Impact of Food Hygiene in Reducing Contamination of Weaning Food and Water in a Diarrhea Endemic Area in Bangladesh

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Background

**WHO (1990):** 1400 million episodes of diarrhoea, <5 yrs, world wide, annually. Over 3 million died.

**Esrey 1990:** 70% of this diarrhoea episodes related to pathogens transmitted through food.
Mead et al., (1999):  
**In USA:**  
76 million episodes, 325,000 hospitalized, 5000 death annually.

Adak et al., (2005):  
**In UK:**  
236,600 cases  
21,138 hospitalized, 718 deaths annually.
In Bangladesh:
Out of 50 disease, 40 including diarrhea, dysentery, typhoid is related to contaminated food and water.

Islam et al., (1993):
Potentiality of growth of diarrhoea causing bacteria in cooked food: Boiled rice, lentil soup, milk, mashed potato, cooked fish, meat curry: 2-3 logs increase in 6 hours.
Keusch et al., 2006; Lanata et al., 2003; Mortajemi et al., 1993, found that food borne diarrhoea in developing countries are due to preparation of foods under unhygienic conditions.

Ousmane Toure and Sandy Cairncross (2010): Peri-urban Mali, Intervention by food hygiene following HACCP procedures substantially reduced the weaning food contamination.
Objectives

To develop a small scale intervention to reduce the contamination of weaning food and water following the HACCP approach.

To find out the effect of intervention in reducing the contamination of weaning food and water.
Methods

**Study site:** Matlab, Chandpur
Demographic Surveillance >40 yrs in 200,000 populaiton.

**Study families:** 60 families
30 each for control & study HHs
Study HHs provided training & demonstration regarding hygienic preparation of weaning food.

3 Field Workers each of them were in charge of 20 HHs (10 intervention, 10 control).
Intervention was provided for 4 weeks and then samples were collected.

3 months later after intervention, again samples were collected and analyzed.
Field Workers collected food and water samples:
2 kinds of weaning foods:
Khichuri (Rice cooked with lentil and vegetables)
Suzi (Semolina: coarse flower of wheat cooked with milk and sugar).
Suzi
Microbiological tests:

Faecal coliforms
Faecal streptococci
*Clostridium perfringens*
Results

Bacterial contamination, before & after intervention, during 1st feeding

Mean counts of bacteria (Log$_{10}$ CFU/g)

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<tbody>
<tr>
<td>Baseline</td>
<td>1.8</td>
<td>2.0</td>
<td>0.2</td>
<td>1.2</td>
<td>1.0</td>
<td>0.4</td>
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<tr>
<td>After intervention</td>
<td>1.4</td>
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<td>0.8</td>
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Bacterial contamination

Study
Control
Bacterial contamination, before & after intervention, during 2nd feeding

Mean counts of bacteria (Log_{10} CFU/g)

- FC
- FS
- CP
- FC
- FS
- CP

Baseline

After intervention

**Bacterial contamination**

- Study
- Control

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KNOWLEDGE FOR
GLOBAL LIFESPAN SOLUTIONS
Bacterial contamination, before & after intervention, during 3rd feeding

Mean counts of bacteria (Log\(_{10}\) CFU/g)

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Bacterial contamination
Bacterial contamination in POU water, before & after intervention

Mean counts of bacteria (Log$_{10}$ CFU/100 ml)

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Study
Control

Bacterial contamination

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Bacterial contamination in study group during 1st feeding at different time interval

Mean counts of bacteria (Log_{10} CFU/g)

Baseline
After Intervention
Final Phase

Bacterial group
FC
FS
CP
Bacterial contamination in study group during 2nd feeding at different time interval

Mean counts of bacteria (Log$_{10}$ CFU/g)

- FC: Baseline, After Intervention, Final Phase
- FS: Baseline, After Intervention, Final Phase
- CP: Baseline, After Intervention, Final Phase

Bacterial group
Bacterial contamination in study group during 3rd feeding at different time interval

- **Baseline**
- **After Intervention**
- **Final Phase**

**Legend:**
- FC
- FS
- CP

**X-axis:** Bacterial group

**Y-axis:** Mean Log value of bacterial (CFU/g)
Bacterial contamination in study group in POU water at different time interval

Mean counts of bacteria ($\log_{10}$ CFU/100 ml)

**Bacterial group**

- FC
- FS
- CP

**Phases**

- Baseline
- After Intervention
- Final Phase
Inferences

- The baseline survey showed wide scale contamination of weaning food in study and control HHs by FC and FS.
- The contamination with *Clostridium perfringens* was negligible.
- There were substantial reduction of both FC and FS in the weaning foods in study HHs following HACCP procedures.
- The difference in reduction of FC and FS before and after intervention is statistically significant (p<0.0001).
Conclusion

Hygiene intervention following the HACCP approach reduced the contamination of weaning food and water substantially which might have an impact in prevention of weaning food related diarrhoea.
Acknowledgement

SHARE
LSHTM
DFID, UK
ICDDR,B
Thank you