Research Paper

Volume : 2 | Issue : 8 | August 2013 • ISSN No 2277 - 8179

Management Strategies for Diarrhoea in Semi-Urban and Slum Children in Developing Countries

Medical Science

KEYWORDS : management, Diarrhoea, children, developing countries

Rashid M A — Associate professors of Paediatrics, Faculty of Medicine, University Technology MARA, Selangor, Malaysia.

Nazmul M H M — Associate Professor of Medical Microbiology, Faculty of Medicine, University Technology MARA, Selangor, Malaysia.

ABSTRACT

Diarrhoea is a common cause of morbidity and mortality in children in developing countries. The global incidence of diarrhea is 2.6 episodes per child per year in children between 0-4 years. Due to the effective management interventions including oral rehydration therapy, continued breastfeeding, zinc and vitamin A supplement, improved weaning practices and health education have markedly reduced the diarrhoeal deaths. Pathogens for diarroea vary between developed and developing countries. Rota virus is the most important aetiological agent in children. In this review the importance of various management strategies for diarrhoea in semi-urban and slum children in developing countries have been mentioned. The role of trained health workers and the use of ORS are extremely important in the management strategy. In addition, Zinc and vitamin A supplementation are the valuable addition in the treatment and prevention of diarrhoea in semi- urban & rural children in developing countries.

Introduction:

Diarrhoea is the passage of unusually loose or watery stools at least three times per day, or more frequently than normal for an individual [1,2]. The consistency of the stools is most important rather than frequency. It is usually caused by a variety of bacterial, viral and parasitic organisms. Rotavirus is the commonest organism causing acute diarrhoea. About 40% of all hospital admissions due to acute diarrhoea among children under five years worldwide are caused by Rotavirus [3]. Infection is spread through contaminated food or drinking water, or from person to person as a result of poor hygiene [4].

Worldwide, there are about two billion cases of diarrhoeal disease every year. Nearly one in five child death –– is due to diarrhoea [1, 2]. It is both preventable and treatable. Most children who die from diarrhoea actually die from severe dehydration and fluid loss. Children who are malnourished or have impaired immunity are most at risk of life-threatening diarrhoea [4].

Both curative and preventive measures are equally important in the care of diarrhoea in children living in the semi-urban & slum areas in developing countries. Parents & the community health workers can play important roles for taking care of diarrhoea. Parents' orientation regarding diarrhea is essential to seek for immediate medical attention. On the other hand the health workers should be trained adequately for recognizing the clinical signs of dehydration and for taking necessary measures as early as possible.

Assessment of dehydration:

A trained health worker can assess dehydration using the WHO guidelines [5] i.e. by asking, looking and feeling for the signs of dehydration:

Ask: How long has the child had diarrhoea? How many watery stools per day? Is there blood in the stool? Is there any vomiting? What are the pre-illness feeding practices? Immunization history. What are the type and amount of fluids (including breast milk) and food taken during the illness?

Look: What is the child's general condition? Is he/she well and alert? Is he/she restless or irritable? When offered a drink, is the child able to drink? If so, does he/she drink eagerly, thirstily? Is he/she very sleepy or unconscious? Is he/she severely malnourished? Are his/her eyes normal or sunken?

Feel: Pinch the skin of the abdomen or thigh. Does it go back to normal slowly? Or very slowly?

According to the severity, dehydration can be categorized as follows [6]:

A) No signs of dehydration: Patient is well and alert, eyes are not sunken, not thirsty and drinks normally.
B) Some dehydration: Restlessness, irritability, sunken eyes, drinks eagerly (thirsty) and skin pinch goes back slowly (1 second).
C) Severe dehydration: Very sleepy or unconscious, sunken eyes, unable to drink or drinking very poorly, skin pinch goes back to normal very slowly (longer than 2 seconds).

Patient should be referred to the health center or clinic if the child has two or more signs of severe or of some dehydration; on the other hand patients having signs of severe dehydration should be referred urgently [6]. In the health centre or clinic these group of patients can be managed by the experienced physicians with intravenous fluid/ or Oral Rehydration Solution (ORS) and antibiotics whichever and wherever necessary. When the child is referred to the Health Center or clinic, the mother should be advised to keep the child warm during the trip. Mother should also be advised to continue breast feeding and to give ORS [7].

If there is none of the signs of some dehydration or severe dehydration the child can be sent back home. When the child is sent home, the mother should be guided for administering the home treatment: [6]

a) Give extra fluid (as much the child can take): Frequent breast feeding, continue to give ORS [7] if the child is exclusively breast fed. If not on exclusive breast feeding, ORS, food based fluids (soup, rice- water) or cooled boiled water can be given. The mother should be taught how to mix and give ORS. ORS packets should be supplied to the mother adequately to use at home. Children up to 2 years of age, 50 to 100 ml of ORS and more than 2 years old child should be given 100 to 200 ml after each loose stool. Mother should also be advised to give ORS or other fluids in frequent small sips from a cup or spoon. If the child vomits, ORS or fluid supplements should be started slowly after an interval of 10 minutes and to be continued till diarrhoea stops.
b) Continue feeding: Exclusively breast fed infants should continue breast feeding. Formula fed infants should continue their usual formula and children receiving semi-solid and solid foods should continue their food as usual.
c) Return to the Clinic or Hospital: When the child is unable to take feed or drink or drinking poorly, becomes lethargic, frequency of the loose stools is increased, having excessive vomiting, developing high fever, has blood in the stools or does not improve in three days should return to the health centre or clinic for further management.

Zinc supplementation: This is a new addition to the treatment of diarrhea in all children. Zinc is important for normal growth and

development and it reduces diarroea [8]. Recommended dose is 10mg/day for children less than 6months of age and 20mg/day for children of 6 months or above. It can be continued for 2 weeks even if diarroea stops [9]. Zinc can cause vomiting but it should not be stopped if vomiting is not severe.

Homemade sugar-salt solution: If the country's health policy permits, community-based workers can suggest a homemade alternative to oral rehydration solution [10]. This can be made as follows:

Wash hands and a container with soap and clean water. To a half-liter of clean water, add a "pinch" of s alt (using 3 fingers to make a "pinch") and a "fistful" of sugar. Stir the water with a clean spoon. Taste the prepared solution. Correctly prepared solution tastes like tears. This can be given to the child by spoon or small sips every 10 to 12 minutes to replace fluid loss. Infants can be given by clean dropper or syringe (without the needle), children under 2 years by spoon every12 minutes and older children by cup frequent small sips. Avoid bottles and nipples. Solution can be left at room temperature for up to 6 hours, in a covered container. If left at room temperature for longer than this, it should be discarded and a new solution should be prepared.

During the diarrhoeal episode the child should be offered small amounts of nutritious, easily digestible food up to 8 times per day. Feeding during a diarrhea episode provides nutrients the child needs to increase strength and prevent weight loss during the illness [10]. After the diarroea has stopped, an extra meal each day for 7 days will help the child regain weight which is lost during the illness.

Proper treatment of diarrhoeal diseases is highly effective in reducing the number of death, but has no impact on the incidence of diarrhoea. On the other hand, the preventive measures are highly effective in reducing the incidence. The community health workers can teach the parents and the family members and motivate them to adopt preventive measures. Mothers of children being treated for diarrhoea are likely to be particularly receptive to such measures.

A number of interventions have been proposed for preventing diarrhoea in young children, most of which involve measures related to infant feeding practices, personal hygiene, cleanliness of food, provision of safe water, safe disposal of faeces and immunization.

Infant feeding practices

Breastfeeding

During the first 6 months of life, infants should be exclusively breastfed. This means that the healthy baby should receive breast milk and no other foods or fluids, such as water, teas, juice, cereal drinks, animal milk or formula. Exclusively breastfed babies are much less likely to get diarrhoea or to die from it than are babies who are not breastfed or are partially breastfed [11]. Breastfeeding also protects against the risk of allergy early in life, aids in child spacing and provides protection against infections other than diarrhoea (e.g. pneumonia). Breastfeeding should continue until at least 2 years of age. The best way to establish the practice is to put the baby to the breast immediately after birth and not to give any other fluids. In Bangladesh breast feeding was found to reduce the severity of infection with Shigella and Vibrio cholerae [12]. The preventive role of breastfeeding against rotavirus diarrhoea has not been well established but it is considered to reduce the severity of the disease [13]. If breastfeeding is not possible, modified cow's milk (infants younger than 6 months) or milk formula (appropriate for age) should be given from a cup. This is possible even with very young infants. Feeding bottles and teats should not be used because they are very difficult to clean and easily carry the organisms that cause diarrhoea. Careful instructions should be given on the correct hygienic preparation of milk formula using water that has been boiled briefly before use.

Improved weaning practices

Weaning is the process by which an infant gradually becomes accustomed to an adult diet. During weaning, complementary foods other than milk are introduced in order to meet the child's increased nutritional demands. However, breast milk remains an important part of the diet.

Weaning foods (complementary foods) should normally be started when a child is 6 months old. These may be started any time after 4 months of age, however, if the child is not growing satisfactorily. Improved weaning practices minimize under nutrition and decrease the child's susceptibility to infection or in other words diarrhoeal diseases [14]. Good feeding practices involve selecting nutritious foods and using hygienic practices when preparing those [15].

The choice of complementary foods will depend on local patterns of diet and agriculture, as well as on existing beliefs and practices. In addition to breast milk (or animal milk), soft mashed foods (e.g. cereals) should be given. When possible, eggs, meat, fish and fruit should be also given. Other foods, such as well cooked pulses and vegetables, to which some vegetable oil (5-10 ml/serving) has been added, should be given.

To encourage exclusive breastfeeding and proper feeding practices, health workers should be instructed in the regular use of growth charts to monitor the weight of children. Before a child with diarrhoea leaves a health facility, his or her weight should be taken and recorded on the child's growth chart.

Personal hygiene

All diarrhoeal disease agents can be spread by hands that have been contaminated by faecal material. The risk of diarrhoea is substantially reduced when family members practice regular hand washing [16]. All family members should wash their hands thoroughly after defecation, after cleaning a child who has defecated, after disposing of a child's stool, before preparing food, and before eating. Good hand washing requires the use of soap or a local substitute, such as ashes or soil, and enough water to rinse the hands thoroughly.

Cleanliness of food

Food can be contaminated by diarrhoeal agents at all stages of production and preparation. Individual food safety practices should also be emphasized. Cleanliness of food reduces the diarrhoeal diseases to a greater extent [17]. Health education for the general population should stress the following key messages concerning the preparation and consumption of food:

- Do not eat raw food, except undamaged fruits and vegetables that are peeled and eaten immediately.
- Wash hands thoroughly with soap after defecation and before preparing or eating food.
- Cook food until it is hot throughout.
- Eat food while it is still hot, or reheat it thoroughly before eating.
- Wash and thoroughly dry all cooking and serving utensils after use.
- Keep cooked food and clean utensils separately from uncooked food and potentially contaminated utensils.
- Protect food from flies by means of fly screens.

Provision of safe water

To facilitate good hygiene, it is more important that the water supply be abundant and clean. Clean water is essential, however, for drinking and for preparing food. The risk of diarrhoea can be reduced by using the cleanest available water and protecting it from contamination [18]. Improved water supplies can result from government-sponsored programmes, in which families and communities may play an important role, or from other community or family efforts, such as collecting and storing rainwater. Families can do the followings:

- Collect water from the cleanest available source.
- Not allow bathing, washing, or defecation near the source. Latrines should be located more than 10 meters away and downhill.
- Keep animals away from protected water sources.

Volume : 2 | Issue : 8 | August 2013 • ISSN No 2277 - 8179

- Collect and store water in clean containers; empty and rinse out the containers every day; keep the storage container covered and not allow children or animals to drink from it; remove water with a long handled dipper that is kept especially for the purpose so that hands do not touch the water.

Safe disposal of faeces

Faecal matter can contaminate water where children play, where mothers wash clothes, and where they collect water for home use. Human faeces should be disposed of in a way that prevents them from coming into contact with hands or contaminating a water source. Safe disposal of excreta reduces the number of diarrhoea cases [18]. This is best achieved through regular use of a well-maintained latrine. Every family needs access to a clean, functioning latrine. If one is not available, the family should defecate in a designated place and bury the faeces immediately. Stools of young children are especially likely to contain diarrhoeal pathogens; they should be collected soon after defecation and disposed of in a latrine or buried.

Immunization

Children who have measles, or have had the disease in the previous four weeks, have a substantially increased risk of developing severe or fatal diarrhoea. Measles immunization can substantially reduce the incidence and severity of diarrhoeal diseases [19]. Every infant should be immunized against measles at the recommended age. No conclusive evidence has been found regarding the role of Vitamin A in the control of diarroea[20]; but the overall incidence as well as the severity of diarrhoea episodes can significantly be lowered by vitamin-A-supplementation [21].

Most activities to prevent diarrhoea in children of semi-urban and slum areas must take place at home. However, mothers and other family members cannot practice diarrhoea prevention until they have learned what this involves and understand how best to carry out each preventive activity. Information on the prevention of diarrhoea can be provided in a variety of ways, e.g., during home visits, through schools, at community meetings and during visits to a health centre. The latter may be especially effective when the visit involves a child with diarrhoea: at this time the mother is particularly aware of the problem of diarrhoea and is more likely to be interested in knowing what steps she can take to prevent future episodes.

REFERENCE

1. Kosek M et al. The global burden of diarrhoeal disease, as estimated from studies published between 1992 and 2000. Bulletin of the World Health Organization 2003, 81(3): 197-204. | 2. UNICEF / WHO Diarrhoea- Why Children are still Dying & What can be done, 2009. | 3. Weekly epidemiological record, vol-83, no.47, 21: November 2008. | 4. WHO Fact Sheet N°330: Diarrhoeal disease, August 2009. | 5. USAID / UNICEF / World Health Organization. Diarrhoea treatment guidelines including new recommendations for use of ORS & zinc supplement for clinic based health care workers, 2005. | 6. World Health Organization. The treatment of diarrhoea: a manual for physicians &other senior Health workers – 4th rev: 2005. | 7. Victoria C G et al. Reducing deaths from diarrhea through oral rehydration therapy. Bull World Health Organ. 2000; 78: 1246-1255. | 8. Bhatnagar S et al. Zinc with oral rehydration therapy reduces stool output and duration of diarrhea in hospitalized children: a randomized controlled trial. J Pediatr Gastroenterol Nutr 2004; 38:34-40. | 9. Zinc investigators' collaborative group, prevention of diarrhea & pneumonia by zinc supplementation in children in developing countries: pooled analysis of randomized trials. Journal of Paediartics, 1999, 135(6): 689-697. | 10. MOST- the USAID diarrhoea treatment program: Guide lines for new diarrhea treatment protocols for community based Health Workers, 2005. | 11. Victoria C G et al. Evidence for the protection of breast feeding against infant death from infectious disease in Brazil. Lancet, 1987, 21:319-322. | 12. Clemens J D et al. Breastfeeding as a determinant of severity in Shigellosis. American Journal of Epidemiology, 1986, 123: 710-720. | 13. Clemens J D et al. Breast feeding & the risk of severe cholera in rural Bangladeshi children. American Journal of Epidemiology, 1990, 131:400-411. | 14. Eric Wobudeya et al, Breastfeeding and the risk of rotavirus diarrhea in hospitalized infants in Uganda: a matched case control study. BMC Pediatrics 2011, 11:17. | 15. Huttly S R A et al, Prevention of diarrhea in young children in developing countries. Bulletin of World Health Organization, 1997, 75(2):163-174. | 16. Moterjemi Y et al. Contaminated weaning food: a major risk factor for diarrhea & associated malnutrition. Bulletin of World Health Organization, 1993, 71: 79-92. | 17. Curtis V A et al. Domestic hygiene and diarrhoea – pinpointing the problem. Tropical Medicine and International Health, 2000, 5(1): 22–32. | 18. Fewtrell L et al. Water, Sanitation & Hygiene Intervention to Reduce Diarrhoea in less Developed countries: A systematic review & meta- analysis. The Lancet Infectious Diseases, 2005, 5(1): 42-45. | 19. Hoekstra E J et al. Reducing Measles Mortality, Reducing child Mortality. The Lancet2006, 368 (9541); 150-152. | 20. Briend A. Vitamin A and diarrhoea. Reducing the risk? Dialogue Diarrhoea. 1988 Jun; (33):4-5. | 21. Barreto ML et al. Effect of vitamin A supplementation on diarrhoea and acute lower-respiratory-tract infections in young children in Brazil. Lancet. 1994 Jul 23; 344 (8917): 228-231. |