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BRAC Research Report

September 2010

Knowledge, Attitudes and Practice About Sanitation and Hygiene: A Midline Evaluation in WASH areas of BRAC

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ACKNOWLEDGEMENTS

Thanks to the study participants for providing valuable time during data collection. We are grateful to the Government of the Kingdom of the Netherlands for providing financial support for the WASH.

RED is supported by BRAC's core fund and funds from donor agencies, organizations and governments worldwide. Current donors of BRAC and RED include Aga Khan Foundation Canada, AusAID, Australian High Commission, Bill and Melinda Gates Foundation, NIKE Foundation, Campaign for Popular Education, Canadian International Development Agency, Charities Aid Foundation-America, Columbia University (USA), Department for International Development (DFID) of UK, European Commission, Fidelis France, The Global Fund, GTZ (GTZ is now GIZ) (Germany), Government of Bangladesh, The Hospital for Sick Children, ICDDR,B Centre for Health and Population Research, Institute of Development Studies (Sussex, UK), Inter-cooperation Bangladesh, International Committee of the Red Cross, International Research and Exchange Board, Manusher Jonno Foundation, Micro-Nutrient Initiative NOVIB, OXFAM America, Plan Bangladesh Embassy of the Kingdom of the Netherlands, Royal Norwegian Embassy, SIDA, Stanford University, Swiss Development Cooperation, UNICEF, University of Leeds, World Bank, World Food Programme, Winrock International USA, Save the Children USA, Save the Children UK, Safer World, The Rotary Foundation, Rockefeller Foundation, BRAC UK, BRAC USA, Oxford University, Karolinska University, International Union for Conservation of Nature and Natural Resources (IUCN), Emory University, Agricultural Innovation in Dryland Africa Project (AIDA), AED ARTS, United Nations Development Program, United Nations Democracy Fund, Family Health International, The Global Alliance for Improved Nutrition (GAIN), The Islamic Development Bank, Sight Saver (UK), Engender Health (USA) and International Food Policy Research Institute (IFPRI).

RED received wide support and cooperation from all divisions of BRAC, particularly from the field staff and the people of Bangladesh without whose sincere support and patronage no field research could be conducted smoothly. RED also received useful comments, suggestions, and guidance from researchers, reviewers, and editors from within and outside the country, which helped improve the quality of research and research outputs. RED is indebted to BRAC management for its continued support.

ABSTRACT

This study aimed to evaluate the impact of BRAC WASH (Water, Sanitation and Hygiene) programme on hygiene knowledge and practice of the people in intervention areas compared to baseline status. A population-based cross-sectional study with a pre-test and post-test design was conducted in 50 sub-districts of rural Bangladesh where BRAC WASH programme exists. A two-stage systematic sampling design was followed in drawing the sample. Data collection took place during November 2006–June 2007 at baseline and April-June 2009 at midline using a pre-tested structured questionnaire and physical verification. Findings reveal that knowledge and practice of hand washing at critical times (such as after contact with feaces and waste, before eating, cooking and serving food) significantly increased at midline compared to baseline. Knowledge about water contamination and water-borne diseases, water purification procedure, sanitation hygiene, rules of maintaining good health, and waste disposal at fixed place increased at midline. Availability of slippers, soap and water nearby latrine increased in intervention areas. However, there still exists room for improvement because practice of hygiene behaviour was not universal although they had knowledge of its importance. To achieve the targets of Millennium Development Goal, the WASH programme needs to pay more attention in providing knowledge related to personal hygiene.

EXECUTIVE SUMMARY

BACKGROUND

To reduce mortality and morbidity, hygiene behaviours produce a greater impact than safe water supply and good toilet facilities. For changing attitude and behaviours, hygiene education comprises a broad range of activities such as water preservation, hand washing, safe rules of sanitation practice, etc. It changes not only attitude and behaviours but also breaks the chain of disease transmission associated with unsafe water and sanitation. As a developing country Bangladesh is fighting against diarrhoea and other waterborne diseases. BRAC is implementing a comprehensive community-based programme on Water, Sanitation and Hygiene (WASH) to achieve the MDGs (Millennium Development Goal 4 and 7) since 2006. A comparative analysis of the baseline and the midline status may reflect the effects of the BRAC WASH programme. This may also provide necessary feedback for scaling up and sustainability of the programme in near future.

OBJECTIVE

The overall objective of the study was to evaluate the impact of BRAC WASH programme on hygiene knowledge and practice of people in the intervention areas compared with the baseline status.

The specific objectives were to assess and compare:

- The knowledge on general health,
- The knowledge on sanitation hygiene,
- The knowledge on water contamination and water purification
- The awareness on collecting and storing water hygienically
- The awareness on domestic waste disposal,
- The knowledge and practice of hand washing, and
- The hygiene practices.

METHODS

This is a population-based cross-sectional study with a pre-test and post-test design. Data were collected during November 2006–June 2007 (rolling baseline) to follow sequential programme implementation and April-June 2009 at the midline using a pretested structured questionnaire and physical verification. A two-stage sampling design was followed in drawing the sample. Firstly, 30 villages were systematically selected from each of the 50 *upazilas* of the first phase of programme. Later, from each village 20 household were chosen using the same method, giving a total of 30,000 households. In both surveys, the respondents were adult female members of the households who had knowledge of day-to-day household activities related to water, sanitation and hygiene. Computation of relative changes between the baseline and the midline surveys compared the effects of the programme, and chi-squared tests determined the level of significance in the changes occurred.

KEY FINDINGS

Study results reveal that after two years of intervention, knowledge about water-borne diseases, water hygiene, sanitation and hand hygiene increased significantly. This was also reflected in practice. Hand washing practice with soap increased before eating by 140%, before serving food by 84%, before feeding babies by 77% and before cooking by 54%. At the same time, significant decline in the gap between knowledge and practice was observed at the midline. More people used pitcher to collect and store water for drinking, washing utensils and cooking. Use of jug for collecting and storing water for drinking and cooking increased in the midline. At the same time, putting cover (lid) on the water pot during transporting and storing increased in the midline. Knowledge about the rules of maintaining good health increased significantly in the midline. However, in the midline fewer people stated that they disposed kitchen waste, poultry waste and household waste at fixed place. Compared to the baseline, more people reported that carrying water pot with right hand during commuting to and from latrine, wearing slippers while using latrine and washing hands with soap after defecation were the rules of using latrines hygienically. Improved hygienic practices were observed during physical verification in the midline. Soaps, slippers and sufficient water preservation were found near latrines in increased proportion compared to the baseline.

CONCLUSION

The study found significant improvement in hygiene knowledge and practice after two years of implementation of BRAC WASH programme. However, a gap still exists between knowledge and practice regarding washing hand before and after eating though data indicated a reduction in this gap. Accelerated and sustained inputs of programme are needed to further reduce this gap.

RECOMMENDATION

The following recommendations are made based on the study findings:

1. To achieve further success the programme should pay more attention on providing knowledge related to personal and domestic hygiene and follow-up practical changes which might help programme to ensure proper hygiene practice in the intervention areas.

2. Different motivational activities such as cluster meetings, folk songs, and popular theatre should be strengthened ensuring participation of all target groups to further improve knowledge and awareness.

INTRODUCTION

The word 'hygiene' was derived from the name of the ancient Greek Goddess of healthful living, 'Hygeia'; which was depicted as a daughter or wife of the God of healing, whose worship was aimed at curing diseases (Blakemore and Jennet 2001). World Bank defines hygiene as the "set of human behaviours related to safe management of excreta, e.g. washing hands with soap at appropriate times, the safe disposal of child feaces, etc." (World Bank 2007). Although the broader definition of hygiene promotion includes the science of preventive medicine, preservation of health, exercise and diet, but generally used in the context of preventing the transmission of infection (Nicolle 2007).

To reduce mortality and morbidity, hygiene behaviours provide a greater impact than safe water supply and good toilet facilities (Cairncross *et al.* 2006). In changing attitude and behaviours, hygiene education comprises a broad range of activities such as water preservation, hand washing, safe rules of sanitation practice, etc. It comprises not only changing attitude and behaviours but also breaks the chain of diseases transmission associated with unsafe water and sanitation. Hygiene education makes the community members aware about the correct use, storage and disposal of water and general hygiene (Duncker 2000). Everyday, about 6,000 children die from diseases associated with adequate sanitation, poor hygiene and unsafe water (UNEP 2003).

Water-borne diseases have a great impact on children's morbidity and mortality in less developed countries (Fewtrell *et al.* 2005). Water is a passive transporter of waterborne diseases like diarrhoea, dysentery, typhoid, and cholera. Improvement of hygiene behaviours may have a great impact in controlling diarrhoeal diseases (Esrey *et al.* 1991). World Health Organization estimated that about 1.8 million people die every year due to diarrhoea and cholera. It is also estimated that 90% of them are <5 years old children. About 88% of diarrhoeal diseases are linked to lack of access to safe water supply, inadequate sanitation, and poor hygiene (WHO 2004).

In developing countries, diarrhoeal diseases are one of the leading causes of morbidity and mortality, especially among <5 years years old children (Bern *et al.* 1992). Every year, diarrhoeal diseases kill more than 100,000 children aged less than five years in Bangladesh. On an average, diarrhoea attacks children more than twice in a year (Bern *et al.* 1992).

However, it is observed that people have a very poor understanding regarding the link between poor hygiene and diseases (WaterAid Bangladesh 2003). Research indicates that considerable number of people builds latrines for their convenience, privacy and social status rather than sanitation and health (WaterAid Bangladesh 2003). In rural areas, some people tend to defecate in open places despite they have sanitary latrines. Among the low income households, almost one in eight people defecate in open places. Child's feaces are not disposed properly rather deposited in different locations outside home (ICDDR,B 2008).

BRAC, in co-operation with the Government of Bangladesh (GoB), has been implementing the WASH programme to increase the coverage of sanitation and to achieve the Millennium Development Goals (reducing child mortality and halving the

number of people without sustainable access to safe drinking water and basic sanitation by the year 2015). BRAC implements WASH programme in 150 rural *upazilas* throughout the country. The programme is financially supported by the government of Netherlands for five years (2006-2010).

The WASH intervention offers education on good hygiene practice to 37.5 million people in 150 *upazilas* (BRAC 2008). The intervention package includes promotional activities for installation of sanitary latrines and tube-wells and facilitation of sanitation and hygienic practices through intensive health education in various settings. The health education component consists of awareness building on i) washing hands with soap/ash/soil after defecation; ii) washing hands with soap before eating, before serving food to the household members and children; iii) using safe water for cooking, washing and bathing; iv) keeping surroundings of the households, kitchen, tubewells and latrines tidy; v) construct platform of the tube-wells with solid materials; vi) disposal of domestic waste, excreta of poultry and livestock in fixed place and disposal of children feaces in sanitary latrine; and vii) preserve foods with appropriate cover.

Village WASH committees (VWC) were formed in the intervention areas to facilitate the WASH activities. The committees consist of teachers, elite, religious leaders and generous people of the community. These committees motivate people to use safe water, improve sanitation and hygienic practices. They also generate funds from the community for helping the ultra poor households for construction of sanitary latrines and tube wells. WASH programme also provides financial support to the ultra poor for constructing sanitary latrine in the villages where ≥80% households possessed sanitary latrines. BRAC staff liaises with government staff and union council representatives elect to make available water and sanitation-related hardware resources for the community people.

Through organizing cluster meetings in the villages for different audiences, including men, women, adolescents, children and village leaders, the WASH programme offers education on good hygiene. Preventive home visits (PHV) are provided to enhance the intervention activities. Besides, popular theater, film shows and folksongs are used to disseminate health education. Educational messages are also disseminated through radio and television. Sanitation month is celebrated through organizing workshops, rallies, sanitation fair and arranging competition to make people aware about water, sanitation and hygiene practices.

Before launching the WASH programme, a baseline survey was conducted in 2006-2007 to understand the pre-programme status vis-à-vis the impact evaluation of the programme. Subsequently, a midline survey was done during mid-2009 after two years of the baseline survey to assess the changes and improvements in the motivation, knowledge and practices in various intervention components. A comparative analysis of the baseline and the midline surveys may reflect the effects of the BRAC WASH programme implementation, which may provide necessary feedback for scaling up and sustainability in the near future.

OBJECTIVE

The overall objective of the study was to evaluate the impact of BRAC WASH programme on hygiene knowledge and practice of the people in the intervention areas compared to baseline status.

The specific objectives were to assess and compare:

1. The knowledge on general health,
2. The knowledge on sanitation hygiene,
3. The knowledge of water contamination and water purification,
4. The awareness on collecting and storing water hygienically,
5. The awareness on domestic waste disposal,
6. The knowledge and practice of hand washing, and
7. The hygiene practices.

METHODS AND MATERIALS

STUDY DESIGN

This is a population-based cross-sectional study with a pre-test and post-test design. In 2006 and 2007, the Research and Evaluation Division (RED) of BRAC conducted a baseline survey in the selected WASH programme areas. Later in 2009 (during April-June), a midline survey was carried out to assess the effects of this intervention on related indicators. The BRAC WASH programme started its activities in three phases. In each phase, 50 *upazilas* (sub-districts) were included in the intervention, giving a total of 150.

SAMPLE SIZE AND SAMPLING

A two-stage systematic sampling design was followed in drawing the sample. In the baseline, all the 50 *upazilas* from the first phase were selected. In the first step, 30 villages from each *upazila* were systematically selected, followed by 20 households from each village. Hence, the total sample size was 30,000 households. In the midline, the same households were surveyed after two years of implementing the BRAC WASH programmes.

DATA COLLECTION AND QUALITY CONTROL

Data for the baseline were collected during November 2006–June 2007 and for the midline during April-June 2009, using a pre-tested structured questionnaire. Possible variables were physically verified. In both the surveys, respondents were the adult female members of the households who had knowledge of day-to-day household activities related to water, sanitation and hygiene. Female respondents were chosen because they are usually responsible for collecting and storing water and maintenance of latrines at households.

Verbal informed consent was obtained from the study participants before data collection. Field interviewers were provided a week-long rigorous training including field practice. A training manual containing instructions about data collection procedure was used. The enumerators were divided into groups with four members in each group (two female and two male). In addition, five supervisors were selected and trained separately who supervised three to five groups each (based on the distance among the surveyed *upazilas*). Enumerators were instructed to complete the entire questionnaire in the field and cross-check each other's questionnaire before finalizing the daily work. Two batches of enumerators were sent separately to the field at first. Later after completion of 50% of the field survey these two batches were mixed to replace the members (one male and one female) of one batch with those from the other batch to overcome any technical error or information gap. The supervisors' duty was to spend a week in each of his assigned group. During their stay in the field they went through all the questionnaires to identify any inconsistency and the respondent was re-interviewed. In addition, they were also told to verify 5% of the previous week's filled in questionnaires.

DATA MANAGEMENT AND ANALYSIS

Filled in questionnaires were edited for consistency and completeness and coded for computer entry under close supervision of researchers and 20% of the questionnaires were re-checked to identify any discrepancy. Economic classes i.e. ultra poor, poor and non-poor were defined according to WASH programme guideline (BRAC 2008). The data were analyzed using Stata 9.0/SE. Computation of relative changes between the baseline and the midline surveys compared the effects of the programme, and chi-squared tests determined the level of significance in the changes occurred. The RD computation formula was,

Relative difference (RD %) = {(Status in ML – status in BL)/status in BL}*100
Here, ML = midline and BL = baseline.

RESULTS

PROFILE OF THE STUDY PARTICIPANTS

Table 1 illustrates the profile of the study participants. Ninety percent of the study participants were adults (20-59 years old) and 3% were ≥60 years old. One-fifth of the households was ultra poor, more than one quarter was poor, and over a half was non-poor. Most study participants were married (92%) and housewives (92%). More than 55% of the respondents were literate. Half of the respondents were members of at least one non-governmental organization (NGO).

Table 1. Profile of study participants

Indicators	%	n
Age group		
Adolescent (10 – 19 years)	6.8	1,871
Adults (20 – 59 years)	90.2	25,000
Older (60+)	3.0	839
Economic status		
Ultra-poor	20.1	6,039
Poor	26.9	8,045
Non-poor	53.0	15,909
Marital status		
Married	91.8	25,296
Unmarried	1.5	422
Others	6.7	1,851
Literacy		
Literate	55.2	16,551
Illiterate	44.8	13,441
Occupation		
Housewife	92.2	25,417
Others	7.8	4,437
NGOs Membership(yes)	49.9	15,236

KNOWLEDGE ABOUT GENERAL HEALTH

'Maintain neat and cleanliness', 'regular intake of nutritious food', 'taking bath regularly' were frequently mentioned both in the baseline and the midline as a way of maintaining good health. But knowledge on light exercise for good health increased tremendously in the midline (by 73%) (Table 2).

Table 2. Knowledge about general health (%)

	Baseline	Midline	Relative difference	P-value
Regular intake of nutritious food	73.5	76.0	3.4	P<0.001
Bath regularly	27.1	27.6	1.8	
Light exercise	1.5	2.6	73.3	
Maintain neat and cleanliness	79.0	83.3	5.4	
Others	8.0	8.0	0.0	
Don't know	0.1	0.1	0.0	
n	29,993	27,710		

KNOWLEDGE ABOUT SANITATION HYGIENE

Table 3 presents knowledge on different rules for hygienic use of latrine. Knowledge on carrying water pot with right hand during commuting to and from latrine increased by 74% in the midline, and wearing slippers for the purpose increased by 12%, and hand wash after defecation by 12%. Knowledge of keeping latrine neat and clean decreased by 29% in the midline.

Compared with the baseline, use of sanitary napkins for comfort in performing daily chores was reported to increase by 48% in the midline (Table 4).

Table 3. Rules for hygienic use of latrines (%)

	Baseline	Midline	Relative difference	P-value
Wear slippers while using latrine	81.4	91.2	12.0	
Take water pot with right hand during commuting to and from latrine	8.7	15.1	73.6	P<0.01
Wash hands with soap after defecation	69.6	77.7	11.6	
Keep latrine neat and clean	24.6	17.5	-28.9	
Don't know	5.4	2.5	-53.7	
n	29,993	27,710		

(Multiple responses considered).

Table 4. Use of sanitary napkin during menstruation

	Baseline	Midline	Relative difference	P-value
Reason for using sanitary napkin				
Prevention of infection	59.4	40.6	-31.6	P<0.001
Comfort in performing daily chores	44.0	65.1	48.0	
n	266	212		

(Multiple responses considered).

KNOWLEDGE ABOUT WATER PURIFICATION TECHNIQUES

After implementation of BRAC WASH programme, significant improvement in the knowledge about techniques of water purification was observed in the midline (P<0.001, Table 5). Knowledge about purifying water with medicine increased by 97%, filtering by 73% and boiling by 14%.

Table 5. Knowledge of water purification techniques (%)

Water purification options	Baseline	Midline	Relative difference	P-value
By boiling	68.1	77.6	14.0	
With medicine	6.6	13.0	97.0	P<0.001
By filtering	2.2	3.8	72.7	
Don't know	20.7	13.7	-33.8	
n	29,993	27,710		

(Multiple responses considered).

Table 6 shows the knowledge of the respondents about prevention of water-borne diseases. The proportion of respondents reporting drinking pure water as a method for prevention of water-borne diseases increased by 15% and drinking tubewell water increased by 2% in the midline compared to baseline. The proportion of 'Don't know' decreased by 31% in the midline.

Table 6. Knowledge of prevention of water-borne diseases (%)

	Baseline	Midline	Relative difference	P-value
Drinking pure water	45.3	51.9	14.6	
Drinking tube-well water	36.8	37.7	2.4	P<0.001
Don't know	22.3	15.5	-30.5	
n	29,993	27,710		

(Multiple responses considered).

Knowledge on different indicators for water contamination increased in the midline at varied degrees; for example, 'contact with dirty hands' by 44%, followed by 'keeping container uncovered' by 43% (Table 7).

The proportion of the respondents who mentioned contaminated water as a cause of diarrhoea increased by 4%, dysentery by 3%, blood dysentery by 5%, jaundice by 4%, typhoid by18% and cholera by 48% in the midline compared with the baseline (Table 8).

The proportion of respondents saying arsenic contaminated water causes gangrene increased by 313%, cancer by 43% and skin diseases by 19% in the midline compared to baseline (Table 9).

Table 7. Knowledge of water contamination (%)

	Baseline	Midline	Relative difference	P-value
Contact with dirty hands	9.1	13.1	44.0	
When garbage gets into water	81.5	84.1	3.2	P<0.001
Keeping container uncovered	27.6	39.4	42.8	
Don't know	5.5	2.9	-47.3	
n	29,993	27,710		

(Multiple responses considered).

Table 8. Types of diseases associated with contaminated water (%)

	Baseline	Midline	Relative difference	P-value
Diarrhoea	90.0	93.8	4.2	
Dysentery	19.2	19.8	3.1	
Blood dysentery	7.9	8.3	5.1	
Jaundice	3.7	5.2	40.5	P<0.001
Typhoid	3.8	4.5	18.4	
Cholera	30.5	39.1	28.2	
Arsenicosis	2.5	1.8	-28.0	
Don't know	5.8	3.3	-43.1	
n	29,993	27,710		

(Multiple responses considered).

Table 9. Diseases caused by arsenic contaminated water (%)

	Baseline	Midline	Relative difference	P-value
Skin disease	48.5	57.9	19.4	
Gangrene	0.8	3.3	312.5	
Cancer	1.4	2.0	42.9	P<0.001
Others	8.0	4.9	-38.8	
Don't know	45.6	37.1	-18.6	
n	29,993	27,710		

(Multiple responses considered).

AWARENESS OF COLLECTING AND STORING WATER

Collecting drinking water using pitcher decreased by 5% in the midline, while collecting drinking water using jug increased by 3% (Table 10). Putting cover on the water container during transportation increased by 47% in the midline compared to baseline. Proportion of storing water using bucket and jug increased in the midline by 96% and 37%, respectively. Putting cover on the water container during storage increased by 23% in the midline.

Table 10. Collection and storage of water for drinking (%)

	Baseline	Midline	Relative difference	P-value
Types of pots used to collect water				
Pitcher	29.3	27.8	-5.1	P<0.01
Bucket	23.7	23.9	0.8	
Jug	45.9	47.4	3.3	
Don't collect	0.1	0.1	0.0	
Others	1.0	0.7	-30.0	
Covered during transportation	18.4	27.0	46.7	P<0.01
Pitcher	24.0	25.2	5.0	P<0.01
Bucket	4.9	9.6	95.9	
Jug	14.7	20.1	36.7	
Don't store	55.3	44.0	-20.4	
Others	1.2	1.1	-8.3	
Covered during storage	31.7	39.0	23.0	P<0.01
n	29,993	27,710		

Collecting water for washing utensils using pitcher increased by 50% in the midline and using jug decreased by 50% (Table 11). Putting cover on the water container during transportation increased by 160% in the midline compared to baseline. Proportion of storing water using pitcher and bucket increased in the midline by 90% and 46%, respectively. Putting cover on the water container during storage increased by 138% in the midline.

Table 11. Collection and storage of water for washing utensils (%)

	Baseline	Midline	Relative difference	P-value
Types of pots used to collect water				
Pitcher	2.0	3.0	50.0	
Bucket	5.4	6.2	14.8	
Jug	0.2	0.1	-50.0	P<0.01
Don't collect	91.9	90.3	-1.7	
Others	0.5	0.4	-20.0	
Covered during transportation	0.5	1.3	160.0	P<0.01
Types of pots used to store water				
Pitcher	1.0	1.9	90.0	
Bucket	1.1	1.6	45.5	
Jug	0.0	0.0	-	P<0.01
Don't store	97.6	96	-1.6	
Others	0.3	0.5	66.7	
Covered during storage	0.8	1.9	137.5	P<0.01
n	29,993	27,710		

Collecting water for cooking using both bucket and jug increased by 4% in the midline, while using pitcher decreased by 2% (Table 12). Putting cover on the water container during transportation increased by 38% in the midline compared to baseline. Proportion of storing water using pitcher increased in the midline by 16% compared to baseline. Putting cover on the water container during storage increased by 23% in the midline.

Table 12. Collection and storage of water for cooking (%)

	Baseline	Midline	Relative difference	P-value
Types of pots used to collect water				
Pitcher	37.3	36.5	-2.1	
Bucket	39.4	41.1	4.3	
Jug	10.2	10.6	3.9	P<0.01
Don't collect	12.1	10.3	-14.9	
Others	1.0	1.5	50.0	
Covered during transportation	14.6	20.1	37.7	P<0.01
Types of pots used to store water				
Pitcher	24.6	28.6	16.3	
Bucket	2.4	7.3	204.2	
Jug	0.2	1.7	750.0	P<0.01
Don't store	71.7	60.5	-15.6	
Others	1.1	2.2	100.0	
Covered during storage	23.2	28.5	22.8	P<0.01
n	29,993	27,710		

KNOWLEDGE AND PRACTICE ABOUT HAND HYGIENE

Table 13 depicts hand washing knowledge at critical times of the study participants. Compared to the baseline, knowledge of hand washing before eating, after defecation, before cooking, before serving food increased by 5%, 6%, 46% and 7%, respectively. But decreased in after cleaning 'bottom of babies' and 'before feeding babies' by 14% and 9%, respectively.

Table 14 depicts self reported hand washing practice with soap among the respondents who reported that hand washing at critical times was important. Significant improvement in hand washing practice with soap were observed in all the activities (P<0.001). It was highest for the activity before eating (140%), followed by before serving food (84%) and before feeding babies (77%).

Table 13. Knowledge on hand washing at critical times (%)

Hand washing knowledge	Baseline	Midline	Relative difference	P-value
Before eating	92.3	97.0	5.1	P<0.01
After defecation	90.8	95.8	5.5	P <0.01
After cleaning bottom of babies	10.9	9.4	-13.8	P <0.01
Before feeding babies	5.8	5.3	-9.3	P <0.01
Before cooking	30.4	44.3	45.7	P <0.01
Before serving food	10.6	11.3	6.6	P<0.01
After eating	66.8	66.6	-0.3	P>0.05

Table 14. Self-stated hand washing practices at critical times (%)

Hand washing practices	Baseline	Midline	Relative difference	P-value
Before eating	8.5	20.4	140.0	P<0.001
After defecation	62.4	73.7	18.1	P<0.001
After cleaning bottom of babies	58.8	68.1	15.8	P<0.001
Before feeding babies	16.7	29.6	77.2	P<0.001
Before cooking	10.3	15.9	54.4	P<0.001
After eating	5.0	7.1	42.0	P<0.001
Before serving food	9.1	16.7	83.5	P<0.001

DOMESTIC WASTE DISPOSAL

Table 15 illustrates households' waste disposal practice at fixed places. Disposal of children's stool and livestock waste in a fixed place increased in the midline by 78% and 3%, respectively, whilst other indicators' values decreased in the midline.

Table 15. Household waste disposal at fixed places (%)

	Baseline	Midline	Relative difference	P-value
Kitchen waste	96.3	95.8	-0.5	
Children stool	13.2	23.5	78.0	
Poultry waste	83.8	76.6	-8.6	P<0.001
Live-stock waste	65.7	67.5	2.7	
Household waste	97.3	96.3	-1.0	

PHYSICAL VERIFICATION OF HYGIENE PRACTICE

Physical verification of certain indicators shows significant improvement in hygiene practice in the midline (Table 16). One-third of the latrines was found to be neat and clean in the baseline, which increased by 51% in the midline. The availability of slippers, soap and water nearby the latrine increased in the midline by 84%, 41% and 17%, respectively.

Table 16. Physically verified personal and domestic hygiene practice (%)

Indicators	Baseline	Midline	Relative difference	P-value
Toilet was found neat and clean	33.6	50.8	51.2	P<0.01
Sufficient water available nearby the latrine	32.4	37.9	17.0	P<0.01
Soap available for hand washing nearby the latrine	13.8	19.4	40.6	P<0.01
Slippers available near the latrine	4.5	8.3	84.4	P<0.01
Tube-well is situated at a higher level than the latrine	17.8	29.1	63.5	P<0.01

DISCUSSION

Study results reveal that after two years of implementing BRAC WASH programme, knowledge and awareness about use of safe water and safe latrine, hand washing and personal hygiene increased significantly. Practice of hygienic behaviours also improved in the midline. Gaps between knowledge and practice narrowed down in the midline from baseline in most of the reported and physically verified study indicators. BRAC WASH programme's motivational activities through cluster meetings, home visits, popular theatre and some educational programme may lead to a remarkable change from the baseline to the midline.

Significant improvement was evident in the BRAC WASH intervention areas regarding knowledge and awareness of sanitation. In the midline, knowledge and practice about the rules of hygienic use of latrines increased from the baseline. It is essential to know the hygienic rules of using latrines because only safe water cannot protect diseases like diarrhoea, dysentery and cholera (Esrey *et al.* 1991, Huttly *et al.* 1997). This change indicates that the respondents became aware of the need of clean latrines. Similar improvement was also observed in having hand washing facilities (like water and soap) nearby the latrines. From the BRAC WASH programme, as part of software support, voluntary health workers (*Shaysthyo shebikas)*, programme organizers, programme assistants and managers visit door to door on a regular basis to disseminate knowledge and monitor practice related to sanitation and hygiene which might have the impact on these positive behavioral changes. Hence, there still exists room for improvement because of the compliance deficiency.

Compared to the baseline, the respondents became more aware about the diseases associated with dirty water and arsenic contaminated water. At the same time, knowledge about the necessity of water purification and prevention of water-borne diseases increased significantly from the baseline. Probably this knowledge and awareness led to a reduction in the occurrences of water-borne diseases in WASH intervention areas (Rana 2009). Improved water and hygiene practices result lower incidences of water-borne diseases among the people. Contaminated drinking water highly contributes to the transmission of water-borne diseases such as diarrhoea which causes 2.5 million childhood death yearly (Kosek *et al.* 2003). However, improved water storage is needed for maintaining good health (Checkley *et al.* 2004). More respondents in the midline than baseline reported that cleanliness is a way of maintaining good health. This implies that people increasingly have begun to understand the association of cleanliness with good health. Because the first step of maintaining good health is personal hygiene (Web Health Centre 2010) which refers to the personal cleanliness (Hygiene Expert, UK 2010).

In the Midline, the participants were more conscious about covering water containers while carrying and storing water for drinking, cooking and washing utensils. The study found that use of jug to collect and store water for drinking and cooking has increased rather than pitcher. The reason behind this finding might be instant use of collected water and closeness of tubewell from the houses. In another study, it was described that containers which have small opening keep water safer than container with wider opening (Jensen *et al.* 2002). In our study, we found that use of water containers (e.g. jug, pitcher) which have narrow opening was higher than container

with wider opening (e.g. bucket). This implies the participants' improved knowledge about hygiene practices.

Findings reveal that hand washing practices with soap at critical times increased from the baseline. Most respondents practiced hand washing with soap particularly after defecation rather than during food handling. The reason behind this might be affordability of soap, as most of them could not afford more than one soap for hand washing and other purposes. They kept the soap in or near the latrine or tubewell area, but not inside their house (Akter *et al.* 2010). At the same time, most of the respondents were not conscious about their child's hygiene. As they still did not consider children's feaces as a potential source of contamination. Gaps were still observed between their saying and practicing. The respondents had good knowledge of washing hands at critical times with soap (e.g. before eating and after eating), but it did not correspond to the knowledge retained. Similar essence has been found in another study which described that community people have good knowledge on hand washing with soap at critical times but few of them have habit of practicing (ICDDR,B 2009). In the midline, improvement of hand washing practice shows a decline between knowledge and practice gap.

Programme intervention resulted in a significant increase in disposing children's stool and livestock wastes at fixed place. In a number of epidemiological studies, it was observed that there was an association between stool disposal and child's diarrhoea (Curtis *et al.* 2000). Study conducted in SriLanka by Mertens *et al.* (1992) shows that unsafe disposal of stool was associated with greater diarrhoea risk and if such unhygienic practices were reduced, and then the diarrhoeal episode could be prevented. However, in the midline fewer people stated that they disposed kitchen waste, poultry waste and household waste at fixed place as they might consider these wastes as less harmful for them.

Although this study endures a methodological weakness because of the absence of control group, availability of baseline data and randomness of the study sample allows drawing a conclusion that the observed changes are the impacts of the intervention. Nevertheless, practice of hand washing with soap and waste disposal at fixed place were not observed which is a limitation of this study.

CONCLUSION

The study found significant improvement in hygiene knowledge after two years of implementation of BRAC WASH programme implementation. Knowledge dissemination through different motivational activities such as regular cluster meetings, home visits, folk songs, popular theatre and practical demonstration of some practices are responsible for this remarkable improvement in knowledge and practice. However, a gap still exists between knowledge and practice regarding washing hand before and after eating, midline data indicated a good sign of reduction in this gap. Accelerated and sustained inputs of programme may help further narrowed down the gap between knowledge and practice.

RECOMMENDATION

Based on the findings the following recommendations can be made:

1. To achieve further success the programme should pay more attention on providing knowledge related to personal and domestic hygiene and follow-up practical changes which might help programme to ensure proper hygiene practice in the intervention areas.

2. Different motivational activities such as cluster meetings, folk songs, and popular theatre should be strengthened ensuring participation of all target groups for further improving knowledge and awareness.

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