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Review Article (Pages: 789-798)

Emergency Management of Common Diseases in Children

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Abstract

Acute respiratory infections, diarrhea and fever are very common in children below the age of five years. All children suffer from these illnesses several times each year. However, during natural disasters like floods children are even more vulnerable to these diseases and death. Pneumonia, diarrhea, measles and malaria, and associated malnutrition, are responsible for over 60% deaths in children under five. During an emergency the proportion of children dying of the above mentioned diseases may be higher. It is possible for health workers to treat most sick children at health camps or in the community and save them from dying. This survey describes the steps to be followed by a health worker when managing a sick child in emergency situations.

Key Words: Children, Common diseases, Emergency condition.

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Received date: May 27, 2015; Accepted date: Jun 22, 2015

Introduction

1. Triage and emergency conditions

Triage is the process of rapidly screening sick children soon after their arrival in hospital or other emergency situations in order to identify:

■ Those with emergency signs, who require immediate emergency treatment;

■ Those with priority signs, who should be given priority in the queue so that they can be assessed and treated without delay; and
■ Non-urgent cases, who have neither emergency nor priority signs.

Emergency signs include:

■ Obstructed or absent breathing;
■ Severe respiratory distress;
■ Central cyanosis;
■ Signs of shock (cold hands, capillary refi ll time longer than 3 s, high heart rate with weak pulse, and low or unmeasurable blood pressure);
■ Coma (or seriously reduced level of consciousness);
■ Convulsions;
■ Signs of severe dehydration in a child with diarrhoea (lethargy, sunken eyes, very slow return after pinching the skin or any two of these).

Children with these signs require immediate emergency treatment to avert death. The priority signs identify children who are at higher risk of dying. These children should be assessed without unnecessary delay. If a child has one or more emergency signs, don't spend time looking for priority signs.

Summary of steps in emergency triage assessment and treatment

First check for emergency signs in three steps:

• **Step 1**: Check whether there is any airway or breathing problem; start immediate treatment to restore breathing. Manage the airway and give oxygen.

• **Step 2**: Quickly check whether the child is in shock or has diarrhoea with severe dehydration. Give oxygen and start IV fluid resuscitation. In trauma, if there is external bleeding, compress the wound to stop further blood loss.

• **Step 3**. Quickly determine whether the child is unconscious or convulsing. Give IV glucose for hypoglycaemia and/or an anti-convulsant for convulsing.

If emergency signs are found:

• Call for help from an experienced health professional if available, but do not delay starting treatment. Stay calm and work with other health workers who may be required to give the treatment, because a very sick child may need several treatments at once. The most experienced health professional should continue assessing the child, to identify all underlying problems and prepare a treatment plan.

• Carry out emergency investigations (blood glucose, blood smear, haemoglobin [Hb]). Send blood for typing and cross-matching if the child is in shock, appears to be severely anaemic or is bleeding significantly.

• After giving emergency treatment, proceed immediately to assessing, diagnosing and treating the underlying problem.

If no emergency signs are found, check for priority signs:

■ Tiny infant: any sick child aged < 2 months;
■ Temperature: child is very hot;
■ Trauma or other urgent surgical condition;
■ Pallor (severe);
■ Poisoning (history of);
■ Pain (severe);

■ Respiratory distress;
■ Restless, continuously irritable or lethargic;
■ Referral (urgent);
■ Malnutrition: visible severe wasting;
■ Oedema of both feet;
■ Burns (major).

These children need prompt assessment (no waiting in the queue) to determine what further treatment is needed. Move a child with any priority sign to the front of the queue to be assessed next. If a child has trauma or other surgical problems, get surgical help where available.

Assessment of emergency and priority signs

■ Assess the airway and breathing (A, B)

Does the child's breathing appear to be obstructed? Look at the chest wall movement, and listen to breath sounds to determine whether there is poor air movement during breathing. Stridor indicates obstruction.
Is there central cyanosis? Determine whether there is bluish or purplish discoloration of the tongue and the inside of the mouth.
Is the child breathing? Look and listen to determine whether the child is breathing.
Is there severe respiratory distress? The breathing is very laboured, fast or gasping, with chest indrawing, nasal flaring, grunting or the use of auxiliary muscles for breathing (head nodding). Child is unable to feed because of respiratory distress and tires easily.

■ Assess circulation (for shock) (C)

Children in shock who require bolus fluid resuscitation are lethargic and have cold skin, prolonged capillary refill, fast weak pulse and hypotension.

Check whether the child's hand is cold. If so, determine whether the child is in shock.
Check whether the capillary refill time is longer than 3 s. Apply pressure to whiten the nail of the thumb or the big toe for 5 s. Determine the time from the moment of release until total recovery of the pink colour.

If capillary refill is longer than 3 s, check the pulse. Is it weak and fast? If the radial pulse is strong and not obviously fast, the child is not in shock. If you cannot feel the radial pulse of an infant (< 1 year old), feel the brachial pulse or, if the infant is lying down, the femoral pulse. If you cannot feel the radial pulse of a child, feel the carotid.

Key Facts about mortality in children

- 6.3 million children under the age of five died in 2013.
- More than half of these early child deaths are due to conditions that could be prevented or treated with access to simple, affordable interventions.
- Leading causes of death in under-five children are preterm birth complications, pneumonia, birth asphyxia, diarrhoea and malaria. About 45% of all child deaths are linked to malnutrition.
- Children in sub-Saharan Africa are more than 15 times more likely to die before the age of five than children in developed regions.

2. Drugs/ Supplies

Health workers need to have the Drugs/ Supplies for combating common health problems in children.

Oral Drugs

- Amoxicillin ;tablets
- Choloroquine tablets
- Ciprofloxacin tablets;
- Oral Rehydration Salt(ORS);
- Paracetamol;
- Vitamin-A.

Injectable drugs/vaccines:

- Availability of these drugs and syringes and needles is critical to

manage children in situations where referral is not possible;

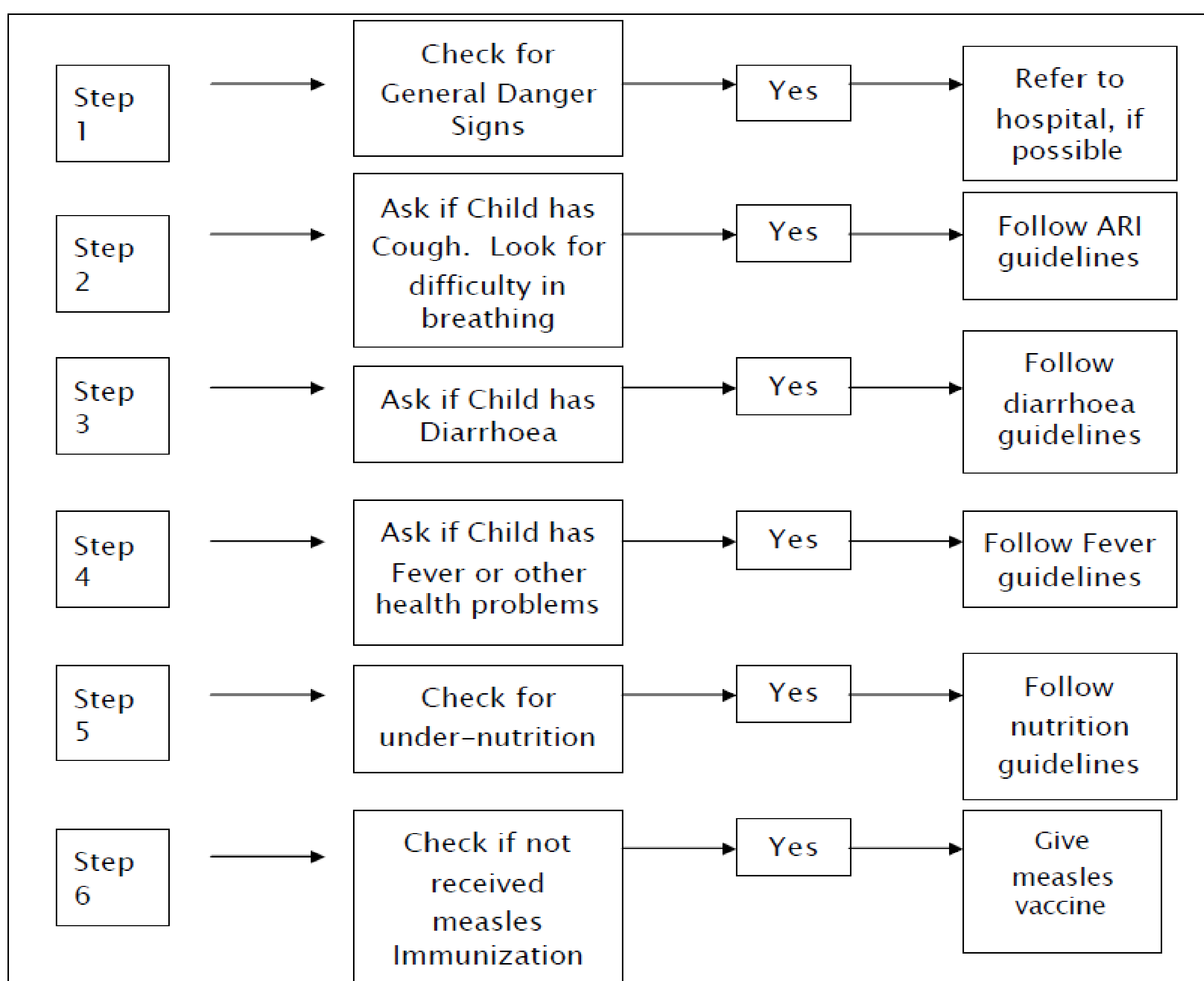
- Injection chloramphenicol;
- Injection gentamicin;
- Measels vaccine; Syringes/needles. Auto-disable preferable.

Others:

- Infant weighing scales.

3. Major steps in treatment of common illness in children aged 2 months to 5 years

It is important to follow ALL steps given below in assessing every child that is brought to the health worker. This allows a systematic assessment of the child and ensures that no common cause of disease or death in children is missed.



4. Check for General Danger Signs

Before assessing any illness check for the following general danger signs. This is important as a child with any danger sign has *very severe disease* and is in danger of dying.

a) The child is not able to drink or breast feed "Not able to drink" means either that: The child can not drink at all or; the child is too weak to drink or; whenever the child does drink something, he or she vomits everything that's taken.

b) The child is lethargic or unconscious

The lethargic child is sleepy when the child should be awake. A child who stares blankly and does not appear to notice what is happening around is also lethargic; the unconscious child does not wake up at all. The child does not respond to touch, loud noise or pain.

c) The child has had convulsions

Convulsion(s) in the current illness episode is significant.

5. Cough and difficult Reathing

1. ARI Guidelines

After checking the child for general danger signs, ask the mother if the child has cough or difficult breathing. If she says YES, proceed further to count the child's breathing rate and check for the presence of chest indrawing.

a) Count the Breathing Rate

The breathing rate must be counted for one full minute. Count the breathing rate only when child is calm and quiet. It will be difficult to count the breathing rate correctly if the child is crying or upset. The breathing rate may be falsely increased if the child is crying.

If the child 's age is	The child has fast breathing If she has:
2 months up to 12 months	50 breaths or more per minute.
2 months up to 5 years	40 breaths or more per minute.

*A child with fast breathing has pneumonia.

b) Look for Chest Indrawing

Look for chest indrawing at the lower chest wall. Make sure that the child's lower chest is fully exposed and you can see it clearly while checking for chest indrawing. Chest Indrawing is present when lower chest wall goes IN as child breaths IN. Normally the lower chest wall comes OUT when the child breaths IN.

*A child with chest indrawing has severe pneumonia.

2. Diarrhoea Guidelines

Ask the mother if the child has diarrhoea. Diarrhoea is frequent passage of watery stool. Mothers generally know that their children are suffering from diarrhoea. If the child has diarrhoea, ask for how long the child has had diarrhoea. If diarrhoea is of more than 2 weeks duration, the child has Persistent Diarrhoea. Ask if there is blood in stool. The child who has blood in the stools has Dysentery.

Check all children with diarrhoea for 4 signs of dehydration:

1. **General condition**:

Is the child is lethargic or unconscious? Restless and irritable?
When you checked for general danger signs, you checked to see if the child was lethargic or unconscious.

A child has the sign restless and irritable if the child is restless and irritable all the time or every time he is touched and handled. If an infant or child is calm when breastfeeding but again restless and irritable when he stops breastfeeding, he has the sign "restless and irritable". Many children can be consoled and calmed. They do not have the sign "restless and irritable".

2. **Sunken eyes:**

Decide if you think the eyes are sunken. Then ask the mother if she thinks her child's eyes look unusual. Her opinion helps you confirm that the child's eyes are sunken.

3. **Check the child's ability to drink.**

Offer the child plain clean water to drink. If the child does not take any water at all or vomits it out completely or is not able to keep any water down, the child is not able to drink.
If the child reaches out for the cup or glass or if child opens the mouth when water is offered or begins to cry when the water is taken away, the child is drinking eagerly.
The child drinks normally if water is taken after some encouragement by the mother.

4. **Check for skin pinch**

Pinch the skin on the abdomen (between the naval and side of the abdomen) with thumb and the first finger by lifting it for one second and releasing it. After leaving the skin, see how soon the skin returns to normal.

- If the skin comes back very slowly that is it takes more than 2 seconds the skin pinch is very slow.
- If the skin does not return to normal immediately, the skin pinch is slow
- If the skin pinch returns to normal immediately, it is normal.

❖ **Feeding recommendations for a child who has Persistent Diarrhoea**

If still breastfeeding, give more frequent, longer breastfeeds, day and night.

If taking other milk:
- replace with increased breastfeeding OR
- replace with fermented milk products, such as yoghurt OR
- replace half the milk with nutrient-rich semisolid food.

For other foods, follow feeding recommendations for the child's age.

6. Fever and other Health Problems

Fever guidelines

Fever is very common problem in young children. First ask the mother if the child has fever. See if child feels hot to touch. If you have thermometer and you know how to check the temperature, measure fever by putting the thermometer in the armpit.

Fever is present if the mother is sure that her child feels hot to touch or if you have determined that the child feels hot to touch or if the temperature measured by a thermometer is more than 37.5 degree C. Fever is high if temperature is more than 38.5 degree C.

7. Nutrition

Nutrition guidelines

Every child should be checked for under-nutrition since this is a very common problem.

1. **Check for visible severe wasting**

A child has visible severe wasting if the child looks all skin and bones. Remove all the child's clothes to check for wasting. The arms and legs of a severely wasted child look like sticks. The shoulder and buttocks are wasted and there are wrinkles on the buttocks and thighs. Visible wasting is a sign of severe under-nutrition.

2. **Check for swelling (Oedema) of both feet**

With your thumb, press gently for a few seconds. Swelling is present if there is depression left in the place where you pressed. This should be checked on the other foot also. The presence of swelling of both feet is a sign of severe under-nutrition.
Any child with visible severe wasting or oedema both feet is severely malnourished and has high risk of dying. Such children should be referred urgently to an

appropriate centre as soon as possible.

❖ **Feeding Recommendations:**

Upto 6 months of age: Encourage mothers to exclusively breastfeed as often as the child wants, day and night, at least 8 times in 24 hours. Do not give any other fluid or food.

6 months to 12 months: Breastfeed as often as the child wants. In addition give adequate servings of locally available complementary foods at least 3 times a day.

12 months to 2 years: Breastfeed as often as the child wants. Give adequate serving of locally available complimentary food at least 5 times a day.
2 years and older: Give three meals of family food per day. Also, give nutritious snacks, twice daily.

8. Measles Immunization

Immunization of all children who are seen by you should be provided as under normal circumstances. However this may be difficult during emergencies.

You should try to give the measles vaccine at least to all children above nine months age since during such circumstances, measles outbreak is common and one of the important killers of children.

Measles vaccine can be given even to sick children. The disease will not get worse as a result of vaccination. The only time you do not give the vaccine is when you are urgently referring the child to a hospital.
Very often, in disaster situations, the national authorities may decide to immunize all children 6 months to 14 years with measles vaccine. Ensure that all children receive the vaccine as per guidelines.

9. Management of Young Infants (<2 months age)

All young infants should be checked for

- Signs of serious illness and
- Feeding problems.

STEP 1: Check for signs of serious illness

Young infants are highly vulnerable to disease and death. They contribute about 40% of childhood deaths. They can become sick and die very quickly from serious bacterial infections. They have only general signs which can indicate serious disease. Therefore, it is very important to recognize these signs and promptly refer the patient to a hospital for parenteral antibiotic therapy.

1. **Convulsions**: ask the mother if young infant has convulsions.
2. **Severe chest indrawing**: Mild chest indrawing is normal in young infant because the chest wall is soft. Severe chest indrawing is very deep and easy to see.
3. **Fast breathing**: the breathing rate of 60 or more breaths per minute is the cut off point to identify fast breathing in a young infant. If the first count is 60 or more, repeat the count because the breathing rate of infant is often irregular. If the second time also the breathing rate is 60 breaths or more, the young infant has fast breathing.
4. **Nasal flaring:** Nasal flaring is widening of the nostrils when the young infant breathes in.
5. **Grunting:** Grunting is the soft, short sounds a young infant makes when breathing out. Grunting occurs when an infant is having trouble breathing
6. **Bulging fontanelle:** The fontanelle is the soft spot on the top of the young

infant's head, where the bones of the head have not formed completely. Hold the young infant in an upright position. The infant must not be crying. Then look at and feel the fontanelle. If the fontanelle is bulging rather than flat, this indicates serious illness.

7. **Umbilical redness extending to the skin**: If the redness extends to the skin of the abdominal wall it is a serious infection.
8. **Fever or low body temperature**: fever (axillary temperature 38 degree C or more is uncommon in first two months of life. If a young infant has fever, this may mean the infant has a serious bacterial infection. Fever may be the only sign of serious bacterial infection. Young infants can also respond to infection by dropping their body temperature to below 35.5 degree C. if you do not have the thermometer, feel the 'infant' stomach or axilla (underarm) and determine if it feels hot or unusually cold.
9. **Severe skin Pustules**: Large skin pustules (>0.5 cm) and pustules with areas of surrounding redness indicate a serious infection.
10. **Drowsy or unconscious**: A drowsy young infant is not awake and alert when she should be. An unconscious infant cannot be wakened at all.
11. **No spontaneous movement**: If the infant who is awake has no spontaneous movement when observed for one minute, this indicates serious illness.

Yellow palms and soles

No attachment to the breast or no suckling at all

Very small baby.

STEP 2: Check for feeding problem

A young infant has a FEEDING PROBLEM if there is:

- Poor positioning or
- Not well attached to breast or
- Not suckling effectively or
- Less than 8 breastfeeds in 24 hours or
- Receives other foods or drinks or
- Low weight for age.

Counselling the mother of a young infant with a feeding problem

- Advise the mother to breastfeed as often and for as long as the infant wants, day and night.

  If not well attached or not suckling effectively, teach correct positioning and attachment.

  If breastfeeding less than 8 times in 24 hours, advise to increase frequency of feeding.

- If receiving other foods or drinks, counsel mother about breastfeeding more, reducing other foods or drinks, to achieve exclusive breastfeeding over the next few days. Feeding bottles should never be used.
- If not breastfeeding at all:

  - If possible, refer for breastfeeding counseling and possible re-lactation.
  - Advise about correctly preparing breast milk substitutes and using a cup.

- Advise mother to give home care for the young infant

If the Young Infant has NO Signs of Illness and NO Feeding Problem:

- Praise the mother for feeding the infant well
- Advise mother to give home care for the young infant.

Home care for the Young Infant

Breastfeed frequently, as often and for as long as the infant wants, day or night, during sickness and health. Do not give water, other liquids or foods.
In cool weather, cover the infant's head and feet and dress the infant with extra clothing. Make cure the young infant stays warm at all times.

- Advise mother to wash hands with soap and water after defecation and after cleaning the bottom of the baby.

Do not apply anything on the cord and umbilicus dry.

- Advise the mother to return immediately if the young infant has any of these danger signs:
 Breastfeeding or drinking poorly;
 Becomes sicker;
 Develops a fever or feels cold to touch;
 Fast breathing;
 Difficult breathing;
 Blood in stools (1-14).

Conclusion

Rapid and slow-onset natural disasters such as floods, earthquakes, hurricanes and droughts occur globally every year because of adverse weather conditions or poor land use. Climate change, together with population growth and urbanisation as well as ageing populations will increase the number of disasters, change the disease pattern. Depending on their nature, duration and location, some natural disasters result in major disease outbreaks and deaths. Populations in developing countries are more disproportionately affected because of poverty, a lack of resources, poor infrastructure and inadequate disaster preparedness efforts. Therefore, emergency control measures are needed, especially for children. It is incorrectly assumed that "common disease and plagues are *inevitable* after every disaster".

Conflict of interest: None.

References

1. Control of Communicable Diseases. The Johns Hopkins and the International Federation of Red Cross and Red Crescent Societies. Available at: http://www.jhsph.edu/research/centers-and-institutes/center-for-refugee-and-disaster-response/publications_tools/publications/_CRDR_ICRC_Public_Health_Guide_Book/Pages_from_Chapter_7_.pdf.
2. Vakili R, Ghazizadeh Hashemi AH, Khademi Gh, Ajilian Abbasi M, Saeidi M. Immunization Coverage in WHO Regions: A Review Article. Int J Pediatr 2015; 3(2.1):111-18.
3. Ghazizade Hashemi AH, Bayyenat S, Purbafrani AA, Taghizade Moghaddam H, Saeidi M. Comparison of Immunization in Iran and Turkey between Years 1980- 2013. Int J Pediatr 2014; 2(3.3): 75-83.
4. Pocket book of hospital care for children: guidelines for the management of common childhood illnesses – 2nd ed. 2013. ISBN 978 92 4 154837 3.
5. World Health Organization. Guidelines for Management of common diseases in young children in emergencies. Available at: http://www.searo.who.int/entity/emergencies/documents/guidelines_for_health_emergency_draft__document.pdf?ua=1. Accessed Jan 2015.
6. Infectious Diseases and Immunization Committee, Canadian Paediatric Society (2008).
Infection Control in Pediatric Office Settings. Available at: http://www.cps.ca/English/statements/ID/ID08-03.pdf.
7. Healthy Child Manitoba. Infection Control Guidelines for Early Learning and Child Care.
Available at: http://www.gov.mb.ca/fs/childcare/pubs/healthypractices/infection-control.pdf.

8. Centers for Disease Control and Prevention. Epidemiology and Prevention of Vaccine-
Preventable Diseases. Atkinson W, Hamborsky J, McIntyre L, Wolfe S, eds. 10th ed. Washington DC: Public Health Foundation; 2007.
9. Vakili R, Ajilian Abbasi M, Ghazizadeh Hashemi AH, Khademi Gh, Alipour Anbarani M, Saeidi M. Pain Management in Children with Collaborative Parents and Healthcare Team. Int J Pediatr 2015; 3(2.2):561-73.
10. A Quick guide to common childhood diseases. BC center for disease control. May 2009. Available at: http://www.bccdc.ca/NR/rdonlyres/8061A728-C969-4F38-9082-B0296EF2A128/0/Epid_GF_childhood_quickguide_may_09.pdf.
11. Common childhood inllnesses. United League Commissioning. Available at: http://www.drwilsonandpartners.co.uk/documents/Childhood_illness-booklet.pdf.
12. Khan MM, Kraemer A. "Factors associated with being underweight, overweight and obese among ever-married non-pregnant urban women in Bangladesh". Singapore medical journal 2009; 50 (8): 804–13.
13. Bhutta Z A, Ahmed T, Black R E, Cousens S, Dewey K, Giugliani E, et al. Maternal Child Undernutrition Study Group. "What works? Interventions for maternal and child undernutrition and survival". *The Lancet* 2008; 371 (9610): 417–40.
14. World Health Organization. Children: reducing mortality. Available at: http://www.who.int/mediacentre/factsheets/fs178/en/. Accessed Jan 2015.