study participants. We obtained information on DCs including availability of different community health providers, numbers of expectant women identified by CHWs, numbers of deliveries at DC and at home, and numbers of referral from both DCs and home. We also collected information on a range of issues on socio-demographic characteristics, services received from Manoshi during pregnancy (ANC) and maternity care from DCs, reasons for receiving or not receiving services from DC, reasons of hospital referrals, satisfaction on services received, availability of other health facilities beside DCs, distance and communication facilities to DCs, suggestions regarding improving the services at DC. A checklist of 26-openended questions was employed to collect information on health providers' duty, workload, and reason for dropout, reason for performing well or poor by DCs, and advice for improving services.

Data collection and quality control

Checklists were pre-tested, and the appropriateness of the language, sequencing of questions and time needed to complete the interview were assessed. One researcher (public health) and two research assistants (social science) involved in the study received a 2-day training consisting of lectures, mock interview and data collection procedure at community level. The interviewers used probing and question-rephrasing techniques to clarify questions and obtain details from the mothers. Field notes were taken by the researcher and research assistants in note pads.

Operational definition and measuring the performance of DC

In direction to measure the performance of DCs, nine parameters were worked out including services, its outcome and mother's responses. DCs' performance through mother's viewpoint encompassed four indicators including kind of services she

The performance of delivery centre	5
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received such as ANC (detection of anaemia, oedema, measurement of blood pressure and external abdominal examination) and health education (health, nutrition, hygiene, obstetric danger signs and birth preparedness) in EDD meeting; delivery attendants at DC, PNC, perception of the services provided at DC (delivery care, CHWs behaviour towards women), and accessibility, availability of CHWs, and availability of services at DCs for 24 hours while received care. One of the indicators was the number of deliveries took place in DC during December 2008-November 2009. The programme considered the performance of DC as 'well' if 50% and more deliveries were conducted at that DC, and as 'poor' if less than 30% of the deliveries took place (programme data). Furthermore, based on programme records the proportion of deliveries at DCs and home, proportion of referrals from DCs, maternal and neonatal health outcome condensed into five indicators to measure performance of DCs.

Each of all the nine factors was coded 0 to 3, measuring performance of DCs (Table 2). The preference-ranking exercise (prepared priority inventory based on average score of listed component to explore reasons for attending or not attending DCs) helped identifying priority responses. Using these factors, a scale was composed ranging from 0–13 to assess the performance of selected DCs. World Health Organization (WHO) estimated that 15% of pregnancies develop life threatening complications which require special care (Islam *et al.* 2005, Ali *et al.* 2005). Taking this estimation, we counted zero in case of referring women more than 15% from DCs as it was counted as excess referring. In 2009, it was revealed that delivery pattern has been changed from the baseline in 2007. Home deliveries were found to be decreased from 84% to 25% over the period (Manoshi 2008-09). Thus, we conferred the highest score to the DC in case of home deliveries less than 25% in DC catchments. To measure the outcome of the delivery at DC, we score one for healthy mother and neonate, and 0 for maternal or neonatal death.

Table 2. Process of scoring to assess DC performance

Criterion	Last one year period	Points
1. Availability of CHWs	All found available	2
	Some cadre dropout/	1
	Unavailable	0
2. Availability of homestead service (ANC, PNC, health education)	Yes	1
	No	0
3. Availability of delivery services/UBA	Yes	1
	No	0
4. Proportion of deliveries at DC	≥ 50%	2
	20 -49%	1
	< 20%	0
5. Proportion of referral from DC	≥ 15%	0
	10-14%	1
	< 10%	2
6. Proportion of home deliveries in DC catchments	> 50%	0
	25 -50%	1
	< 25%	2
7. Health providers behaviour	Good	1
	Harsh	0
8. Maternal outcome	In good healthy	1
	Maternal death	0
9. Neonatal outcome	In good healthy	1
	Neonatal death	0
Total		13

Based upon prior assessment of CHWs performance by Alam *et al.* (2011) and assessing client perception in terms of awareness, satisfaction and use of service by Banerjee (2003), we categorized 8–13 as 'well' performed DC (grade A), 5–7 as 'average' (grade B), and ≤4 as 'poor' (grade C).

Women's satisfaction

Mother's satisfaction was gauged by asking the reasons of their satisfaction. Respondents were also asked (why did they have childbirth at DC, what kind of services they received since ANC, childbirth and PNC, how was the services and behaviour of CHWs towards them) to understand their perception regarding poor performing DC by questioning the types of services they received from Manoshi, reasons for not preferring DC for childbirth despite taking ANC from Manoshi, the reasons for not informing CHWs during their labour pain, place and person attended the delivery.

Analysis

The researchers read the interviews thoroughly several times to obtain logic. Then the text of the each interview was extracted and condensed into meaning units. Thereafter, meaning units were squeezed into description close to text and to make

The performance of delivery centre	7
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apparent the content we interpreted of underlying meaning unit. The compressed meaning units were abstracted into sub-themes. Tentative sub-themes were discussed with another researcher and revised accordingly. Finally, similar judgment and discussion resulted in agreement about how to short the sub-themes. Various sub-themes were compared based on the similar and different responses and shortened into theme (Burnard 1994, Graneheim and Lundman 2004) (Table 3). The preference-ranking exercise, scoring and grading approach we used to identify priority responses where needed and gauged the performance of DC.

Table 3. Process of analysis

Condensed meaning unit close to text	Underlying meaning unit	Sub-theme	Theme
Frequently visited my home and provided good advised for rest, nutritious food, obstetric danger signs	Provided good advises in ANC visits	Received ANC and messages	Women satisfaction due to health providers behaviour, attitude and services of DC
They checked my blood pressure, foetal position, eye and feet in home visit	Offered women homestead antenatal care		
We live many people in crowded room; there is no space for child birth and it shameful to give birth in front of all.	Lack of space and privacy at home	Environment of DC made women feel comfortable	
DC was clean and CHWs dress were clean and none can enter inside the DC during delivery; I was comfortable as there was a separate room for delivery	Women were comfortable in clean and spacious DC compared to their house		
They were very nice to me and take very good care during my labour pain, gave me glucose drink. They didn't use harsh language when I did not follow them in pain and encouraged for bearing down the baby like my dearest one	Health provider hospitality was good, showed sympathy for women in pain and soft spoken to them	Generosity and emotional support from CHWs made women happy and courageous in helpless condition	
Assisted delivery with care and did not introduce hand repeatedly to feel foetal head, also assure me to refer in case of complication; I had none to transfer me hospital	UBA did no mishandle in checking the progress of labour, cared women and assured taking initiative during complication		
She (UBA) cleaned me and the 'polluted' water and blood after delivery like my mother	Health properly completed their responsibility	Health providers attitude towards women was good	
Their behaviour was good; we know them very well as they live close to me.	Health providers are from local community and well behaved	Health providers behaviour, community acceptability was good	

(Table 3 continued.....)

(Table 3 continued.....)

Advised not to cut baby's hair for one months, keep the warm and maintain frequent breast feeding	Provided advice regarding newborn care	Received postnatal visit and messages on newborn care	
BRAC brother (PO) and sister (SK) came to my house asked about me and see the baby	Look after women since identification of pregnancy		
DC was same as our home, there has no fulltime doctors or nurse, UBA is not a doctor	DC is lack of skilled provider and not well-equipped like clinic or hospital	Lack of professionals and technical support	Disappointment regarding DC's resources
No facility of pushing saline/oxytocics or emergency medicine	Community expectation did not fulfil regarding health care	Logistics deficit	
They did not try to handle any minor complication and refer to hospital very frequently.	Reluctant to go another health facility	Unwilling to refer and fear of hospital intervention	
I am afraid of caesarean section which is very common in hospital delivery	Having misconception and fear of surgical intervention		

Results

Background characteristics of women

Six DCs from Magbazar, Madartek, Kamranginr Char, Ramna, Kotwali, Shyampur branches were serving 22,537 households with approximately 77,357 slum population. The women who had delivery in Manoshi DC were younger and completed primary education than the women gave birth at home. Majority (26) of them inhabited in present dwelling for a certain extent of time ranging from 3 to 17 years (mean age 23 years); no more than 10 women were living in that place for two months to one year. Majority of them were housewives with a few involved with some income generating activities including daily wage earner, garment workers and housemaid. Diversity of occupation found in men's role which includes majority involved in services such as cleaner, factory or garment workers, cook and others were driver, van/rickshaw puller, daily wage earner and involved in small business. However, their average monthly income ranged from BDT 5,867 to 6,472 (Table 4). Women who were economically deprived preferred DC for having childbirth.

Table 4. Socio-demographic characteristics of respondents

Variables	DC delivery	Home delivery
Mean age in years	22.6	24.5
Age range in years	19-28	17-38
Mean years of schooling	5.4	4.1
Occupation		
Housewives	15	16
Garment worker	01	01
Day labour	01	01
Domestic help	01	00
Husbands occupation		
Driver	02	03
Van/rickshaw puller	05	01
Day labourer	03	05
Service (Cleaner/factory or garment worker/cook)	06	05
Small business/hawker/vendor	02	04
Average monthly income (BDT)	5866.7	6472.2
N	18	18

Background characteristics of community health workers

All community health workers were resided locally except three MMWs and a PO. The mean age of these cadres ranged from 24 - 35 years except UBAs, whom were middle aged. Educational qualifications of POs were masters, MMWs were diploma in paramedics, and SKs completed the secondary school certificate examination. Nevertheless, SSs had formal education of 1-4 years and UBAs had none (a UBA

can only sign name). According to health providers' statement, every single of them received basic training from BRAC Health Programme (BHP) ranged from 7-60 days depending on their designation. Furthermore, MMWs and POs received special training on breastfeeding, acute respiratory tract infection (ARI), neonatal sepsis and community mobilization. Alongside basic training, SS received training on maternal danger signs and nutrition, ARI while SKs mentioned including these training they received some additional training on breastfeeding, diarrhoea and management of low birth weight (LBW) babies. In response to the question on main source of income all MMWs, POs and most of the SKs mentioned that remuneration from BRAC was their only source. However, every SS was found to give her effort in different font of work beside assigned work for BRAC including tailoring, selling medicine, handicraft, making shopping bags, housemaid, counsellor of Urban Primary Health Care Project (UPHCP) and vendor. Among six UBAs, two earned extra money by tailoring and bathing dead bodies in funeral.

DCs' profile

Out of total expectant women (2108), about 50% of deliveries were conducted in DCs of Magbazar and Kamrangir Char and 30% or less was in other four DCs. The use of DC of Kotwali was poor (13%). Simply 51 deliveries took place throughout the year at Kotwali DC. Maternal death was recorded in Kotwali and Madartek DCs but not a single death was observed in other four DCs. However, there were neonatal deaths in all the DCs. Neonatal mortality rates in Ramna and Kotwali DCs were found to be alarming; 53 and 39 per 1,000 live births, respectively. On the contrary, referring women from DC was found more in Shyampur (26%) and referral from their dwelling found to be remarkably high (41%) in Kotwali area. Furthermore, percentage of home delivery was found higher in Shyampur (25%) and Ramna (22%) than having birth at DC (Table 5).

Table 5. Profile of six DCs during December 2008 to November 2009

	Magbazar	Kamrangir Char	Madartek	Shyampur	Ramna	Kotwali
Total EDD mother	300	477	473	392	148	318
Total Delivery at DC	221 (45.6%)	258 (54%)	144 (30%)	90 (23%)	28 (19%)	40 (12.6%)
Total Refer from DC	91 (30%)	66 (13%)	96 (20%)	101 (26%)	33 (22%)	51 (16%)
Total delivery at home/other places	26 (8.7%)	88 (18.4%)	100 (21%)	98 (25%)	32 (22%)	14 (4.4%)
Refer from home	20 (6.66%)	49 (10%)	71 (15%)	104 (26.5%)	20 (13.5%)	129 (40.6%)
Number of maternal death	0	0	01	0	0	01
Number of neonatal death	06	04	01	01	03	02
Neonatal mortality rate	23	12	4	5	53	39

Manpower and physical environment of DCs

Findings reveal that CHWs like MMWs, SKs, UBAs were available throughout the year in four DCs. *Shasthya Shebikas'* number varied from 17 to 19 in all DCs but in Ramna and Kotwali catchments eminence of CHWs was below average. Merely seven SSs were active, in addition, MMW, SK and UBA dropout were also found in these two areas.

Dropout in all community health cadres was a problem in Ramna DC, and SK did not exist in Tantibazar DC catchments. In both areas, SS dropout and lack of motivation to work was found to be a challenge throughout the year; on an average only seven SSs were active. Some mothers in Ramna, Kotwali and Magbazar areas stated that they found DC was locked most of the time and the UBAs were found to be unavailable.

According to mothers' statement, the median distance of DCs from respondent's home except Magbazar and Tantibazar, remained within 60 to 100 yards, 7 to 15 minutes to walk; and quite convenient for the women to get DCs. The highest distance reported by mothers was 440 yards from their residence to Tantibazar DC in Kotwali area, which was approximately 9 minutes walk. On an average, the way to reach the centres were narrow on average but rickshaw and tri-wheeler can reach all those DCs, but some dwelling in Ramna were linked to DC with a narrow bamboo bridge.

Table 6. Physical environment and opening hours in delivery centres

	Magbazar	Kamrangir Char	Madartek	Shyampur	Ramna	Kotwali
Median distance of DC from home	270 yards	100 yards	75 yards	100 yards	60 yards	440 yards
Time to reach the DC (minutes)	5.8	7.0	14.7	7.3	8.5	9.1
Road connecting to DC	Spacious	Narrow	Spacious	Narrow	Narrow	Narrow
Transports can reach	Rickshaw, tri-wheeler, ambulance	Rickshaw, tri-wheeler,	Rickshaw, tri-wheeler, car	Rickshaw, tri-wheeler	Rickshaw, tri-wheeler	Rickshaw, tri-wheeler
DC found open round the clock	05	05	06	04	05	04
DC found locked (L)/do not know (DK)	L- 01	DK- 01	0	DK- 02	L-01	L- 01 DK-01

Women explicitly expressed their fear to use the bridge during pregnancy, especially at the moment of labour pain. They felt risky and did not go to the DC. Three respondents stated that they found the DCs to be locked for a certain time and four women had no idea about the opening hours and services of DCs (Table 6).

Assessment of DCs performance

Composite score and grading system in Table 7 showed that DCs in Kamrangir Char and Magbazar were scored 11 and 8 out of 13, in turn graded as A and categorized as "well" performed. Similarly, Madartek and Shyampur DCs were found to be scored 7 and 6, graded as B and performed "average". On contrary, DCs in Ramna and Kotwali were scored 4 and 3, graded C, and considered performed "poor".

Table 7. Performance of DCs

Parameters	Magbazar	Kamrangir Char	Madartek	Shyampur	Ramna	Kotwali
Availability of CHWs	2	2	1	1	1	1
Service availability at home(ANC, health education)	1	1	1	1	0	0
Service/UBA availability at DC	0	1	1	1	0	0
Deliveries at DC	1	2	1	1	0	0
Deliveries at home	2	2	2	1	2	2
Refer from DC	0	1	0	0	0	0
Behaviour of health providers	1	1	1	0	0	0
Outcome (Maternal)	1	1	0	1	1	0
Outcome (Neonatal)	0	0	0	0	0	0
Total score	8	11	7	6	4	3
Performance of DC (%)	62%	85%	54%	46%	31%	23%
Grade	A		B		C	

Reasons for well performance of DCs

After analyzing the data from in-depth interview, a wide range of reasons regarding attendance or non-attendance to the DCs during delivery were identified. The preference-ranking exercise was used to identify priority reasons for using and problems in attending DCs during childbirth.

Women's perception

Eighteen women were interviewed who had given birth in DCs. The majority of women received at least four antenatal visits and attended EDD meeting during their eighth month of pregnancy at DCs at least once. Cleanliness of the DC and free services provided by CHWs were the frequently reported reasons to have child birth at DC. Women found DCs more cleanly than their residences and they were not so financially solvent to access to other health facilities (Table 8). A woman from Magbazar stated -

"Delivery centre seemed clean and beds were separated by curtain which made me feel comfortable. Moreover, I heard from BRAC apa that having childbirth was free of charge there."

Furthermore, having no space or extra room in respondents dwelling was also a reason for attending DCs. A woman from Kamrangir Char said, *"Polluted blood and water will spoil the room after delivery as we have no separate space; we all live in one room with in-laws. We cook and eat in the same place."*

Behaviour of CHWs motivated women to attend DCs as they found CHWs were very nice to them, well mannered, and familiar in the community. SS and Sk frequently visited their home throughout their pregnancy for providing antenatal check-up and advised for physical care.

Table 8. Reasons for attending DCs during childbirth (women's responses)

Rank	Purpose of using DC (Responses of 18 women)	Magbazar	Kamrangir Char	Madartek	Shyampur	Ramna	Kotwali	Frequency score
1	Cleanliness of the DCs	3	3	2	2	3	2	15
2	Services were free in DC, cannot afford hospital expenses.	2	2	3	3	2	1	13
3	No space at home, DC has referral facilities	3	3	2	1	1	2	12
4	SS/SK visits home and good mannered	2	3	1	1	2	2	11
5	Committed financial help for the in referral	3	-	1	1	1		6

DCs have the facilities for referring women to appropriate hospital in obstetric complications and CHWs usually help family members or women in getting transport and receiving treatment in the hospital with assistance of referral PO. At the time of complications BRAC also help financially. These factors also drove women to the DCs at any point in delivery process. A woman from Shyampur mentioned –

"I went to DC in fear of having complications during delivery, as I knew BRAC does everything while referring to the hospital. If problem would have arisen at home my mother and husband could not be able to transfer me to the hospital for financial constraints."

Health providers' perception

To ascertain the idea of health providers regarding good performance of DC, interviews revealed that most (26) of the community health providers (PO, MMW, UBA, SK, SS) mentioned regular homestead services by active SS and SK, and safe delivery at DCs with care by experienced UBA were the pillar of a well performed DC (Table 9).

A UBA said, "A good relationship has been built with the women through paying regular home visits by SS, and SK. They motivated women for having safe delivery in DCs. Mothers also convey messages to other women that trained dai conducts deliveries at DCs and they are very good, skilled, caring and sympathetic during labour pain."

Majority of MMWs and SSs stated that slums are densely populated as well as women have no space at home to conduct deliveries. On the other hand, UBAs were locally recruited, trained and familiar in the community as 'Dai'. These factors let women convinced to come to DCs for childbirth. In most circumstances, community health cadres mentioned that good motivation provided by health providers and well manners towards birthing women acted as crucial factors for good performance of DCs. Moreover, provision of free services and easy accessibility to DC carried additional value for DC's performance. One SK said, "Women have no expense if they have deliveries at DCs even they have no need to buy a single blade for cord cutting. While referring any patient, we do everything for them."

Table 9. Reasons for well performance DC (Health providers' responses)

Rank	Reason for performing good	PO	MMW	UBA	SK	SS	Frequency score
1	Regular home visits by active ss, sk	5	5	4	4	8	26
2	Safe delivery by locally familiar trained UBAs	2	5	5	6	1	19
3	Densely populated slums and no space at home	4	4	2	2	6	18
4	Proper motivation provided by CHWs	4	4	-	4	5	17
5	Good behaviours of CHWs/UBA	2	2	-	2	8	14
6	Free services	-	2	-	4	5	11
7	DCs are in the community	-	2	-	1	7	10
8	Advocacy by active MNCH-WSG	3	4	-	-	-	7
9	Referral system	-	2	-	2	1	5
10	No hospital in vicinity	1	1	-	1	1	4

The performance of delivery centre | 15

Few CHWs mentioned that MNCH-WSG were found to be active. Women knew about DCs from other women who previously used DCs for having childbirths. Good motivation from active MNCH-WSG and referral system of Manoshi convinced many women to have childbirth at DCs (Table 9).

Reasons of poor performance of DCs

Women's perception

Women who did not receive care from DC for childbirth highlighted that afraid of being referred from DC to hospital where one might have to go through surgical interventions was the main reason for not using DC (Table 10). A woman from Kotwali said, "I did not go to the centre in fear of referral; they sent women hospital for every minor problem. I feel panic on the name of C-section."

Table 10. Priority problems in attending DCs during childbirth

Rank	Reasons for not using DC (Responses of 18 women)	Kamrangir Char	Magbazar	Madartek	Shyampur	Ramna	Kotwali	Frequency score
1	Afraid of being referred and surgical intervention	1	1	2	1	1	2	8
2	Previous home delivery	2	-	1	1	2	1	7
3	DC is like home, has no doctor, no facility for saline and injection	2	-	1	-	3	1	7
4	Family members restriction	1	2	1	2	-	-	6
5	Lack of child-attendant/ husband/ guardian was absent	2	2	-	-	2	-	6
6	<i>Purdah</i>	-	3	-	1	1	-	5
7	Harsh behaviour of SS/SK	-	-	-	1	1	1	3

Also those women who had previous home deliveries did not go to DC as they assumed that the index delivery would be troubled less and baby was born within very short period since the labour pain started. Another important factor they

mentioned that women and their family member found DC indifferent from their home as DC has no doctor and facilities for pushing saline and oxytocics to augment the labour pain for easy delivery.

A woman from Shyampur said, "My husband said 'why do you want to go to DC? There was no doctor and they won't push you saline; you have to tolerate pain for long time'. I am calling doctor (drug seller) from pharmacy to push saline and it will relieve you early."

While another woman from Shyampur said, "If I was ill-fated, I had to go to the centre, my husband is conservative, does not like women going outside." Other reason included family members and husbands were not so convinced to take women to DCs, husband or guardian were absent, children were alone at home when the pain started, and *purdah*. Because of *purdah*, women felt ashamed to make people know about their labour pain. Very few women mentioned that they got ruthless behaviour from CHWs during antenatal visits.

Providers' limitations

Responses from PO, MMW, SK, SS and UBA were identical regarding less interest of slum women in attending DC. DCs have no provision of injecting medicine and saline for inducing labour pain which was very common practice in other health facilities even in home deliveries also. Moreover, medical doctors were not obtainable at DCs; consequently, pre-diagnosed and predicted maternal complications had to refer to tertiary teaching facilities, NGOs or private clinics. On the contrary, frequent staff dropout especially SSs and SKs increased the obscurity and it was remarkable in Ramna and Kotwali area. A PO from Ramna mentioned that husbands did not want them to work at low remuneration; they resigned job when they got better opportunities. Demolition of slum was found to be another reason for losing these front line workers. UBA resigned for long laborious duties with low-paid remunerations. In Kotwali region, PO and MMW stated that SSs did not identify pregnant women properly, they had less interest in doing regular household visit as most of them were busy with side businesses which were more lucrative. Whereas the SKs did not pay regular monthly home visit to pregnant women and failed to make good rapport with them. For which women were not motivated enough to attend DC during delivery. On the other hand, most of the SKs, SSs and UBAs expressed that well-off and educated family members preferred going hospital for delivery instead of attending DCs. They were not motivated sufficiently as DC did not provide TT, child immunization, and medicine for obstetric emergency. Only some family members could not distinguish DCs from their dwelling. Occasionally the awful behaviour from CHWs made bad impression about DC.

Women's satisfaction

Women who received care from DCs during delivery, acknowledged the services. Most of the mother who had normal deliveries was satisfied with delivery cares.

Majority reported that UBA cleaned their polluted water and blood after delivery, UBA took care throughout the process, tried to make them fearless and encouraged them to bear down the baby. A woman from Magbazar stated that,

"UBA was very caring and cleaned my polluted blood like my mother. When I was in pain they gave me glucose to drink, behaved well and asked me to pray to Almighty to relieve."

Mothers also stated that SK regularly visited their home throughout the pregnancy for asking about their physical status and measuring blood pressure. They took care even after their delivery. Last of all, no health provider claimed any tips or money from them.

Community suggestion to make DC more functional

Pregnant women attended DCs with expectations of getting complete medical services. Health providers try to build good rapport with women while providing ANC, however, motivating women and their family members to attend DC found to be a hard job. Majority of the respondents expected complete package of maternity and child health services. DCs should have physicians to manage the emergency cases, provision for TT vaccine and child immunizations, intravenous saline with oxytocics, free medicine during and after delivery. Women were dissatisfied when they came to know that these services were not provided by DC. A number of women complained that health providers used to send women to hospital for negligible complaints which increased delivery expenses of respective families. Instead of referring women, DC should have the capacity of managing those patients. Finally they said that health providers should give more effort on motivating women in favour of attending DCs.

Discussion

It was evident from the findings that Magbazar and Kamrangir Char DCs were found to be performing good from the point of all study parameters. Higher proportion of deliveries took place at these DCs because of the availability of community health cadres throughout the year, and good behaviour of health providers. Our findings are consistent with the studies in Pakistan, India, Ethiopia and Nigeria which showed that availability of health providers in the facility and easily accessible services were the important components of increased use of the facility and also for measuring the health system performance (Ali *et al.* 2005, Banerjee 2003, Onah *et al.* 2006). As these factors are directly related to take life saving measure; safe delivery and being cared with emotional support during crucial moment make women enthused to use health services available in these centres.

In Uganda, CHWs have played a significant role to raise awareness and change health-seeking behaviour of women regarding maternal and child health (Campbell and Graham 2006) which is in accordance with our study. Most of the CHWs of this study mentioned that routine home visits assisted in making rapport with community people which eventually helped in motivating women to attend DCs for safe delivery. In addition, UBAs were recruited from the same neighbourhood and hence familiar locally as a trained TBA that made women comfortable during childbirth.

In our study, geographical distance, an average of 5 to 15 minutes walk, was found to be convenient for the women to attend the DCs, and rickshaw and tri-wheeler were commonly used to reach to or to refer women from those centre. Evidence indicates that easily accessible MWHs in the community settings in Cambodia, provided antenatal and delivery care and food during stay at, increases deliveries with trained midwives from 14.3% in 2006 to 31.4% in 2009 (Ministry of Health, Cambodia 2010). The homes were in convenient distance from community and enable women greater access to medical care.

DCs at Ramna and Kotwali were found to be performing poor where unavailability or lack of CHWs had been identified as a challenge. Similar findings reported in an Indian study (Banerjee 2003). Referring women both from home and DCs found to be remarkably high from both DCs as medical doctors were not assigned for maternal complications arises at DCs. Neonatal mortality rate of Ramna was consistent with the findings of Bangladesh Urban Health Survey 2006 (NIPORT, ICDDR,B, ACP, and USAID/Bangladesh, 2008) but in Kotwali the rate was unacceptably high.

Patient satisfaction is an important independent measure of the success of a health system (Blendon *et al.* 2002, Donelan *et al.* 1999). Majority of the women in our study received more than four ANC visits and attended meeting where they received health education. They expressed their satisfaction mostly because cleanliness of DCs and

free services. A study revealed that women remain outside of services even when they are accessible due to costs of using services including other associated expenses (Koblinsky *et al.* 2006). Women in this study articulated their satisfaction which included CHWs paid regular home visits and they communicated with mothers and shared information regarding health and nutrition during antenatal check-up. Furthermore, when they visited DCs for having childbirth, they received emotional support, caring behaviour from CHWs. Studies in different countries reported similar features: caring behaviour, being treated with respect, emotional support, communication and good information sharing, efficiency of care always remained important to the patient (Jennings *et al.* 2005, Sofear *et al.* 2005, Khan and Ahmed, 2009). A review of published article also reported the similar findings (Kruk and Freedman 2008).

This study illustrates the core reason for not informing CHWs about labour pain and had home deliveries were fear of being referred to the hospital which might compel women to undergo caesarean delivery. Similar reasons for not using facilities were also reported in another study in urban slums in Bangladesh (Nahar *et al.* 2011). Results showed that expectation of women receiving comprehensive services from DCs including skilled services, medicines for labour induction and emergency case management attract women to use health facility. Similar findings were revealed from studies in Bangladesh and India (Khan and Ahmed, 2009, Banerjee 2003). On the contrary, CHWs faced several challenges in low performed area, as SSs, SKs and UBAs had less motivation and frequent dropout due to long laborious duties with low remuneration and recurrent slum demolition. For this reasons CHWs failed to communicate and motivate women to receive services from DCs during delivery as well as who did not go to the DCs. Similarly in many African countries, retention of providers was a major part of the supply side problem due to these similar kinds of crisis (Koblinsky *et al.* 2006), women expressed their dissatisfaction regarding unavailability of food and health staff, lack of respect from health staff in MWH (Lonkhuijzen *et al.* 2009, WHO 1996). Collective referral of home and DC for maternal complications from home and DC found high in all DCs catchments except Kamrangir Char. Reason was identified as many government and NGO facilities were a stone throw distance to the slum dwellers.

Conclusion and recommendations

This study shows that Kamrangir Char and Magbazar DCs performed 'well', Madartek and Shyampur DCs were 'average', while in Ramna and Kotwali were found poorly performed DCs. Reasons for good performance included clean DC, free services, regular home visits, good behaviour, caring and emotional support in childbirth. On the contrary, in 'poor' performing area, CHWs were found to be less motivated and frequent dropout because of low remuneration and recurrent slum demolition and failed to communicate and motivate women to receive services from DCs during delivery. The core reasons for not informing CHWs were fear of being referred to the hospital, surgical intervention, and DCs had no doctor, medicines for labour induction, and emergency case management.

Mothers suggested that instead of referring women for minor complications, DC should be competent of managing those patients including providing basic treatment during ANC and childbirth, tetanus toxoid (TT) in ANC and child immunizations during PNC. Several strategies were taken by some of African countries to make MWHs popular includes regular doctor or midwives visits, providing food especially in Papua New Guinea, postpartum tubal ligation facility increased use of MWH (Lonkhuijzen *et al.* 2009). BRAC programme may think about on call doctors attending deliveries in DCs and labour induction can be given at DCs under supervision of MMWs in appropriate indication.

Moreover, given the existing scenario, BRAC programme needs to pay attention to the 'poor' performed DCs in Ramna and Kotwali in developing alternative strategies to enhance collaboration with existing health facilities. As the government and NGO health facilities are functional in those areas, Manoshi programme may provide more attention on community mobilization on ANC, PNC, safe delivery, and appropriate referral for obstetric and neonatal complications.

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