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Bangladesh WASH sector: large scale impact assessment

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BRIEFING PAPER 1983

The Sanitation, Hygiene Education and Water Supply in Bangladesh (SHEWA-B) programme was launched by UNICEF in 2007 with a primary focus on sanitation and hygiene promotion. It is one of the largest WASH programmes ever attempted in a developing country, and reached a target population of 21.4 million people by the end of 2013. Progress is assessed using a three-pronged monitoring system that incorporates external (third-party) process monitoring, participatory community-based monitoring, and a comprehensive health impact study to gauge how programme outputs are influencing hygiene behaviour change and the incidence of diarrhoea and acute respiratory infection in children under five. This paper describes the methodology and scope of the health impact study, presents preliminary results, and discusses the importance of impact studies in refining programme strategies and contribution to the global WASH evidence base.

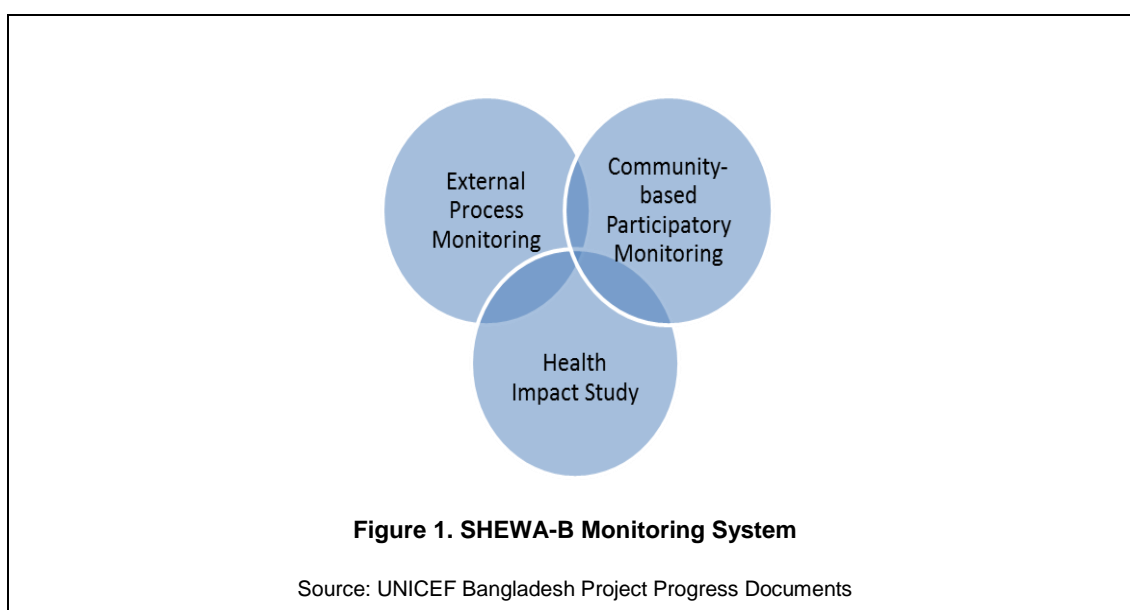
Background

The Sanitation, Hygiene Education and Water Supply in Bangladesh (SHEWA-B) programme is a collaboration between the Government of Bangladesh, the United Kingdom Department for International Development, and UNICEF. Launched in 2007, the goal is to reduce diarrhoeal disease and acute respiratory infection (ARI), the top two causes of post-natal under-five death in Bangladesh (Sayem et al, 2011), through a strong programmatic focus on sanitation and hygiene behaviour change.

The programme design was based on principles of the demand-responsive approach, and made extensive use of participatory techniques and community-based planning to develop Community Action Plans. It is equity focused, and explicitly targets the poorest segments of the population in under-served communities (UNICEF Bangladesh, 2009-2012).

The programme's core promotion strategy was intensive engagement with communities and household members through a large network of community-based hygiene promoters. Ten thousand of these Community Hygiene Promoters (CHPs) were recruited, trained and provided with hygiene promotion materials (and a modest monthly stipend). The CHPs engaged with communities during household visits, group discussions, organized events such as hygiene fairs and village theatre productions, and in the development and review of the Community Action Plans. In urban areas, a network of 11,000 adolescent girl volunteers was formed to engage their peers (both girls and boys) on hygiene and sanitation-related issues, including menstrual hygiene management. And for hygiene promotion in schools, Student Brigades were formed and trained in each intervention school.

A comprehensive monitoring system consisting of three distinct but inter-connected components was established to assess programme progress and results (Figure 1).



External process monitoring was carried out by third party agencies that provided process and progress information on a quarterly and annual basis. These agencies use surveys, spot checks, questionnaires and other monitoring tools to track progress against the programme log-frame on a large set of indicators ranging from physical infrastructure quality to the frequency and type of hand-washing promotion activities.

Community-based participatory monitoring involved WASH committees and CHPs to provide regular updates on implementation of Community Action Plans, while the adolescent girl volunteers and the school brigades provided feedback on mobilization and hygiene promotion activities.

The health impact study is the subject of the remainder of this paper.

Design of the health impact study

The health impact study was designed to investigate the extent to which incidence of diarrhoeal disease and ARI is influenced by improved hygiene behaviours, and increased access and use of WASH facilities (while taking into consideration poverty and education levels). The key study objectives were:

1. To investigate the health-related impact in terms of hygiene, sanitation and water-related behaviour change, and changes in WASH-related disease morbidity in children under five;
2. To examine detailed patterns of WASH practices in both intervention and control areas using statistically robust household surveys and sentinel surveillance;
3. To independently measure programme results at goal, purpose, and output levels;
4. To help address the knowledge gap on the effectiveness of large-scale WASH programming.

Baseline, interim, midline, year 4, and endline surveys were conducted over a seven-year timeline beginning in 2007, and supplemented with additional one-off studies and continuous sentinel surveillance. The research was undertaken through a collaborative agreement with the International Centre for Diarrhoeal Disease Research, Bangladesh. Other research institutions including the London School of Hygiene and Tropical Medicine, and the Human Development Research Centre provided additional inputs.

Study sample and methods

Statistically representative, stratified random sampling techniques were used to select urban and rural households and schools from matched control and intervention Unions (the smallest administrative division in Bangladesh). With respect to the sentinel surveillance, the principal method used to collect health data, the study team identified the centre of each village and enrolled the nearest household with a child under five. The next two nearest households were skipped, and then the next household meeting the sampling criteria was selected. This process was repeated until 10 households had been selected per village. The sampling method is described in depth elsewhere (Johnston et al, 2009; Luby et al, 2011).

The study used three main methods: structured observation, cross-sectional surveys with spot checks, and sentinel surveillance. All three were employed in both intervention and control communities. Figure 2 summarises the Methods, Indicator and Study Characteristics.

Cross-sectional surveys with spot checks were carried out by the study teams after the observational data is collected. The teams used a survey tool to gather household demographic and wealth-related data, information on the occupation and education levels of householders, and WASH-specific indicators. Another survey component assessed the level of householder members' knowledge of key hygiene messages, and the extent to which they are actually practiced in the household environment. During the same visit a spot check was used to gather information on type and condition of water supply, water storage, sanitation and hand-washing facilities, and on evidence of open defecation. Similarly, data was also collected on school WASH facilities and sanitary situation, and students and teachers interviewed. A limited set of health data was also collected for comparison purposes with the sentinel surveillance data. For the cross-sectional survey, an additional seven households were recruited in each study village to increase the statistical power of the analysis.

The sentinel surveillance component measured the health impact of the SHEWA-B interventions, and collected information on the microbiological quality of drinking water. In each study village, one educated female resident was recruited and trained to collect information on the incidence of diarrhoea and ARI. These community monitors visited each household monthly to administer a brief questionnaire on disease episodes for each child under five in the household. Sentinel surveillance also included microbiological water quality testing (*E. coli*) of stored drinking water in each household, conducted by a separate mobile team on a quarterly basis.

Table 1. Methods, indicators and study characteristics			
Household indicators measured	Structured observation of hygiene practices	Cross-sectional survey and spot checks	Sentinel surveillance of health and water quality
Socioeconomic Status <ul style="list-style-type: none"> Household wealth indicators Education and occupation indicators 			
WASH Facilities Access/Condition <ul style="list-style-type: none"> Type of latrine, evidence of open defecation Water storage/handling facilities 			
Microbiological Water Quality <ul style="list-style-type: none"> <i>E. coli</i> levels in drinking water storage containers used by children under five 			
Hygiene Knowledge <ul style="list-style-type: none"> Recall of key hygiene messages: hand-washing at critical times, latrine use and care, safe water 			
Hygiene Behaviour <ul style="list-style-type: none"> Hand-washing with soap/ash at critical times Disposal of stools of children 			
Health Impact <ul style="list-style-type: none"> Incidence of diarrhoea and acute respiratory infection in children under five 			

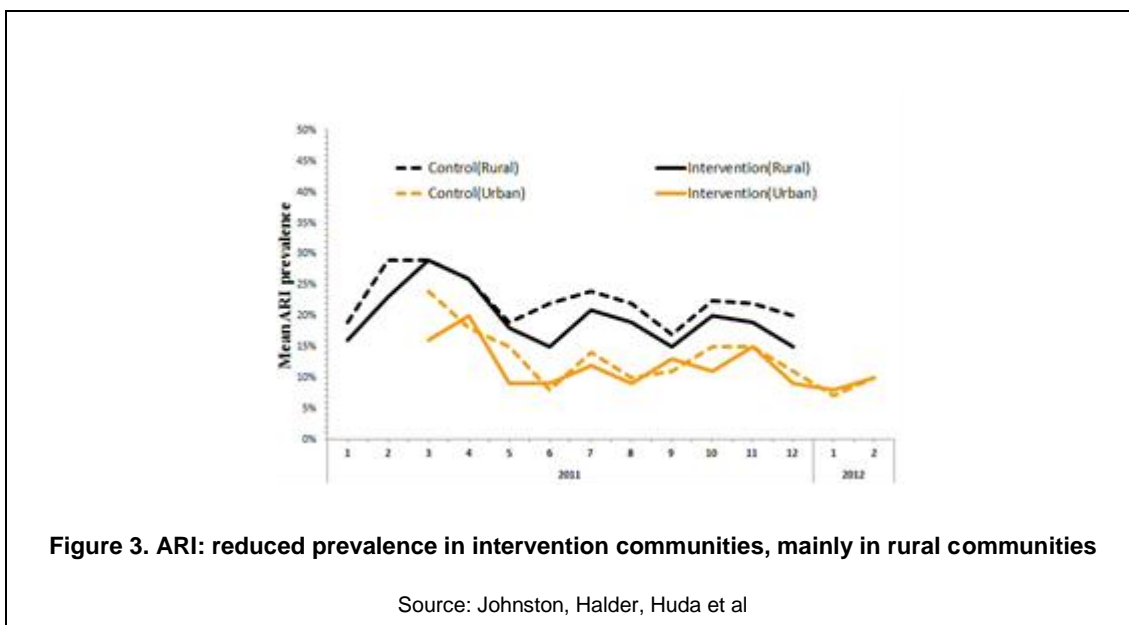
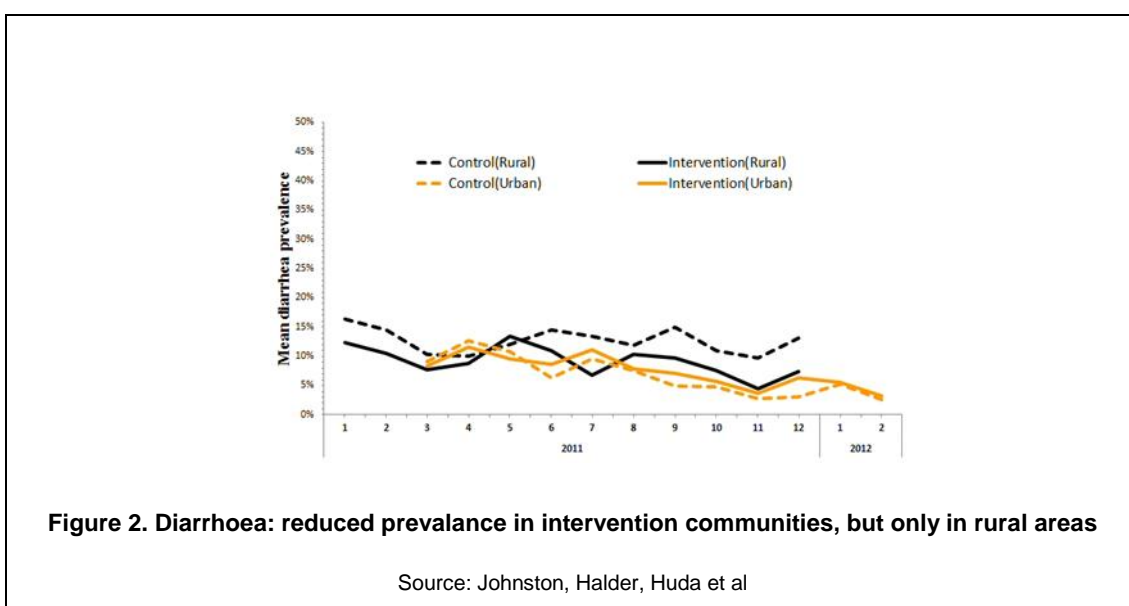
Preliminary study results

The 2009 midline impact assessment showed that SHEWA-B hygiene promotion efforts were indeed helping to stimulate behaviour change but not as quickly as originally envisioned and not across all message areas. Furthermore, although diarrhoea and ARI prevalence rates were dropping they were doing so at the same rate in the intervention and control communities. Thus, there was no evidence that programme activities themselves were having an impact on infectious disease rates in under-fives (Huda et al, 2012). In response, a formative research study was conducted by the London School of Hygiene and Tropical

Medicine in 2010 to help design improved promotion tools. The study concluded that hygiene messages needed to be sharper, better targeted and more effectively delivered, and that direct promotional efforts should be reinforced by messages in the media.

The resulting re-designed hygiene package focused efforts on two principal audiences: mothers of children under five years old and primary school students. It limited the number of messages to be delivered, and shifted from didactic methods to more of an ‘edutainment’ model. Recognition and reward mechanisms were introduced for both community WASH leaders and high-performing CHPs. The package also included a new mass media campaign to complement the direct hygiene promotion efforts, and to reach a wider audience.

The latest data set from 2011 and 2012 (Figure 3) showed a widening gap between control and intervention villages, mainly in rural areas. This suggests that the programme is indeed improving child health, possibly due to the mid-term correction in hygiene promotion methodologies and/or because enough time has elapsed for hygiene behaviour changes to have an impact.



In addition, preliminary study results showed significant improvements in some key hygiene practices in rural areas, notably hand-washing with soap before eating and feeding a child, and appropriate disposal of child faeces. Impact and monitoring data also showed improvements in schools and in urban areas but these are generally less pronounced than in the rural component of the programme.

Discussion

The preliminary impact study results have already proved worthwhile by prompting changes in SHEWA-B programming strategies during the course of the implementation period. After the first two years of the programme, the process monitoring results were good: outputs in the areas of training, community planning and the construction of water and sanitation facilities were mainly on-track. It is only because the midline impact assessment highlighted poorer than expected progress that it became evident that changes to programme strategies were needed. Factors impeding improvements in the urban areas occurred due to the difficulty in finding a control area which has not been influenced by other programmes and significant difference in income in urban households compared to rural and thus, potentially more income to spend on water treatment. Most WASH programmes do not have interim impact study results to draw from (many have no impact studies at all); the SHEWA-B experience illustrates the value of using impact assessment tools more widely in the sector.

The SHEWA-B health impact study has made a substantial contribution to expanding the evidence base with regard to designing WASH interventions, particularly with respect to sanitation and hygiene promotion, to tackle infectious diseases. The partnership with the International Centre for Diarrhoeal Disease Research, Bangladesh and other research and academic institutions has resulted in the wide dissemination of the interim impact results both within and beyond Bangladesh.

There are already many published peer-reviewed papers that have been generated as a direct result of the design, implementation and preliminary findings from the SHEWA-B health impact study, and that serve to inform the next generation of WASH programme design. The close partnership between the SHEWA-B programme and the research community ensures that valuable lessons concerning WASH programming are properly documented and disseminated.

Conclusion

The importance of assessing WASH impact cannot be overstated. Policy, planning and investment decisions are increasingly based on evidence from studies comparing the effectiveness of different interventions on health outcomes. These comparative studies are becoming more rigorous. A case in point is the influential Global Burden of Disease study series funded by the Gates Foundation and published in *The Lancet*. The latest version of the study (2012) uses a higher standard of evidentiary rigour to determine which studies are included in the meta-analysis. As a result, some risk factors that had been included in the past are no longer used in the analysis because not enough studies that meet the new high standard are available. Hygiene practices as a risk factor for diarrhoeal disease is one of these exclusions (Lim et al., 2012). Observers have suggested that such exclusions could ultimately lead to policy decisions that do not take into account the full set of measures available to improve child health (Watt and Cairncross, 2012). It is clear, therefore, that high-quality impact studies on the relationship between WASH interventions and health outcomes are needed more than ever.

Acknowledgements

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