

## Food Poisoning of the Infantile Group, Microbiological Standpoint

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### Abstract

Infantile food poisoning is the poisoning of a child or an infant. It occurs after the child eats food containing contaminant like fungi, bacteria, virus, toxicants etc. Some microorganisms have been implicated as the cause of infantile food poisoning and they are *Staphylococcus aureus*, *Salmonella* spp, *Escherichia coli*, *Clostridium perfringens*, *Shigella* spp, *Campylobacter* spp, *Clostridium botulinum*, etc. The symptoms of the infection ranges from stomach flu like abdominal pain, nausea, vomiting, diarrhea and fever. Prevention of the infantile food poisoning ranges from hygienic practices which are feeding infants with well processed food, keeping utensil clean, using clean water for the food preparation and pasteurizing infant food. If mothers and caregivers keep to the prescribed hygienic standard, infantile food poisoning will be drastically reduced.

**Keywords:** Infantile, Food Poisoning, Microorganisms, Hygienic standard

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### Introduction

Infants are among the children, babies or very young children. The feeding of an infants is generally regarded as food from starchy tubers like cassava, cocoyam, sweet potato or on cereals like maize, rice, wheat, sorghum and millet [1]. The food is normally administered to the children in form of gruels, that is either mixed with boiled water or boiled with water. Such gruels need to be further diluted with water in order to give a consistency that is appropriate for child feeding [2]. Infantile food poisoning occurs after a child eats food containing contaminants like bacteria, fungi etc [3]. The symptoms of infantile food poisoning are basically stomach flu like abdominal pains, nausea, vomiting, diarrhea and fever. The child who may be unable to explain his/her problem is mostly disadvantaged. The bacteria that causes food poisoning cannot be seen, smelled or tasted, so the child cannot understand or know when he/she is eating the microorganisms [4]. In order to reduce or eliminate the infantile food poisoning, good hygienic practice in breast milk feeding and weaning food preparation must be practiced. The reduction of food poisoning of the infant is the aim of this short note.

### Safe Production of Infant Food

Hygienic preparation of food and proper food handling by mothers and caregivers is a prerequisite in the reduction of infantile food poisoning. The maintenance of hygienic standard ranges from food handling, utensils, preparation of food, serving of food to the child, cups and bowls when feeding the child, avoiding the

system of using feeding bottles which can hide microorganisms [5]. Safe preparation of food for the infant is not only meant for the weaning food but also the breast milk. Some infectious diseases can be passed from the mother's breast milk to the child. Mothers who have serious disease may not be allowed to breastfeed their child in order not to transmit the infection to the new born [6]. Example was shown on the infected mother with hepatitis B, the baby should receive the vaccination for hepatitis B along with immunoglobulin (HBIG) immediately after birth [7].

### Route of Food Poisoning to the Child/ Infant

#### Breast Milk

The first point and source of infantile food poisoning is the breast milk of mothers. Some infectious diseases can be transmitted to the baby through the breast milk, [6] advises nursing mothers who are infected with some viruses to stop breastfeeding their offspring. Such mothers should use babies pasteurized human milk available in the markets. The current trend is the use of donor milk from mothers who are not infected with any disease [8]. Donor milk is obtained from mothers who are free from all kinds of diseases but the milk must be processed, pasteurized and stored in a milk bank [9].

#### Feeding Bottles

Feeding bottles are difficult to keep clean due to hidden parts where hand washing may not be successful. Evidences abounds

shows that feeding bottles are a particularly important route of transmitting pathogenic microorganisms to the child. Example in urban Peru 35% of bottle nipples tested positive (+ve) for *Escherichia coli*, an indication of faecal contamination while 31% of teas served in baby bottle were contaminated with *E. coli* compared to 2% of teas served in cups [10].

### Udder of Animals

In animals that produces milk, aseptically drawn milk from the udder shows a predominance of *Staphylococcus* and *diphtheriods* mainly heat sensitive *Corynebacteria* both groups being part of the cow's normal skin flora [11]. During milking operation, more milk are being contaminated from the utensils, environmental dusts, udder of the animal, including the milk handlers. Bacterial counts of Micrococci, *Corynebacteria*, aerobic spore forming bacilli and *Streptococcus faecalis* have been isolated in numbers as 10<sup>2</sup>-10<sup>3</sup>/ml in milking equipment's [12].

### Transplacental and Breast Milk Route

A child can be exposed to infection through the utero to toxic environmental agents that crosses the placenta. It could be biological (viral, bacterial, parasitic), chemical (pesticides, toxins) etc. A child could also be exposed to pollutants that passes into mother's breastmilk [13]. There are many routes of exposure to the child due to their size and developmental level. The behavior of a child is termed hand to mouth which exposes the child to more risk. The agents of food-borne diseases are viruses, bacteria, protozoa, parasite and prions as well as a wide range of chemicals that may enter the food [14]. HIV/AIDS is not a food – borne disease but should be discussed briefly due to the transmission to the child from the breast milk. Breast milk may be a route of viral infection to the infant owing to mother – to – child transmission. It occurs in utero at delivery and also after birth [15]. To prevent HIV transmission risk to the child, breast feeding should be discontinued as soon as possible and replacement feeding adopted [16]. Developing countries like Nigeria should have a comprehensive national infant and young child feeding policy which includes information on mother-to-child disease control mechanism. The policy will have a guidelines for health workers on how to protect, promote and support breastfeeding in the general population [14].

### Food Handlers

Certain microorganisms associated with human being are constituents of man's normal flora of the body. Therefore, the number and type of microorganism associated with a food handler is a direct reflection of the person's hygienic standard.

This flora would normally be seen on any object including food handled by the individual who can pick up from the dust, water, air [17]. Some genera of bacteria that are specifically associated with the hands, nasal cavities, mouth etc include *Micrococcus*, *Staphylococcus* and if an individual sanitary hygiene is poor, the hand and clothing flora may include *Escherichia*, *Salmonella*, *Shigella*, and other enteric organisms which may find its way into the child's food [18]. In a way to reduce the problems of food poisoning in children, hygienic practice during food preparation and feeding is a crucial prevention of gastrointestinal illness. The peak incidence of diarrheal disease occur in the second half year of infancy when the intake of complementary food is assumed to have commenced [19].

### Infantile Mycotoxins

Mycotoxin are poisonous substances produced by fungi and have the capacity of causing outbreak of mycotoxicosis in humans and animals, it could also be regarded as a secondary metabolites produced by fungi contaminating the food chain which are toxic to animals and humans [20]. Infants are more vulnerable than adults in infectious mycotoxins due to their constant growth, they breath more air, consume more cereal food, and drink more water than adults [21]. Infantile central nervous system, immune system, reproductive and Digestive systems are still developing, exposure to environmental toxicants (As mycotoxins) can lead to irreversible damage of vital organs [22]. Route of aflatoxins exposure could come from eating food or drinks containing the toxins, breathing moldy air in damp indoors and dermal absorption [23] (Table 1).

### Prevention of Infantile Food Poisoning

Infantile poisoning could be prevented or reduced to its lowest rate by practicing the following rules.

1. Food containing raw egg should not be added to complementary foods.
2. Utensils used in the preparation of complementary foods should be kept clean.
3. Complementary foods must be cooked/boiled to a safe temperature before feeding.
4. Water for the preparation of complementary food should be clean and free from microorganism.
5. Unpasteurized milk should not be added to the complementary food.
6. Left-over foods should be refrigerated or kept in freezing temperature.

**Table 1** Symptoms Associated with children Exposure to mycotoxins.

	Toxic/biological effects of ingestion	Mycotoxins	Possible foods
a	Hepatotoxicity carcinogenicity	Aflatoxins	Groundnut, figs, maize, milk, meat, milk product
b	Nephrotoxicity	Ochratoxins	Maize, cereal, coffee, milk, meat, beans, wine
c	Vomiting, gastrointestinal disturbances	Deoxynivalenol	Cereal and its derivatives
d	Esophageal cancer	Fumonisms	Maize
e	Oestrogenecity infertility	Zearalenone	Maize, bailey wheat
f	Edema, hemorrhage and cancer	Patulin	Apple, pear, juice, spoil apple
g	Neurotoxicity	Ergot alcaloids	Rye

7. Complementary food handlers must keep their hands clean [24].

### Feeding of sick child

During the time of sickness, a child food should increase in fluid including more frequent breastfeeding. The child should be encouraged to eat soft varied, appetizing favorite foods. These feeding should continue after the sickness while making the child to eat more and more. Sick children often prefer breastmilk to other foods [25]. Frequent breast feeding during illness is advisable; mothers can observe a reduced appetite of their child but continuous consumption of complementary foods is recommended to maintain the child's nutritional balance and promote recuperation [26].

### Conclusion and Recommendation

Infantile food poisoning occur after eating food contaminated by bacteria, fungi, virus etc. The symptoms are stomach flu like abdominal cramps, nausea, vomiting, diarrhea, and fever. The microorganisms that causes food poisoning cannot be seen, smelled, tasted, therefore, the child or the caregiver cannot dictate the presence in food and food products. Preventing infantile food poisoning starts when you buy food from the store, hand washing must be put into practice. The key points are keep food clean, cook food completely and keep hot food hot while cold food should remain cold.

### Recommendation

The investigation and control of food borne disease are multi-disciplinary task requiring skills in the area of Medicine, Epidemiology, Laboratory Sciences, Food Microbiology and Chemistry, food safety and food control including risk management. Food borne diseases are poorly investigated because of a single investigator is expected to master the broad area without having been trained. Therefore, I recommend a full research comprising of the above mentioned multi-discipline on infantile food poisoning. This will yield a data for the academic community and the government.

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