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Essentials of COMMUNITY MEDICINE PRACTICALS

As per the Competency Based Medical Education Curriculum (NMC)

DK Mahabalaraju

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CHAPTER

3 Communicable Diseases

TYPHOID

MEDICAL (CLINICAL) DETAILS OF THE PATIENT

Part I of the model proforma has to be filled before starting this part.

History of Present Illness

Chief complaints (in chronological order)	Onset (sudden/gradual)	Duration	Description of symptoms
Fever (step ladder)			
Chills			
Abdominal discomfort			
Pea soup stools			
Toxic look			

Treatment before admission: Yes/No
If yes, nature of treatment (in brief):
If treatment has discontinued, reasons:

Past History (As Relevant)

History of previous illness/hospitalization for similar complaint:

- Time of illness:
- Nature:
- Hospitalization:
- Complications:
- Treatment:

Diet History (As Relevant)

History of food and water taken in past 15 days (incubation period of typhoid—15 days)

Epidemiological History

- Any similar case/carrier in the family: Yes/No
- Any similar case/carrier in neighborhood: Yes/No
- Any direct/indirect contact with similar case/carrier: Yes/No
- Prevalence of similar disease in the locality/district:
- Other relevant information:

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General Examination

- Built:
- Height:
- Weight:
- Nourishment:
- Temperature:
- Pulse:
- Blood pressure:
- Respiration:
- Anemia:
- Clubbing:
- Cyanosis:
- Jaundice:
- Lymphadenopathy:
- Edema:

Systemic Examination

- RS:
- CNS:
- CVS:
- Abdomen:
- Other relevant system:

Clinical Findings Suggestive of Typhoid

- Fever—Step ladder fashion
- Diarrhea—Pea soup like
- Abdominal pain, distention
- Coating of tongue—V shape
- Dicrotic pulse
- Relative bradychardia
- Rashes—rose spots
- Toxic look
- Features of hemorrhage, shock

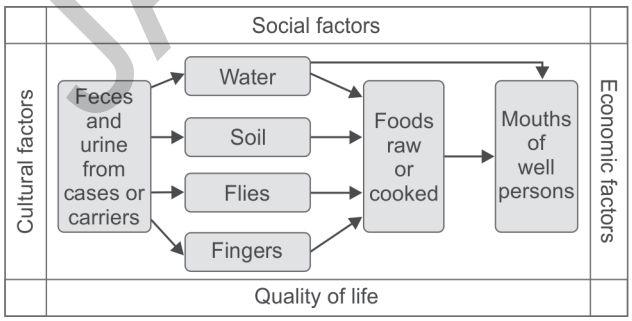
Epidemiological Diagnosis

Laboratory Investigations

Sl. No.	Examinations required	Report
1.	Widal test	
2.	Culture of urine and stool	

Clinical Diagnosis

Criteria for Diagnosis



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MEDICOSOCIAL DISCUSSION

Identification of the Factors Responsible for/Influencing the Present Condition

Agent factors	Host factors
• Biological agent—*Salmonella typhi* • Reservoir—Cases/Carriers • Source of infection • Primary—Cases/Carriers • Secondary—Contamination of **F**luid, **f**ood, **f**ingers, **f**lies, **f**omite	• Age • Sex • Ethnicity • Migration • Immunity • Others

Environmental factors	Social factors
(Physical, biological, psychosocial) • Rainy season • Increase in fly population: Flies nuisance • Pollution of drinking water: Lack of potable water supply • Poor housing: Poor quality of life • Improper sanitation • Occupational environment	• Open air defecation • Poor standard of personal and food hygiene • Sewage forming • Ignorance: Incorrect knowledge, attitude and practice • Economic conditions • Sociocultural practices/Superstitions • Religious practices • Nonavailability and utilization of health services

Levels of Prevention

Levels of prevention		Which level has failed?	How it could have been prevented?
Primary	Health promotion		
	Specific protection		
Secondary	Early detection and prompt treatment		
Tertiary	Disability limitation		
	Rehabilitation		

Assessment of Knowledge, Attitude and Practice (KAP) Towards the Disease

Particulars	Knowledge	Attitude (beliefs and customs)	Practice
• Cause of typhoid • Treatment • Food sanitation • Handwashing • House flies • Sanitary latrine			

Influence of Medicosocial Factors in Diagnosis, Treatment and Prevention of the Disease

Impact of the Disease on Socioeconomic Status of

Family:

Community:

Nation:

Medicosocial Diagnosis

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MANAGEMENT

General and Specific Measures

1. Control of reservoir
   - Identification (early diagnosis)
   - Isolation—Till three urine/stool specimen on different days are negative for bacilli
   - Treatment
   - Disinfection
   - Follow-up
2. Improvement of sanitation
3. Immunization

Treatment Plan

1. Case
   - Bed rest
   - Antibiotics
     - Chloromphenicol—500 mg (50 mg/kg/day) 6th hourly for 14 days
     - Ciprofloxacin —500 mg BD for 14 days
     - Hydrocortisone (if indicated)
2. Contact/Carrier (as relevant)
   - Identification
     - Duodenal drain culture—For *S. typhi*
     - Serological examination—For V_1 antibodies
   - Treatment
     - 6 weeks intensive course: Ampicillin 4–6 g/day+Probenecid—2 g/day
     - Surgical: Cholecystectomy with concomitant ampicillin therapy
3. Other family member
   - Immunization (as relevant)
   - Surveillance for three weeks
   - Disinfection: Stool/Urine: 5% Cresol for two hours in a closed container
   - Linen: Soaking in 2% chlorine, followed by steam sterilization

Surveillance

National Health Programme Regarding the Disease

Recent Advances/Modifications in Medicosocial Management of the Condition

ADVICE

Individual Level

- Follow-up of medical advice (drugs—food—rest)
- Disinfection of urine and stools, soiled clothes, linen
- Follow-up examination—3rd and 12th month after discharge (to rule out the carrier state)

Family Level

- Motivate the patient to adhere medical advice
- Undergoing follow-up examination
- Maintaining food and water hygiene

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- Keep food covered; Eat hot foods
- Use of sanitary latrine
- Handwashing practices

Community Level

- Provision of safe water
- Sanitary drainage
- Control of house flies
- Food hygiene at hotel establishment
- Screening and surveillance of food handlers and carriers
- Typhoid vaccination
- Health education:
  - Healthy food practices
  - Need of safe water and latrine
  - Washing the hands with soap after toilet and urination, before handling the food
  - Causes and spread of typhoid
  - Importance of early diagnosis
  - Not eating cut fruits, sweets, ice cream, sold at road side (as there is a possibility of contamination)

Immunization

Advice

- Those living in endemic areas
- Those visiting endemic areas
- Those visiting melas and yatras
- School children, hospital staff
- Contacts

Typhoid vaccine	Primary dose	Booster dose
Monovalent • 1,000 million *S.typhi* • Heat killed or acetone killed (AKD) • Phenol preserved	0.5 mL SC at an interval of 4–6 weeks (2 doses)	Every 3 years
Bivalent • *S.typhi*—1,000 million • *S.paratyphi*—500 million • Heat or acetone killed (AKD) • Phenol preserved • Stored 2–4°C not frozen	Children: 1–10 years (0.25 mL) Site: Outer aspect of the upper arm, behind the posterior border of the distal part of the deltoid	
Capsular (V_1) polysaccharide	Intramuscular (IM)	Every 2 years
Oral (TY21a) vaccine • Enteric coated capsule lyophilized • $>10^2$ viable attenuated • *S. typhi* strain TY21a	Children above 6 years Orally 1st, 3rd and 5th day with cold water or milk	Every 3 years (1-3-5 day)

Review Questions

❑ What are the recent advances/modifications in medicosocial management of typhoid?

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❑ List the common beliefs and practices during typhoid.

❑ Write about recent developments of typhoid vaccine.

❑ Comment on drug resistance in typhoid.

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PRIME VIVA QUESTIONS AND ANSWERS

What is the epidemiological triad of typhoid?

Agent: Organism Salmonella typhi is a Gram-negative, encapsulated, flagellated, non-spore-forming, motile rod-shaped bacterium.

Possess three main types of antigen:

1. O antigen: Somatic
2. H antigen: Flagellar
3. V1 antigen: Virulence related

Onset of typhoid fever depends upon:

- Infecting dose
- Virulence of the organism

Source of infection—urine and feces of cases and carriers/reservoir-man-cases or carriers

Host factors

- Most of cases are seen in children adolescents, under the age of 30. People aged more than 30 years acquired immunity by subclinical infections.
- Typhoid does not occur in children less than 2 years.
- More common in males than females, but carriers state is more in females.

Environmental factors

More during July to September

Social factors

- Lack of potable water supply
- Open air defecation
- Bad food sanitation
- Ignorance
- Illiteracy
- Poor personal hygiene
- Substandard housing
- Fly population
- Unhygienic kitchen

What are the types of carriers is typhoid?

- **Typhoid carrier can be classified as:**
  - Incubatory
  - Convalescent
  - Contact
- **Depending upon the duration**
  - Temporary
  - Chronic
- **Depending upon the portal of exit**
  - Intestinal
  - Urinary
  - Biliary
- Carriers are identified by culture and serological examinations.
- Duodenal drainage examination, if positive, establishes the presence of Salmonella in the biliary tract.
- V1 antibodies are present in carriers.

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Explain the dynamics of typhoid transmission.

- Typhoid is transmitted via fecal oral urine oral route
- This may take place directly or indirectly
- There are numerous sources of infection
- Many vehicles of transmission
- Many social and cultural environmental, economical factors, quality of life also takes part in the dynamics of typhoid transmission



What are the complications of enteric fever?

Serious complications

Hemorrhage—form intestinal ulcer—malena (in 2nd week)

Perforation of intestional ulcers, acute peritonitis shock (in 3rd week)

Less frequent complications

- Relapse
- Carrier stage
- Meningitis
- Hepatitis
- Arthritis
- Psychosis
- Nephritis
- Myocarditis
- Cholecystitis
- Pneumonia
- Osteomyelitis
- Thrombophlebitis
- Urinary retention

How you treat carrier in typhoid?

Ampicillin or amoxicillin 4–6 g/day, along with probenecid 2 g/day for 6 weeks. Cure rate is 70%.

Surgery: Cholecystectomy along with ampicillin chemotherapy

- Resection of loop of gut in intestinal carrier, cure rate is 80%.
- Urinary carriers are easy to treat, but relapse is more common/if one kidney is damaged and other is healthy nephrectomy may be done.
- Carriers should be kept under surveillance.
- Carriers are not allowed to handling food, milk, water, etc.
- Advised to wash their hands with soap water after defection urination and before handling food.

What is multidrug resistance typhoid? How will you manage?

- Drug resistance to typhoid fever has been reported in India.
- Resistance has occurred to first line drugs like chloramphenicol, ampicillin, cotrimoxazole.
- Resistant occurred even for ciprofloxacin drug of choice for multidrug resistance typhoid is amikacin and gentamicin.

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How will you eliminate typhoid fever in your area?

Elemination of thypoid can be done by:

1. **Measure against carrier (source)**
   - Identification of carrier (crux of the problem)
   - *Treatment of carrier:* (a) Chemotherapy; (b) cholecystectomy
2. **Measure against cases**
   - Isolation
   - Treatment
   - Disinfection of stools and urine
   - Follow up to prevent carrier state
3. **Measures against susceptible population**
   - Immunization
   - Surveillance
   - *Health education:* Food and water hygiene
   - Control of sanitation

How you disinfect the stool of typhoid patient?

- Urine and stool of typhoid patient are disinfected by 5% cresol
- Feces and urine are collected in impervious vessels, and an equal volume of disinfectant is added to it. It is allowed to stand for one to two hours. After disinfection, the excreta is emptied into a water closet or buried in the ground.

Disinfectants used for urine feces

Bleaching powder	50 g/l of water	5%
Crude phenol	100 mL/L of water	10%
Cresol	50 mL/L of water	5%
Formalin	100 mL/L of water	10%

If none is available milk of lime (1:4 lime and water) is added to stool and urine of typhoid patient and left for 2 hours,then disposed.

What steps measures will you undertake in typhoid outbreak?

Investigation of outbreak

- Confirmation of diagnosis
- **Tracing the source:** Food handler and carrier (by phage typing)
- Control measures against typhoid
- **Control of reservoir:** (a) carrier, (b) cases, untreated cases, (c) contacts-family member, (d) water supply
- **Control of sanitation:** (a) water supply, (b) excreta disposal, (c) food sanitation
- Immunization
- Health education
  - Personal hygiene
  - Food hygiene
- Stopping unhealthy practices

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What is the confirmatory test for typhoid and when will you do it, which is the sensitive test for typhoid fever?

In typhoid blood examination (Widal), it is only effective during the second week. However, a repeated Widal test during the third week showing an increase in antibody titer is a confirmatory test for typhoid.

Widal test is moderate in sensitive and specificity. Because of:

- 30% Widal negative shows positive in culture
- Salmonella serotypes share antigens
- Blunted response because of antibiotic therapy

New diagnostic tests are more sensitive and reliable alternative to the widal test

Example:

IDL Tubex – Detects I gm 0 g antibodies

Typhoidot – Detects I gm and Ig E and Ig and antibodies against a 50K d antigen of S.typhi

Typhidot-M- Detects IgM antibodies

Is typhoid is notifiable disese? what are the notifiable diseases?

Typhoid is not notifiable diseases

Notifiable diseases louse born typhus		
Cholera	Relapsing fever	} are subjected to international surveillance
Tuberculosis	Polio, SARS	
Plague	Influenza A	
Yellow fever	Malaria	
	Rabies	
	Salmonellosis	

What are the types of vaccines available for typhoid?

Currently three types of vaccines are available.

1. Live vaccine TY21a (oral)
2. Unconjugated Vi polysaccharide (Vi-PS)
3. Typhoid conjugated vaccine (Typbar-TCV)

Live vaccine: Prepared by using Salmonella typhi-21-a strain

Administered orally in liquid formula – for children > 2 years of age.

Capsule form, this vaccine stimulates the production of antibodies against OH and other surface antigen provide strong cell-medicated immunity. But not against v1 antigen, it is for above 6 years of age.

Pack 3 capsules are marketed as Typhoral

Dose: One capsule on alternative days, one hour before food. Oral antibiotics are not given. Immunity develops on 2 weeks immunity lasts for 3 years.

Efficacy is 50–80%

Side effects are nil stored at 2°C–8°C

Booster dose once in 3 years. Same 3 capsules

V1 polysaccharide vaccine

Storage = -2°C to + 8°C

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Route: Subcutaneously

Dose: 0.5 mL (25 micrograms of V antigen)

Contrindication: Pregancy, < 2 years child

Immunity: Starts after 7 days of injection. Protection for a period of 3 years.

Revaccination: Every 3 years

Not Protect against paratyphoid A and B

Heat and phenol or acetone killed vaccine (outdated now)

Only vaccine for children less than 2 years

Dose: 2 dose at 4 weeks a part

Route: Subcutaneous

Booster: Every third year

Storage: +2° to + 8°c

How the typhoid fever patient presents?

- Typhoid patient presents in the following manner
- **Prodromal:** Sudden chills and high fever, abdominal pain, constipation, headache, weakness, cough fatigue
- 7 to 10 day fever reaches maximum, patients looks toxic, and exhausted. Constipation and pea-soup stool, abdominal distention
- After this, fever comes down
- Relapse may occur after 2 weeks

Clinical findings are:

- Tongue is coated in V shape
- Step ladder fever
- Splenomegaly
- **Bradycardia:** Pulse rate is relatively lesser for the raising temperature
- Dicrotic pulse
- Rose spots on trunk
- Laboratory findings—leukopenia
- In 2nd week blood, urine, stool culture—positive for salmonella
- Widal test – 'O' and 'H' antibodies appears in increasing titer

What is the typical pattern of fever in typhoid? Mention some other patterns of fever.

Fever in typhoid is a step ladder, which means the temperature remains constant for some time, then rises and becomes constant again. This pattern continues for 10 days or less.

Other types of fever	Example
Continuous fever	Pneumonia, UTI
Saddle back fever	Dengue
High (hectic) fever	Bacteremia, milliary TB
Relapsing fever	Malaria
Pel Ebstein fever	Lymphoma
Low grade fever	TB
Hyperpyrexia	Tetanus, septicemia
Rigors as temperature rises	Malaria

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DIARRHEA

MEDICAL (CLINICAL) DETAILS OF THE PATIENT

Part I of the model proforma has to be filled before starting this part.

History of Present Illness

Chief complaints (in chronological order)	Onset (sudden/gradual)	Duration	Description of symptoms
Diarrhea			
Vomiting			
Thirst			
Low urine output			
Fever			
Others			

Treatment before admission: Yes/No

If yes, nature of treatment (in brief):

If treatment has discontinued, reasons:

Past History (As Relevant)

- H/o previous illness/hospitalization for similar complaint:
  - Time of illness:
  - Nature:
  - Hospitalization:
  - Complications:
  - Treatment:
- H/o low birth weight
- Feeding practices—Breast/Bottle
- Weaning practices
- Immunization
- Poor living standard and poor socioeconomic status
- Poor personal, domestic and kitchen hygiene
- Infections: Measels, TB, etc.

Diet History (As Relevant)

H/o food and water taken in past 15 day.

Epidemiological History

- Any similar case in the family: Yes/No
- Any similar case in neighborhood: Yes/No
- Any contact with similar case: Yes/No
- Prevalence of similar disease in the locality/district:
- Other relevant information:

General Examination

- Built:
- Height:
- Weight:
- Anemia:
- Clubbing:
- Cyanosis:

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- Nourishment:
- Temperature:
- Pulse:
- Blood pressure:
- Respiration:
- Jaundice:
- Lymphadenopathy:
- Edema:

Systemic Examination

- RS:
- CNS:
- CVS:
- Abdomen:
- Other relevant examination: For associated infections, such as pneumonia, malaria, others

Clinical Findings Suggestive of Diarrhea

Epidemiological Diagnosis

Assessment of Dehydration

Sl. No.	Particulars	Dehydration		
		No	Some	Severe
	By history (ask)			
1.	Stools per day	<2	2–10	>10
2.	Vomiting	Nil	Nil	Often
3.	Thirst	Normal	Thirsty	Morbid thirst but unable to drink
4.	Urine output	Normal	Reduced	Scanty/Markedly reduced
5.	Tears	Present	Reduced	Absent
	By examination (look)			
1.	General condition	Well, alert	Well, alert	Dull
2.	Mouth and tongue	Moist	Dry	Very dry (parched)
3.	Eye	Normal	Sunken	Markedly sunken
4.	Skin pinch (turgor)	Normal	Lost	Prominent
5.	Pulse	Normal	Normal/Rapid	Rapid feeble
6.	BP	Normal	Normal	Systolic <80 or non-recordable
7.	Breathing	Normal	Normal	Rapid
8.	Temperature	Normal/May be increased	Normal/May be increased	Usually increased
9.	Anterior fontanelle	Normal	Depressed	Markedly depressed
10.	Consciousness	Normal	Lethargic	Lethargic to unconsciousness
11.	Irritability	Slight	More irritable	Morbid, apathetic

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Laboratory Investigations

Sl. No.	Examinations required	Report
1.	Stool	• Naked eye examination • Microscopic examination—pus cells, cysts, red cells, cellular exudates, vegetative form • pH, culture and sensitivity • Electron microscopy for rotavirus
2.	Urine	Microscopy, sugar and albumin
3.	Blood	• Electrolytes, osmolality • ELISA • Test for presence of toxins

Clinical Diagnosis

Criteria for Diagnosis

Classification

1. Acute watery diarrhea
2. Dysentery—diarrhea with blood or mucus or both
3. Persistent diarrhea—diarrhea runs >14 days

MEDICOSOCIAL DISCUSSION

Identification of the Factors Responsible for/Influencing the Present Condition

Agent factors	Host factors
• Biological agent: Bacteria, Virus, Parasite • Infections: ENT, Respiratory, Urinary, Malaria, etc. • Reservoir: Human cases • Source of infection: Feces • Transmission: Feco-oral • By contamination of: **F**luid, **f**ood, **f**ingers, **f**lies, **f**omite	• Age: Oral phase/teething • Sex • Malnutrition • Infection • Prematurity • Migration • Immunity • Others
Environmental factors	**Social factors**
(Physical, biological, psychosocial) • Rainy season (July–August) • Increase in fly population: Flies nuisance • Water scarcity • Pollution of drinking water • Lack of potable water supply • Poor housing • Improper sanitation • Occupational environment	• Bottle feeding, incorrect feeding practices • Fairs, festivals and pilgrimages • Open air defecation • Poor standard of personal and food hygiene • Sewage forming • Ignorance: Incorrect knowledge, attitude and practice • Poverty • Sociocultural practices/Superstitions • Religious practices • Movement of population • Poor quality of life • Nonavailability and utilization of health services

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Levels of Prevention

Levels of prevention		Which level has failed?	How it could have been prevented?
Primary	Health promotion		
	Specific protection		
Secondary	Early detection and prompt treatment		
Tertiary	Disability limitation		
	Rehabilitation		

Assessment of Knowledge, Attitude and Practice (KAP) Towards the Disease

Particulars	Knowledge	Attitude (beliefs and customs)	Practice
• Cause of diarrhea • Management • Food sanitation • Hand washing • House flies • Sanitary latrine • Availability of services			

Influence of Medicosocial Factors in Diagnosis, Treatment and Prevention of the Disease

Impact of the Disease on Socioeconomic Status of

Family:

Community:

Nation:

Medicosocial Diagnosis

MANAGEMENT

Treatment Plan

1. Rehydration 2. Nutrition 3. Chemotherapy

Rehydration—Fluid and Electrolyte Management

Early replacement of fluid loss is the important part in managing diarrhea.

Treatment for Diarrhea with no Dehydration

Offer home available fluids frequently as much quantity as the child can take orally.

- Home fluid:
  - Butter milk
  - Rice ganji or kanji
  - Weak tea
  - Coconut water
  - Fruit juice
  - Lemon sherabat with salt
- Homemade rehydration solution (HRS):
  - Prepared at home by mixing
    - 8 level tea spoon of sugar—40 g (closed fist full)
    - 1 level spoon full of table salt—5 g (3 finger pinch up to 1st crease)
    - Potable water—1 liter
    - Puffed rice powder 50 g can be substituted for sugar.

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Treatment for Some Dehydration (Fig. 3.1)

Oral rehydration solution (ORS) composition as approved by the World Health Organization is as given below:

- Glucose—13.5 g
- Sodium chloride—2.5 g
- Trisodium citrate—2.9 g or
- Sodium bicarbonate—2.5 g
- Potassium chloride—1.5 g
- Potable water—1 liter
- Sodium (Na)—75 mEq/L
- Potassium (K)—20 mEq/L
- Chloride—65 mEq/L
- Bicarbonate—10 mEq/L
- Glucose—75 mEq/L

During the first four hour ORS given in mL = Weight of child in kg × 75

For each diarrheal stool, extra 100 mL of ORS is given

Assessment of hydration is done after 4 to 6 hour

- If the child is still severely dehydrated
- Signs of moderate dehydration continues
- Child is drowsy, pulse is weak, not passed urine
- Extremities are cold

Then, child is considered as having severe dehydration.



Fig. 3.1: Moderate dehydration.

Treatment for Severe Dehydration

Child is admitted to hospital and intravenous drip of Ringer's lactate solution is given.

- 30 mL/kg body weight in the first hour
- 20 mL/kg body weight in the next 3 hour

If the child passes urine, then rehydration is complete

Once the child's condition improves (starts taking orally), intravenous drip is discontinued but ORS is continued.

Gradually, the child resumes usual food and fluids.

Nutritional Management

- Mother should be assured about benefits of nutrition.
- Child should be given regular formula milk
- Easily digestible, food must be selected
- Small but frequent feeding is given
- Well cooked rice, dal, bananas, fruit juice and small quantities of nutritionally rich foods are given. High sugar content is avoided for time.

During Convalescence:

More food is given to restore, to compensate the loss and to promote early recovery.

Chemotherapy (Treatment of Cause)

Usually, diarrhea (except for *Shigella, Vibrio, E. coli*, *Entamoeba*, *Giardia*) does not require any drug.

Symptomatic treatment is given if there is vomiting, abdominal distention, convulsion.

Preventive and Promotive Measures

- Breastfeeding
- Nutritional supplementation
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DK Mahabalaraju MBBS MD (Community Medicine) has been serving in the teaching profession since 1980. He is recognized as a hardworking, highly competent, and dedicated teacher for 43 years. He got best teacher award by Air India. He has served as examiner in various universities. He has guided numerous postgraduates and presented/published many research articles in reputed national and international journals. He authored more than 50 books on health literature in local languages for which he has been honored with many international, national and state awards. He has meticulously architecture his mastered creation, *Essentials of Community Medicine Practicals* with his lifetime expertise and competence. This fifth edition has come out in very short span of time after the previous edition has sailed successfully throughout the globe.

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