



CENTRE
FOR HEALTH AND
POPULATION RESEARCH

HSB

Health and Science Bulletin

Vol. 3 No. 1

ISSN 1729-343X

March 2005

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HIV surveillance in Bangladesh: the present scenario

Annual surveillance for HIV infection and risk behaviours has been conducted among populations at elevated risk for HIV infection since 1998. The last round of surveillance was conducted between June 2003 and March 2004. Among the 10,445 persons tested 35 (0.3%) were HIV infected. Among injecting drug users participating in a needle/syringe exchange program in one city, 4% were HIV infected and in one neighbourhood in that city, 8.9% were HIV infected. Behaviours that can transmit HIV were common. Continued efforts to reduce high-risk behaviours are needed.

In accordance with UNAIDS/WHO guidelines (1), HIV surveillance in Bangladesh has focused on selected groups of individuals known to be at high risk for acquiring HIV infection. This includes sex workers, drug users, males who have sex with males, and Hijras (male transvestites). In addition, particular population sub-groups that may eventually be the source of spread of the epidemic into the general population, such as regular partners of sex workers or mobile male workers, including truckers and rickshaw pullers, are evaluated. In each of the past four annual surveillance rounds, the pooled level of HIV prevalence was <0.5% among all the vulnerable population groups tested (2-7).

The most recent round of surveillance was conducted between June 2003 and March 2004 using methods similar to the previous rounds. The country was divided into six geographical regions according to the administrative divisions: central, northwest, northeast, south, southeast and southwest. Cities within the administrative divisions are referred to by letter. For behavioural surveillance a two-stage cluster sample was used where geographic locations were selected,

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and then individuals recruited from these locations. For serological surveillance, individuals belonging to the vulnerable population were identified through intervention organisations.

Field workers administered structured questionnaires. Blood samples were collected at the drop-in centres of the intervention organisations and were tested for HIV and syphilis. Blood collected from injecting drug users was also tested for hepatitis C virus (HCV). Testing for HIV and HCV was unlinked and anonymous while that for syphilis was linked to the subject so that treatment could be provided to individuals. For HIV, samples were initially tested by an ELISA kit and positive results were confirmed by line immunoassay (LIA). An indeterminate result by LIA was considered as negative. Syphilis was tested by the rapid plasma reagin (RPR) test and confirmed either by treponema pallidum haemagglutination assay (TPHA) or treponema pallidum particle agglutination (TPPA) test. Samples positive for TPHA or TPPA with an RPR titre ≥ 8 were considered to reflect active syphilis. For antibodies to HCV, sera were initially tested using ELISA kit and all positive samples were re-tested with a second ELISA kit. Discrepant results in the two ELISAs were confirmed by LIA. Samples positive for any two tests were considered as positive.

Among 10,445 persons at high risk for HIV infection tested, 35 (0.3%) were HIV infected (Table 1).

Table 1: HIV infections among vulnerable population groups sampled for serological surveillance in Bangladesh, June 2003-March 2004

Study population	Number HIV antibody positive	Number tested	Percent HIV positive
Drug user			
Injecting drug users	16	1,619	1.0
Heroin smokers	3	391	0.8
Female sex worker			
Brothel	6	2,204	0.3
Hotel	3	698	0.4
Street	1	1,206	0.1
Casual (part-time)	2	679	0.3
Male			
Males who have sex with males*	2	1,871	0.1
Hijras	1	405	0.2
Boyfriends of female sex workers	0	482	0.0
Partners of Hijras	0	88	0.0
Rickshaw pullers	1	802	0.3
Total	35	10,445	0.3

* This includes both male sex workers and non-sex workers, since they were not distinguished at all surveillance sites

Drug Users

One percent of injecting drug users were HIV infected (Table 1). These infections were concentrated in specific areas. Four percent of injecting drug users in Central City A were HIV infected. No HIV was detected in any injecting drug users from any city except Central City A. Within Central City A, rates of HIV prevalence varied among the neighbourhood needle/syringe exchange programme drop-in centres (Table 2). In the neighbourhood covered by one drop-in centre, 8.9% of injecting drug users were HIV positive and in a second centre, 2.1% were HIV positive. None of the injecting drug users sampled from the other five neighbourhood centres were HIV positive (Table 2). The two centres with identified HIV infected clients, represent 62% of the total samples tested in the city. The prevalence of hepatitis C virus antibodies was also highest among injecting drug users from these same two neighbourhood centres.

Table 2: HIV and hepatitis C antibody prevalence among injecting drug users from the drop-in centres of the needle/syringe exchange programme in different neighbourhoods in Central City A

Needle/syringe exchange centre ID (n)	HIV n (%)	HCV n (%)
1 (157)	14 (8.9)	115 (73.2)
2 (94)	2 (2.1)	63 (67.0)
3 (59)	0	27 (45.8)
4 (25)	0	8 (32.0)
5 (24)	0	6 (25.0)
6 (32)	0	12 (37.5)
7 (13)	0	8 (61.5)
Total (404)	16 (4.0)	239 (59.2)

In Central City A, although coverage of injecting drug users by the needle/syringe exchange programmes increased from 45% to 88% over the previous year, injecting drug users continued to frequently report high-risk behaviours for HIV infection. Eighty-six percent reported borrowing used needles/syringes within the preceding week; 35% of the injecting drug users had commercial female sex partners and 36% had non-commercial female sex partners in the last year. Sixteen percent used a condom during their most recent sex with a female commercial partner. Seven percent of injecting drug users had sold their blood in the past year.

Of the heroin smokers sampled in Central City A, 0.8% were infected with HIV

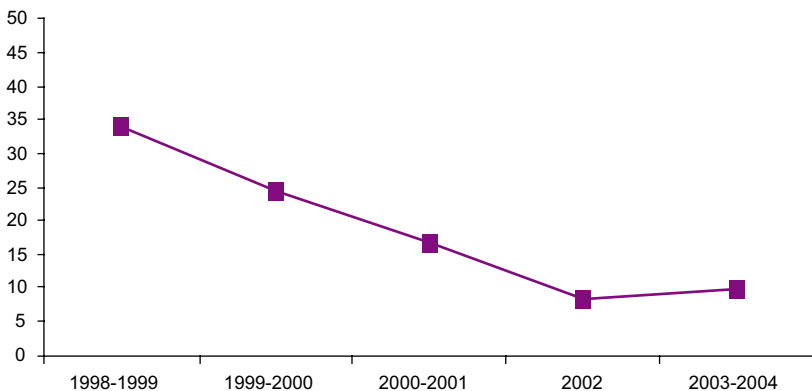
and 2.6% were actively infected with syphilis. Thirty-four percent reported injecting drugs in the last six months, of whom 96% had shared their needles/syringes during the last injection. Moreover, 74% of heroin smokers reported buying sex in the past year; 14% reported group sex, and less than 1% reported consistently using condoms.

Female sex workers

Among the 4,787 female sex workers tested, 12 (0.25%) were HIV infected. The highest HIV prevalence among female sex workers was noted from the border city of Northwest K1 (2%) and from hotels of Southeast A (1.5%). In all other groups of female sex workers, HIV prevalence was below 1%. Within the last year, 60-92% of casual (part-time) sex workers in two northwest cities reported selling sex across the border.

Intervention efforts were increasingly effective in reaching female sex workers in Central City A; 96% reported contact with the intervention programme compared to 51% in the preceding round ($p < 0.001$). In the same group, the proportion of female sex workers reporting consistent condom use in the last week increased from 1.7% to 12% with new clients and from 1.7% to 15% with regular clients between the fourth and fifth rounds ($p < 0.001$ for both). Among female sex workers in Central City A, the prevalence of active syphilis has declined markedly during the course of surveillance ($p < 0.001$) (Figure 1).

Figure 1: Prevalence of active syphilis among female sex workers from the streets of Central A



Males who have sex with males (MSM)

Among 1,871 males who reported having sex with males, 2 (0.1%) were HIV positive. Of the male sex workers accessed from Central City A, 6.2% had active syphilis; 54% reported group sex.

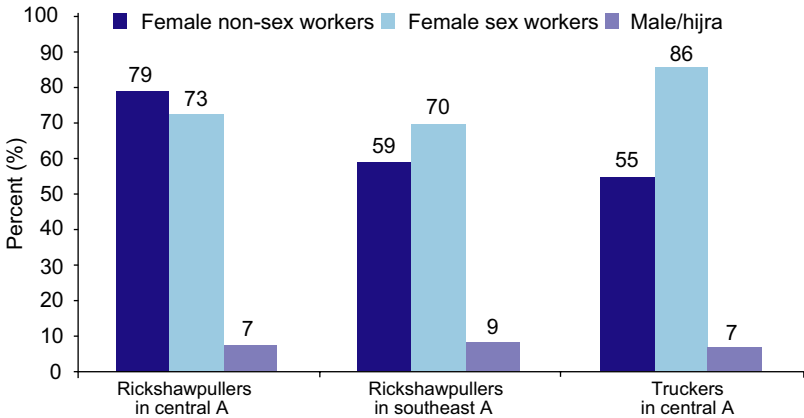
Hijras (transvestites)

Among the 405 Hijras tested, only 1 (0.2%) was HIV infected, although 10.4% were actively infected with syphilis. Hijras reported a mean of 31 clients in the preceding week; 75% reported having more than 20 clients in the last week. Only 2.2% reported using condoms regularly with new clients.

Other male groups

These included boyfriends/regular partners of female sex workers in three brothels, regular sex partners of Hijras from central A, and rickshaw pullers in central A and southeast A. Other than one rickshaw puller from central A, all those sampled from the male groups were HIV negative. Boyfriends/regular partners of female sex workers from central D had the highest (6.3%) active syphilis rate and rickshaw pullers from central A had the lowest (0.2%) active syphilis rate. A large proportion of rickshaw pullers and truckers reported having both commercial and non-commercial sex partners (Figure 2); consistent condom use in the last week with different partner types ranged from 3-6%.

Figure 2: Proportions of mobile men reporting different types of sex partners in the last year



Reported by: Programme on HIV/AIDS, ICDDR,B

Supported by: Government of Bangladesh; World Bank; Department for International Development (DFID), United Kingdom; and United States Agency for International Development (USAID)

Comment

This round of surveillance among persons engaging in high-risk behaviours in Bangladesh continues to demonstrate a low overall prevalence of HIV

infection (<1%). There are, however, two primary causes of concern. First, there is an outbreak of HIV among injecting drug users in one city in Bangladesh. Because people who inject drugs also donate blood and are sexually active, the outbreak represents a broad risk to public health.

Second, behaviours that facilitate the transmission of HIV are commonly reported among these population groups that are most at risk. Indeed the high rates of HCV among injecting drug users and the high rates of syphilis among sex workers demonstrate that risky behaviours are frequent enough to transmit pathogens. Unless behaviours change, as the prevalence of HIV increases, a large outbreak of HIV will occur in Bangladesh.

Compared to previous surveillance rounds, the current data are notable for the stable overall rate of HIV prevalence but an increase in the proportion of injecting drug users who borrowed a used needle/syringe in the last week from 66 % to 86%. The reduction in the prevalence of active syphilis in street female sex workers of Central City A following intervention suggests that prevention efforts can be effective.

Overall, these data suggest that public health efforts to reduce high-risk behaviour should remain a high priority. More effective programmes are urgently required to prevent an epidemic.

References:

1. Joint United Nations Programme on HIV/AIDS. Guidelines for Second Generation HIV Surveillance: the next decade. Geneva: World Health Organization, 2000. 40 p.
2. Azim T, Islam MN, Bogaerts J, Mian MA, Sarker MS, Fattah KR, *et al.* Prevalence of HIV and syphilis among high-risk groups in Bangladesh. *AIDS* 2000;14(2):210-1.
3. Azim T, Alam MS, Rahman M, Sarker MS, Ahmed G, Khan MR, *et al.* Impending concentrated HIV epidemic among injecting drug users in Central Bangladesh. *Int J STD AIDS* 2004 Apr;15(4):280-2.
4. Bangladesh. Report on the second national expanded HIV surveillance, 1999-2000 Bangladesh. Dhaka: AIDS and STD Control Programme, Ministry of Health and Family Welfare, Government of Bangladesh, 2000. 86 p.
5. Choudhury MR, Islam N, Jenkins C, Azim TA, Hussain AM, editors. Report on the sero-surveillance and behavioural surveillance on STD and AIDS in Bangladesh, 1998-1999. Dhaka: AIDS and STD Control Programme, Ministry of Health and Family Welfare, Government of Bangladesh, 2000. 52 p.
6. Bangladesh. Ministry of Health and Family Welfare. National AIDS/STD Programme. HIV in Bangladesh: where is it going? Background document for the dissemination of the third round of national HIV and behavioural surveillance. Dhaka: National AIDS/STD Programme, Ministry of Health and Family Welfare, Government of Bangladesh, 2001. 27 p.
7. Bangladesh. HIV in Bangladesh: is time running out? Background document for the dissemination of the fourth round (2002) of national HIV and behavioural surveillance. Dhaka: National AIDS/STD Program, Ministry of Health and Family Welfare, Government of Bangladesh, 2003 35 p.

8. Azim T, Chowdhury E, Hossain N, Rahman M, Khan R, Ahmed G, *et al.* Baseline characteristics of a cohort of injecting drug users in an intervention programme in Bangladesh. *In: 15th International Conference on the Reduction of Drug Related Harm, 20-24 April 2004, Melbourne, Australia, 2004.*

Assessing chlorine shock treatment of tube wells

In response to severe flooding in July and August 2004, UNICEF collaborated with the Department of Public Health Engineering of the Government of Bangladesh to disinfect flooded tube wells using chlorine shock treatment. We investigated the water quality of recently submerged tube wells, and the effect of tube well pumping and shock chlorination on improving bacteriological quality. The study team identified 26 tube wells that had been flooded in the preceding three weeks and were contaminated with faecal coliform bacteria. The tube wells were randomly assigned to shock chlorination versus control. There was no change in the proportion of water samples that had no detectable faecal coliform bacteria immediately before chlorine shock treatment ($n=4$, 23%) and 60 minutes following chlorine shock treatment ($n=4$, 23%). There was no difference in the proportion of water samples that had zero colony forming units of faecal coliforms per 100 ml between tube wells treated with bleach shock treatment compared to control wells 7-18 days later (31% versus 23% $p=0.66$). Shock chlorine treatment of inundated tube wells in Bangladesh three to six weeks after the flooding did not improve drinking water quality, and is not recommended in future flooding.

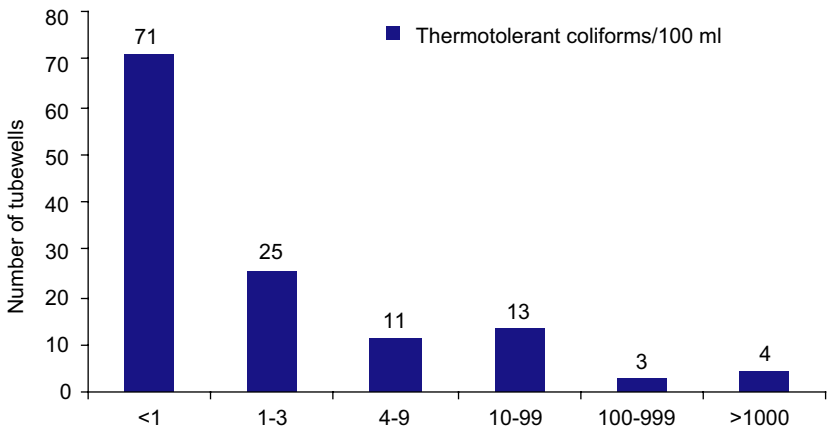
In July and August 2004 Bangladesh experienced severe flooding. Approximately two-thirds of the land mass of the country was submerged, including an estimated two million tube wells. When a tube well becomes submerged, surface water contaminated with sewage can backflow through the hand pump and contaminate the superficial aquifers that supply drinking water. In response UNICEF collaborated with the Department of Public Health Engineering of the Government of Bangladesh to disinfect flooded tube wells using chlorine shock treatment. Chlorine shock treatment involves removing the head of the tube well and adding a mixture of hypochlorite bleaching powder and water into the well, and letting it sit for 30 minutes. This shock chlorination protocol is based on engineering assumptions about water disinfection, but its effect on water quality has not been rigorously evaluated in the field (1). Thus, a collaborative study team from ICDDR,B, UNICEF and the Department of Public Health Engineering investigated the water quality of recently submerged tube wells, and the effect of tube well pumping and shock chlorination in improving bacteriological quality.

The study was conducted in Brahmanbaria upazilla, an area heavily affected by the flooding. The first task was to identify recently inundated tube wells that were contaminated with faecal coliform bacteria. The Department of Public Health Engineering identified tube wells that had been recently inundated. For

each identified tube well, the study team confirmed from local residents that at its highest water level the mouth of the tube well was completely submerged. Water was then drawn from the tube well for five minutes; the mouth of the tube well was flamed, and a 500 ml sample of water was collected. The water sample was placed in an insulated plastic cooler on ice and transported to the ICDDR,B environmental microbiology laboratory. Samples were analyzed for faecal (thermotolerant) coliforms using a standard membrane filtration technique and culture on membrane filter coliform agar (2). All water samples were filtered and placed on culture media within 12 hours of collection.

The study team identified 127 tube wells that local residents reported had been submerged in the flooding in the preceding three to five weeks, and collected a water sample. Water samples from 56 tube wells (44%) were contaminated with faecal coliform bacteria (Figure 1).

Figure 1. Level of faecal contamination in recently flooded tube wells (n=127)



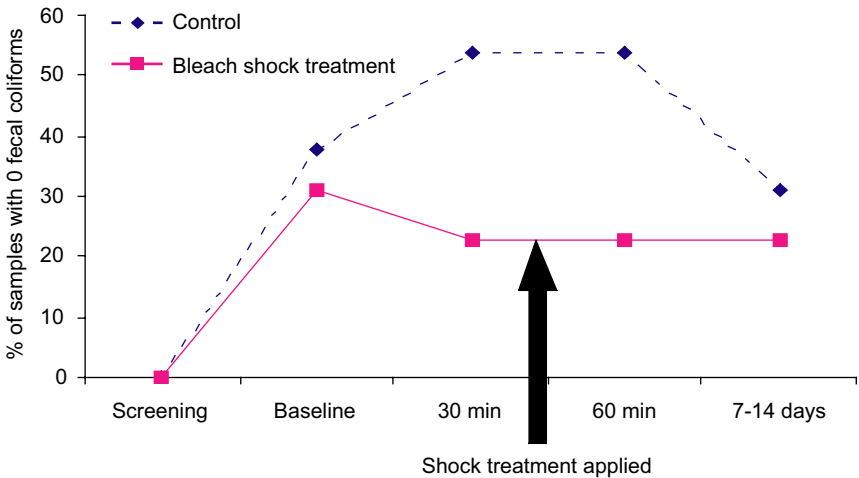
We assumed that shock treatment with bleach would be 80% effective in reducing faecal coliforms to <1 per 100/ml versus no effect in the control group. Nine wells per intervention group would be sufficient to evaluate this difference with 80% power and 95% confidence. We increased the sample size to 13 wells per arm to improve the power to evaluate smaller differences. Thus, after identifying 26 water samples with ≥ 4 colony forming units (cfu) of faecal coliforms, the laboratory supervisor randomly assigned 13 to shock chlorine treatment, and 13 to control. The study team returned to each selected well. They flamed the tip of the tube well and then collected an initial water sample for analysis at time zero. Next they pumped the tube well for 30 minutes and collected a second sample.

After the baseline and 30 minute sample was collected, for tube wells randomized to shock treatment, for each 100 feet of tube well depth 35 g of calcium hypochlorite bleaching powder was added to a ten litre bucket of water and dissolved. The lime precipitate was allowed to settle out of solution. The tube well pump head was removed, and supernatant chlorine stock was decanted into the tube well. The chlorine solution was left in the tube well for 30 minutes, and then the well was pumped continuously for 30 minutes, and a third water sample collected. For tube wells randomized to control, the study team waited for 30 minutes (after the 30 minute collection), then pumped the well continuously for 30 minutes and collected a third water sample. The evaluation team returned 7-18 days later and collect a single water sample from each tube well, after letting water flow for two minutes.

The study team returned to 26 of the tube wells that had the highest concentration of faecal coliforms. All had ≥ 4 faecal coliforms per 100 ml in the initial screening. Nine (35%) of the tube wells that were found contaminated during the screening evaluation had no detectable thermotolerant coliforms in the first sample from the return visit.

There was no observed effect of bleach shock treatment of tube wells on bacteriologic water quality (Figure 2). The proportion of water samples that had no detectable faecal coliform bacteria after 30 minutes of pumping and immediately before chlorine shock treatment (n=4, 23%) was identical to the proportion of water samples that were contaminated with faecal coliforms 60 minutes following chlorine shock treatment (n=4, 23%).

Figure 2: Proportion of potable wells (<1 cfu faecal coliforms per 100 ml) by treatment group and time



Apparently by chance, the wells randomized to the control group were somewhat more likely to be contaminated after 30 minutes of pumping (n=7, 54% in the control group versus n=4, 23% in the shock treatment group). However, pumping water without shock treatment also did not markedly improve water quality. After 7-14 days there was no difference in the proportion of contaminated wells in the shock treatment versus the control group (23 versus 31% p=0.66).

Reported by: UNICEF; Department of Public Health Engineering; Laboratory Science Division and Health Systems and Infectious Diseases Division, ICDDR,B

Supported by: UNICEF

Comment

These findings demonstrate that chlorine shock treatment of inundated tube wells in Bangladesh three to six weeks after flooding does not improve the bacteriologic quality of tube well water, and so would not be expected to improve public health.

This technique was ineffective probably because the active chlorine did not have sufficient contact with contaminating bacteria. A higher dose of bleach and/or a larger volume of solution possibly with a longer dwell time might improve the efficacy of treatment, but these changes may not make much difference. A bleach solution poured in the top of a tube well and allowed to sit for 30 minutes would not be expected to diffuse far into the surrounding aquifer that the tube well draws water from. Moreover, the source of contamination of these tube wells is unknown. The study team noted that many tube wells were placed within ten meters of a latrine or highly contaminated pond. Even a high dose shock treatment with chlorine would not be expected to effectively treat a tube well drawing water from a sewage-contaminated aquifer.

The public health threat represented by submerged tube wells is unclear. Tube well water is not sterile. In one study in Matlab, Bangladesh, three of five intensively studied tube wells were contaminated with thermotolerant coliforms. All of the tube wells had multiple other microorganisms present (2). In a larger study of 105 tube wells in Matlab, 13 (12%) were contaminated with thermotolerant coliforms (D. Norton, personal communication). The 44% prevalence of faecal contamination in recently submerged tube wells in the initial screening appears higher than would be expected from non-flood affected tube wells.

It is possible that more tube wells are contaminated immediately after the flooding, and that chlorine shock treatment might benefit these. However, since treating one tube well with this approach requires over an hour, treating all submerged tube wells would take months to reach all of the affected tube

wells. Indeed, if there were 1000 teams treating inundated tube wells, who were each capable of disinfecting six tube wells per day, it would require 11 months to shock treat the estimated two million affected tube wells. Thus, these data from three to six weeks post submersion are reasonable proxies of what could be expected in an extremely aggressive treatment program.

The study was powered to identify an 80% success rate in decontamination with chlorine shock treatment. A 0% success rate was observed, i.e. 77% of wells were contaminated before shock treatment and 77% of these wells were contaminated after shock treatment. It is possible that there is a smaller, but non-zero effectiveness of chlorine shock treatment that this small sample size was insufficient to detect. However, a small effect in improving water quality would be expected to have a small health impact.

These data suggest that during future episodes of flooding in Bangladesh, resources should not be spent promoting tube well treatment with shock chlorination. If tube well submersion is believed to represent a substantial public health threat, then an applied research program to develop and evaluate methods of tube well treatment should be undertaken.

References

1. Rowe A, Angulo F, Roberts L, Tauxe R. Chlorinating well water with liquid bleach was not an effective water disinfection strategy in Guinea-Bissau. *Int J Environ Health Res* 1998 Dec;8(4):339-40.
2. Islam MS, Siddika A, Khan MN, Goldar MM, Sadique MA, Kabir AN *et al* Microbiological analysis of tube-well water in a rural area of Bangladesh. *Appl Environ Microbiol* 2001;67:3328-30.

Posting of trained birthing attendants: a comparison of home- and facility-based obstetric care

Efforts are being made to train and post professional birthing attendants at the community level throughout Bangladesh. We conducted an historical cohort study between 1987 and 2001 in Matlab where both home- and facility-based obstetric care approaches had been implemented. The findings reveal marked differences in the use of professional attendants according to wealth quintile, mother's and father's education, and distance to the attendant. Interestingly, the differences were similar for home- and facility-based obstetric care. Before reinforcing home-based delivery care strategies, further research comparing the feasibility, cost, effectiveness, acceptability and equity implications of the different obstetric care strategies is needed.

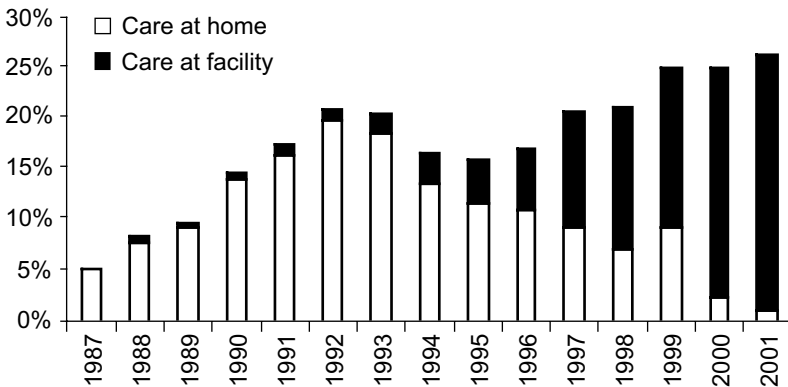
Maternal health policies in Bangladesh have concentrated on facilitating access to obstetric care by posting professional birthing attendants at the village level. Given the fact that 91% of births occur at home, and only 12% of births are attended by a trained birthing attendant (1), this seems to be a

logical approach. Furthermore, it has been argued that a strong cultural preference for women to deliver at home makes a facility-based approach unacceptable.

In Matlab, we had a unique opportunity to examine whether a home-based approach to professional birth attendance is associated with a more equitable utilization pattern than a facility-based approach. There, a home-based trained attendance strategy was initiated in 1987 and gradually replaced in 1996 by a facility-based approach. For both approaches, all services were free of cost. By minimizing financial barriers, we were able to assess whether a home-based skilled attendance strategy is more effective in reducing inequalities in access to professional basic delivery care than a facility-based approach.

We analyzed data for 41,419 births (twins and triplets were considered one birth) recorded through a surveillance system and pregnancy monitoring records between 1987 and 2001. In 1987, access to a trained midwife around the time of birth was very low, but increased steadily over time (Figure 1). The proportion of births at home with a professional midwife increased from 5% in 1987 and peaked at 20% in 1992, while in a facility the proportion increased from 0% in 1987 to 27% in 2001. At the height of the home-based strategy in 1992, a team of two midwives attended on 133 home births, compared to 183 births in each facility in 2001.

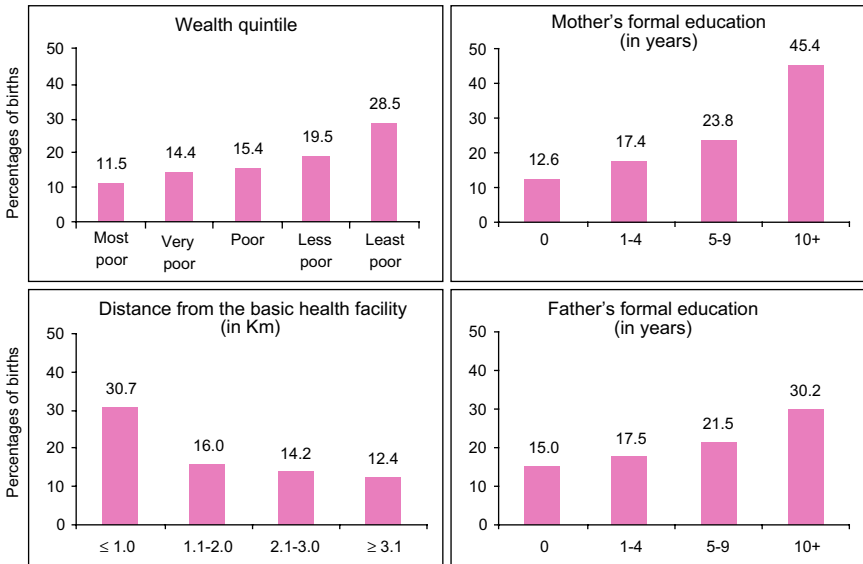
Figure 1: Trends in use of a professional birth attendant at home or in a facility in the MCH-FP area (Matlab 1987-2001)



The findings highlight marked differences in the use of a trained birthing attendant by wealth quintile, mother's and father's education, and distance to the facility (Figure 2). Only about 12% of the most poor sought care from a trained midwife around the time of birth at home or in a facility compared to 29% among the least poor. Utilization of a trained attendant consistently increased with higher mother's and father's education. About 46% of women

with ten or more years of schooling called a midwife to the home or delivered in a health facility with a midwife compared to less than 13% among women with no education. While the differences were somewhat smaller, the same pattern was observed in regard to father's education. Religion was the only factor that distinguished home from facility-based professional attendance. Specifically, Hindu women were more likely to attend a facility; in contrast, they were less likely to call a midwife at home. Despite the fact that households are in close proximity to services, distance appeared to be a major barrier for both facility and home-based care. Use of a trained attendant dropped by about half when distance from the home to the health centre was beyond one kilometre. This held true whether a midwife was called to the home or the woman accessed services in the health centre.

Figure 2: Utilization of skilled obstetric care in the MCH-FP area (Matlab 1987-2001) by socioeconomic characteristics



Qualitative research conducted as part of this study highlights important factors contributing to careseeking. Our data shows that it is generally acceptable to seek care with a trained attendant when the woman is perceived to be experiencing complications. We also identified a variety of obstacles related to accessing the services of the midwives. Because labor and delivery is associated with the woman's sexuality and is a highly shameful event, the pregnant woman is often reluctant to share that she is in labor until the very advanced stages. A prevailing concern that contributes to her efforts to maintain privacy is the belief that the more people who know about the labor,

the more prolonged the labor will be. Contacting the *dai* (traditional birthing attendant) and the reluctance on the part of the *dai* to refer a woman with complications to biomedical attendants further delays care seeking outside the household. Fears of and misconceptions about the care provided by the trained attendants also affect decision-making. Specifically, many families are opposed to the biomedical delivery position (lying on the back rather than the traditional kneeling position) used by the trained attendants, which is associated with breaking *pardah*; hold grave fears about episotomies; and expressed disdain for the behaviour of some of the midwives who are known to practice preferential treatment towards wealthier patients during delivery. Other barriers related more specifically to seeking care outside the household include concerns about exposure to *alga batash* (evil spirits) on the way to the facility, fear that the delivery will occur on the road, and the need to attend to other household responsibilities, particularly the provision of childcare. An overriding concern relates to getting into a referral system and the expenses associated with emergency obstetric care.

Reported by: Public Health Sciences Division, ICDDR,B

Supported by: United States Agency for International Development

Comment

In this context, where the vast majority of women deliver at home with an untrained birthing attendant, the increase in the utilization of skilled attendants for births that occurred in Matlab between 1987 and 2001 is striking. While the provision of care may be unlike other obstetric services offered in Bangladesh, the findings suggest that cultural and community barriers can be reduced if services are made geographically, financially and culturally acceptable to women and their families.

Given the fact that services are free, the differences in access to trained attendants by socio-economic status is remarkable. While indirect costs such as transport were relatively small (Tk. 18 or US\$0.3), the average costs incurred for food, gifts and other supplies were more sizeable at Tk. 305 (US\$5) for home deliveries and Tk. 488 (US\$8) in a health centre (2). In this context, where the majority of the population rely on fishing and agriculture for subsistence, these costs are significant and may, to some extent, explain differences in service use by wealth quintiles. It is also possible that opportunity costs related to sending a family member to inform the trained attendant or removing the woman and those accompanying her to a facility from the household, have a greater impact on impeding the poorest segment of the population from utilization the services of the trained midwives. Cultural barriers related to misconceptions about the procedures used by the skilled

attendants, fear of delivering with an attendant from outside the immediate community, and concerns about exposure to evil spirits may be heightened amongst the poorest groups. The steady rise in the use of Caesarean-sections in Bangladesh is likely to serve as a greater constraint to poor families considering accessing skilled care (3). Emergency obstetric care represents costs that could have calamitous effects on the economic situation of low-income families.

While the role of women's education in the use of skilled care has been widely documented (4,5,6), little is known about the independent role of father's education (6). In Bangladesh, women are required to seek permission from their husbands to leave the household home and, as the primary income earners, men often participate in decisions on healthcare seeking for women. In-depth data collected as part of this study suggests that increased father's education enhances men's understanding of the dangers of childbirth and need to access skilled attendance. It also influences spousal communication related to childbirth, ultimately enhancing husband-wife authority in the decision-making process. An explanation for the higher use of facility based care among Hindu women is likely related to the costs involved in constructing the *chhatighar*, the traditional birthing room the Hindus use to separate other family members from pollution associated with childbirth.

Distance is known to negatively impact service utilisation and is also cited as a reason why women choose to deliver at home rather than in a health facility (5,6,7). Given the cultural context, the remarkable effect of distance on use of facility-based care is not surprising. However, the same effect of distance on home-based care was unexpected. This highlights the fact that attending a home birth is complicated, often involving several steps. Someone has to travel outside the household to call the midwife, the midwife has to walk or arrange transport (a country boat, rickshaw), and she may have to travel a long distance to reach the home or at night when security is of grave concern. Prevailing cultural norms may also represent barriers for the midwives to travel far away from their home, particularly at night.

Many countries in South East Asia opt for a home-based skilled attendance strategy, which is believed to make services more accessible (8,9). Our data failed to provide evidence that a home-based strategy is more equitable than a facility-based strategy. Before reinforcing home-based birthing strategies in Bangladesh, more direct comparisons of skilled home and facility-based obstetric care are needed.

References

1. National Institute of Population Research and Training. Bangladesh maternal health services and maternal mortality survey 2001: Dhaka, National Institute of Population

- Research and Training, 2003. 234 p.
- Borgi J, Sabina N, Ronsmans C, Blum L, Hoque E. Time and monetary costs of pregnancy in rural Bangladesh in a context of free care: a case study from Matlab. Paper presented at 3rd International Conference on Health Economics, Management and Policy. Athens, Greece, June 3-5, 2004.
 - Afsana K. The tremendous cost of seeking hospital obstetric care in Bangladesh. *Reprod Health Matters*. 2004 Nov;12(24):171-80.
 - Kunst AE, Houweling T. A global picture of poor-rich differences in the utilisation of delivery care. *Stud Health Services Organ Policy* 2001;17: 293-312.
 - Ensor T, Cooper S. Overcoming barriers to health service access: influencing the demand side. *Health Policy Plan* 2004 Mar;19(2):69-79.
 - Raghupathy S. Education and the use of maternal health care in Thailand. *Soc Sci Med* 1996 Aug; 43(4):459-71.
 - Hodgkin D. Household characteristics affecting where mothers deliver in rural Kenya. *Health Econ*. 1996 Jul-Aug;5(4):333-40.
 - Huque ZA, Leppard M, Mavalankar D, Akhter HH, Chowdhury TA. Safe motherhood programmes in Bangladesh. In: Berer M, Ravindran TKS (eds). Safe motherhood initiatives: critical issues. London: Blackwell Science, 1999:53-61
 - Geefhuysen CJ. Safe motherhood in Indonesia: A task for the next century. In: Berer M, Ravindran TKS, editors. Safe motherhood initiatives: critical issues. London: Blackwell Science, 1999:62-72.

Surveillance updates

With each issue of the HSB, updates of surveillance data described in earlier issues will be provided. These updated tables and figures will represent the most recent observation period available at the time of publication. We hope these updates will be helpful to health professionals who are interested in current patterns of disease and drug resistance.

Proportion of diarrhoeal pathogens susceptible to antimicrobial drugs: January-December 2004

Antimicrobial agent	<i>Shigella</i> (n=113)	<i>V. cholerae</i> O1 (n=607)	<i>V. cholerae</i> O139 (n=2)
Nalidixic acid	40.7	NT	NT
Mecillinam	100.0	NT	NT
Ampicillin	60.2	NT	NT
TMP-SMX	38.1	0.5	50.0
Ciprofloxacin	99.1	100.0	100.0
Tetracycline	NT	98.0	100.0
Erythromycin	NT	98.0	100.0
Furazolidine	NT	0.0	50.0

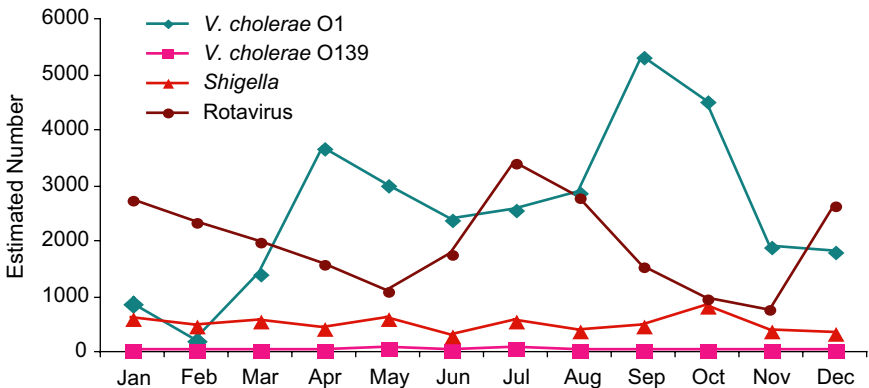
NT=Not Tested

Antimicrobial resistance patterns of 42 M. tuberculosis isolates: August 2003-July 2004

Drugs	Resistance type		Total (n=42)
	Primary (n=36)	Acquired* (n=6)	
Streptomycin	19 (52.8)	5 (83.3)	24 (57.1)
Isoniazid (INH)	3 (8.3)	4 (66.7)	7 (16.7)
Ethambutal	2 (5.6)	1 (16.7)	3 (7.1)
Rifampicin	2 (5.6)	0 (0.0)	2 (4.8)
MDR (INH+Rifampicin)	2 (5.6)	0 (0.0)	2 (4.8)
Any drug	19 (52.8)	5 (83.3)	24 (57.1)

() column percentages * Antituberculous drugs received for 1 month or more

Monthly isolations of V. cholerae O1, V. cholerae O139, Shigella and rotavirus: January-December 2004



Antimicrobial susceptibility of N. gonorrhoeae isolated during October-December 2004 (n=17)

Antimicrobial agent	Susceptible (%)	Reduced susceptibility (%)	Resistant (%)
Azithromycin	100.0	0.0	0.0
Ceftriaxone	100.0	0.0	0.0
Ciprofloxacin	29.4	0.0	70.6
Penicillin	23.5	35.3	41.2
Spectinomycin	100.0	0.0	0.0
Tetracycline	0.0	0.0	100.0
Cefixime	100.0	0.0	0.0

ICDDR,B: Centre for Health and Population Research receives financial support from countries and agencies which share its concern for the health problems of developing countries. Current nations providing unrestricted support include: Australia, Bangladesh, Canada, the Kingdom of Saudi Arabia, the Netherlands, Sri Lanka, Sweden and Switzerland.



Photo: Mother and baby waiting for healthcare services
(Courtesy of Nahid Kalim)

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