



WORLD ORS DAY

Spread Awareness, Save Lives!

ORS & ORT

**Oral Rehydration Solution
Oral Rehydration Therapy**

29th July 2021



A Social Initiative From

Indian Academy of Pediatrics Delhi

WORLD ORS DAY

ORS Day is celebrated every year on 29th July to emphasize on the significance of ORS.

ORS is recommended by the **WHO & UNICEF** to be used as the treatment of Dehydration throughout the world

It serves as an easy, effective & most economical method to treat dehydration, which particularly affect Children





5 Principles *of Oral Rehydration Therapy* *for Treatment of* **Children with Diarrhea**

ORS is the treatment of choice

Oral Rehydration therapy should be given for 4 hours

Breast feeding should be continued along rehydration therapy

Age appropriate semisolid foods can be started immediately after rehydration therapy

ORS should be given additionally for further losses due to diarrhea and vomiting

About Author



Dr Lalit Mendiratta

Author

Consultant Pediatrician, New Delhi

© Indian Academy of Pediatrics Delhi State Branch

WORLD ORS DAY

Spread Awareness, Save Lives!

ORS & ORT

Oral Rehydration Solution
Oral Rehydration Therapy

A Social Initiative From
Indian Academy of Pediatrics Delhi

Contributors



Dr Manish Gupta



Dr Puneet Kumar



Dr Pankaj Garg

Foreword



Dr Piyush Gupta
President
Indian Academy of Pediatrics

*It gives me an immense pleasure to introduce the book **ORS & ORT** on **World ORS Day**. This is a great **initiative** by **IAP Delhi** for which I will like to compliment **President Dr. Lalit Mendiratta** leading from the front for his great efforts writing this book. The **importance of ORS to prevent and treat dehydration** can never be over emphasised but the success of **ORT** in management of dehydration depends not only on accurate preparation of **ORS** but also on exact quantity and time duration in management of dehydration. We all need to know these facts and educate parents while managing children with **Diarrhea to prevent and treat dehydration**. This book will serve very **useful purpose** in educating all medical students, nurses and all paediatricians about **ORS & ORT**.*

*Let's all take a pledge on this day for no death due to **Diarrhea** in children and spread awareness about **ORS** and save lives.*



Dr Piyush Gupta
President,
Indian Academy of Pediatrics

Foreword



Dr Sangeeta Yadav

Vice President IAP North Zone 2021,
Jt. Secretary Liaison CIAP 2018-19
President IAP Delhi 2007, & Secretary IAP Delhi 2000.

Dear Colleagues,

Greetings!

It is indeed an honour and privilege to write this message for the booklet on **Oral Rehydration Therapy** on the ORS Day observed worldwide on 29th July every year. Congratulations to Delhi Indian Academy of Pediatrics who under the leadership of Dr Lalit Mendiratta, leading from the front, Dr Manish Gupta and the august team members are launching this very practical and useful material for the beneficiaries.

Oral Rehydration Salt Solution (ORS) is called the “Jeevan Rakshak Ghol” or “Amrut in Dehydration”.

Globally, nearly 1.7 billion children less than 5 yrs of age have diarrhea every year and around 5,25,000 children die every year. Worldwide, diarrheal diseases are the second leading cause of death in children less than 5 years of age. In India, it is the third leading cause of childhood deaths and accounts for 13% of all deaths/year in children under 5 years of age. Most of the children die due to because of severe dehydration and fluid loss in diarrhea. Dehydration caused by diarrhea can be prevented and effectively treated by giving ORS. This has been the most cost effective treatment since the early 1980s, “Oral rehydration therapy” and prescribed by the World Health Organization (WHO) and UNICEF. It also encompass various homemade solution along with continued feeding”. The program was aimed to increase child survival in developing nations through proven low-cost interventions.

We all are aware that ORS has significantly prevented dehydration in children suffering from diarrhea and its complications. This booklet shall be useful and provide everything you need to know about ORS and its role in dehydration and diarrhea.

Long Live IAP Delhi!

In Academy Service

Best wishes



Dr Sangeeta Yadav

Introduction

ORS Day is celebrated every year on 29th July to highlight the importance of Oral Rehydration Solution (ORS) as a cost-effective Health Intervention. Acute Diarrheal diseases are one of the leading causes of mortality in infants and young children in many developing countries. According to WHO, **Diarrheal disease is the Second leading cause of death in children under Five years old. Diarrhea is the third leading cause of childhood mortality in India.** Diarrhea, which is frequently caused by poor sanitation and hygiene, can have serious, even deadly results, typically as a result of Diarrhea-related dehydration. It particularly affects infants, children and old people. Diarrhea generally lasts for several days, and leaves the body without water and salts that are necessary for survival. Mostly children, who die from Diarrhea actually die because of dehydration due to fluid loss from the body.

Dehydration from Diarrhea can be prevented by giving extra fluids at home, or it can be treated simply and effectively by giving adequate glucose-electrolyte solution called Oral Rehydration Solution (ORS) solution. ORS Jodi (ORS and Zinc) has proven to be successful in the prevention and management of acute Diarrhea and dehydration.

This book is intended to **highlight and reinforce the knowledge about various types of ORS (Oral Rehydration Solution) and ORT (Oral Rehydration Therapy)** for all health care providers, medical students and nurses. The importance of ORS can not be overemphasised as it can prevent and treat dehydration due to any cause and prevent morbidity and mortality caused by dehydration due to Diarrhea and other illnesses.

Basic methods as how is ORS is prepared and kind of Oral Rehydration Therapy to be used according to the level of dehydration is explained in this book and stressing the importance of nutrition and breast feeding along with ORS in the treatment of Diarrhea. There has been serious observation that in treatment of Diarrhea the importance of ORS is not discussed by the treating physicians and in fact how to prepare and duration of ORT is not emphasised. Just prescribing ORS without explaining the exact method of preparation and exact volume and duration does not

benefit the child at all as incorrect preparation, improper duration and inadequate volume can lead to serious consequences of Dehydration causing severe morbidity and mortality in children. Another important point to emphasise is the breast feeding and nutrition advice being given to parents and care givers after examination of the child with Diarrhea. This important advice not only helps in rapid recovery of child with Diarrhea but also improves immunity.

There is a brief section on treatment of Diarrhea in malnourished children and importance of ORT in these children is discussed as dehydration is the most important determinant factor responsible for mortality in these children. Finally use of ORS has been discussed in a section in acute febrile illnesses.

Hope this book shall achieve its full purpose of educating all health care providers, nurses, medical students, health workers about ORS (Oral Rehydration Solution) and ORT (Oral Rehydration Therapy) in routine day to day management of Diarrhea in children as majority of Diarrhea illnesses can be treated on outpatient alone. Therefore by preventing and proper treatment of dehydration we can significantly contribute in decreasing mortality due to dehydration caused by Diarrheal illnesses in children.

Dr. Lalit Mendiratta

Author & President, IAP Delhi

Key Facts

1. Globally, there are nearly 1.7 billion cases of childhood Diarrheal disease every year.
2. Diarrhea is a leading cause of malnutrition in children under five years old.
3. Diarrheal disease is the Second leading cause of death in children under five years old. It is both preventable and treatable.
4. Each year Diarrhea Kills around 5,25,000 children under five.
5. A significant proportion of Diarrheal disease can be prevented through safe drinking water and adequate sanitation and hygiene.

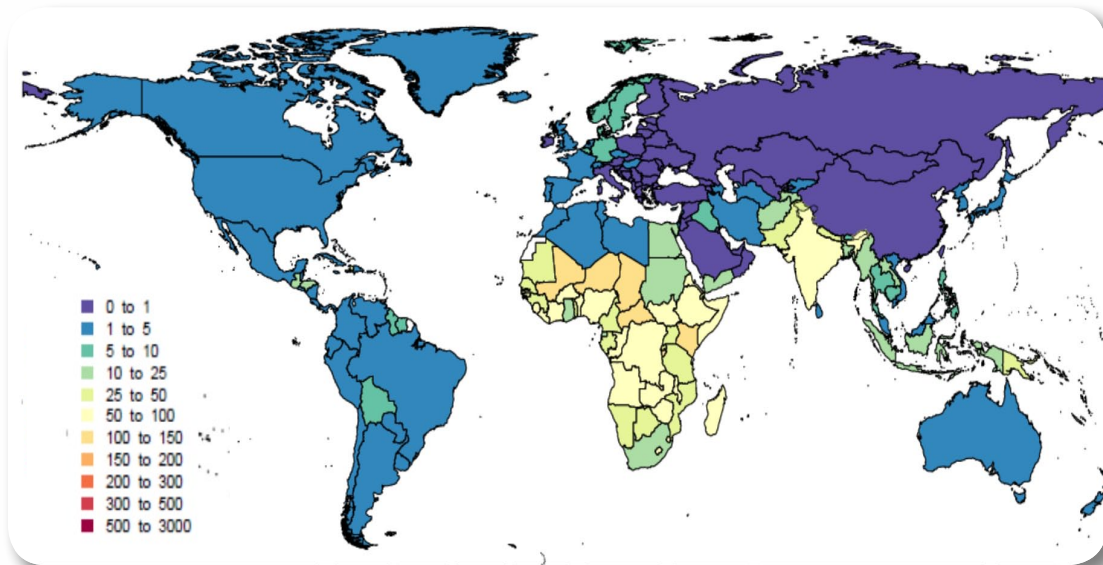


Figure 1: Maps of Global Diarrhea Mortality rates for all ages in 2016

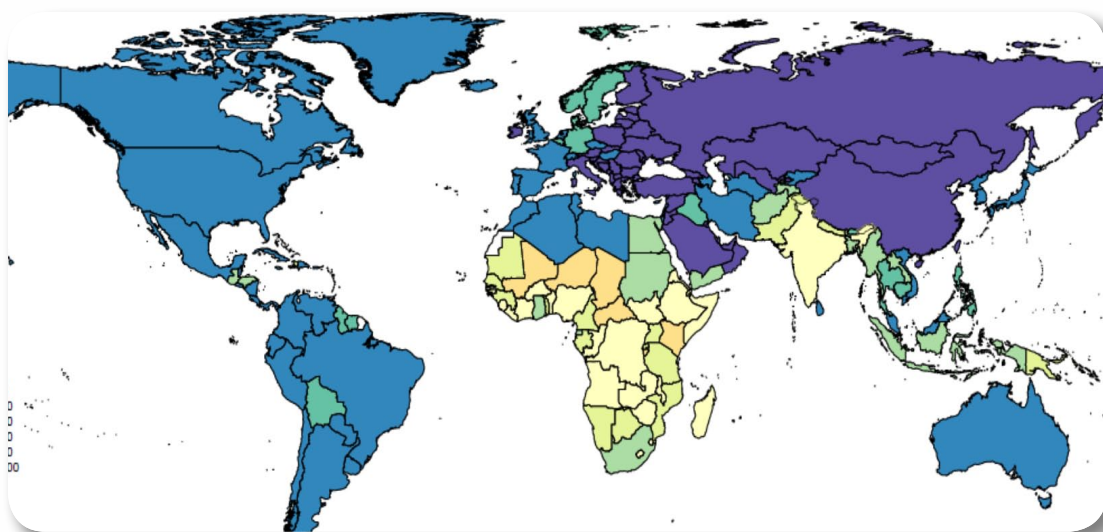


Figure 2: Maps of Global Diarrhea 2015 Mortality rates for Children younger than 5 yrs.

Source: Institute for Health Metrics and Evaluation website.

Data Visualization www.healthdata.org/results/data-visualizations. Accessed October 16, 2018

“**Diarrhea Death**” is a term coined to estimate the number of deaths among children caused by Diarrhea and Diarrhea induced acute dehydration. While ORS can reduce the chances of death due to Diarrhea by 93%, and that the number of Diarrhea deaths in children has been reduced by a third, researchers observed that 5,00,000 children still die due to acute Diarrhea globally, every year, of these 5,00,000 children 42% belong to Nigeria and India. Among India and Nigeria, it turns out, India faces the most deaths, with over 1,05,000 Diarrhea induced deaths. (Lancet2015). In 2004, WHO formalised the ORS + zinc protocol as the gold standard Diarrhea treatment. But only about a third of vulnerable children get ORS, and only 7% get the complete treatment package of both medicines.

A landmark decision by WHO in 2019 that will help change that: co-packaged ORS and zinc is now on WHO’s Model List of Essential Medicines (EML), including the list for children’s medicines (EMLc), a signal to the countries do the same in their national EMLs.

For health systems, an EML listing means budget and procurement prioritization of the co-pack. For families, it means a more affordable option than purchasing each medicine on its own, and a way to reinforce that a diarrhea treatment is incomplete without both medicines. For children, this means fewer lives cut short from a preventable disease. Kenya’s children have already benefitted from the introduction of the co-pack in its national EML. The opportunity for impact in India, previewed by Save the Children’s Stop Diarrhea Initiative, is monumental. We won’t rest until no child dies from Diarrhea.

Summary of the benefits from co-packaging of Zinc & ORS from various studies are

- Increased uptake and coverage of ORS and zinc (as a combination therapy and as individual components dispensed together), reducing the risk of severe health consequences of chronic diarrhea and stunting, acute diarrhea, and zinc deficiency among children.
- Improved adherence to the combined therapy of ORS and zinc.
- Improved adherence to / preparation of individual components (e.g., correct concentration of prepared ORS, completion of a full course of Zinc).
- Improved dispensing practices by health care workers.
- Reduced hospitalizations due to diarrhea.
- Reductions in inappropriate antibiotic prescribing and use.
- Enhanced satisfaction levels by caregivers of ORS and zinc relative to status quo products.

History of ORS

In 1957 an Indian physician by the name of Hemendra Nath Chatterjee discovered the results of oral rehydration therapy, however, since Chatterjee had failed to do a controlled test, it wasn't able to gain the limelight it should have. However, in 1960s Robert Crane established the sodium-glucose-transport absorption that takes place in the intestines. This process seemed unaffected during cholera, thus oral rehydration became the most viable & effective option for someone suffering from cholera.

In 1967-68 two scientists, by the names of Norbert Hirschhorn and Nathaniel F. Pierce, working separately in Dhaka and Calcutta, discovered that patients suffering from cholera can absorb electrolytes better when given orally. In 1968, David Nalin proved that when adults were given an electrolyte solution orally, it can reduce the need for IV treatment by nearly 80%. In the early 1970s, Hirschhorn conducted some further studies and discovered that babies and children can take the oral rehydration to the amount they need and continue with their feeding, making oral rehydration more popular for dealing with dehydration in children and preventing child mortality.

The campaigns for promoting the use of ORT started around the 1980s and from 2006 onwards the UNICEF and WHO got onboard and started a global scale promotion for the use of ORT. Low osmolarity ORS was launched in 2003 with decrease in sodium and glucose concentration and hence decrease in osmolarity from 311 to 245. Basis was well established from the studies that low osmolarity ORS use results in decrease in stool output and vomiting as the original standard ORS.

Oral Rehydration Solution

Oral rehydration solution is a drink made to help body gain its electrolyte balance. The electrolyte imbalance occurs during state of dehydration.

Dehydration

It is the state of the body in which body loses water more than it compensates for it. Water is lost through sweat, stool, urine and breath and body tries to compensate with drinking water with an average 2000 ml (8 glasses) per day and the person is said to be dehydrated if it can't compensate for the loss.



Oral Rehydration Therapy (ORT)

Oral rehydration therapy is the most effective and painless way of treating and preventing dehydration. The most effective way is Oral Rehydration Solutions.

Principle of ORS

Water and minerals continue to be absorbed from gastrointestinal tract even while fluid is lost through body by vomiting, Diarrhea or sweat.

Rehydration therapy through IV

When person is in state of severe dehydration or has persistent vomiting with ORS the best alternative is to supply necessary nutrients, electrolyte solution intravenously.

Efficiency and Advantages of ORS

Efficiency

- Diarrhea being the third most cause of mortality below 5 years in India. ORT may lower mortality as much as 93%.

Advantages

- Non-invasive, simple & effective way to treat dehydration, home therapy can be given along with milk feeds and complimentary foods.

Remember

- ***Coke, Limca, Frooti, Glucon-D, Roohafza, Tang and such sugary drinks are not meant for ORT.***

Causes of Dehydration



High Grade Fever

It is an important cause of dehydration in children because of excess water loss through skin and poor intake in illness. ORS is an important part of treatment in febrile illnesses in children to prevent dehydration and rapid recovery of fever.



Vomiting

Child with more than three episodes of vomiting can become dehydrated.



Diarrhea

Passage of more than 3 watery stools is called as Diarrhea. It is the most important and commonest cause of dehydration in children.



Burns

Skin is an important organ of the body as it provides protective layer of the body and in third degree burns skin is lost and not able to prevent water loss.

Diabetes Ketoacidosis

Diabetes ketoacidosis or DKA, is a life threatening condition cause by dangerously high blood sugar leading the excessive water loss in urine along with sugar.



Type of ORS

Low Osmolarity ORS

Standard ORS

Trisodium Citrate ORS

Rice based ORS

Home based ORS

Super ORS

Super Super ORS

Low Osmolarity ORS

- Use results in decrease stool output by 25%
- Decrease in vomiting by 30%.
- Decrease need for intravenous fluids.
- Effective in all kinds of Diarrhea including Cholera.
- Decrease in sodium and glucose results in decrease osmolarity.



Reduced Osmolarity ORS	Grams/Litre	Reduced Osmo. ORS	mmol/Litre
Sodium Chloride	2.6	Sodium Chloride	75
Glucose, Anhydrous	13.5	Glucose, Anhydrous	75
Potassium Chloride	1.5	Potassium Citrate	20
Trisodium Citrate, Dihydrate	2.9		10
		Total Osmolarity	245



Various Preparations Available in Market	Grams/Litre
Sodium Chloride	50-70
Glucose	40-70
Glucose	75-90
Total Osmolarity	210-260

Type of ORS Continued....

Standard ORS

- For more than 25 years WHO & UNICEF have recommended a single formulation of Glucose-based Oral Rehydration Solution (ORS) to treat or prevent dehydration from diarrhea.
- Standard ORS has been replaced by Low Osmolarity ORS which was launched in 2003 with decrease in sodium & glucose concentration & hence decrease in osmolarity from 311 to 245.

Standard ORS	Mmol/Litre
Sodium	90
Glucose, Anhydrous	111
Potassium	20
Chloride	80
Citrate	10
Total Osmolarity	311

Trisodium Citrate based ORS

- More stable shelf life (2-3) years, no discolouration.
- Trisodium citrate has direct effect on intestine in promoting glucose and sodium absorption and hence effective in high output Diarrhea like Cholera.
- WHO recommends that countries use ORS citrate where feasible.

Type of ORS Continued....

Rice based ORS

- Better taste, provides more calories than glucose based ORS.
- Culturally acceptable, reduces stool volume (40%) and shortens the duration of Diarrhea in both Cholera and other diarrheas diseases.
- Starches other than rice including wheat flour and maize have shown to be effective in patients with Cholera.
- Provides more substrate in the lumen without increasing osmolarity and hence more glucose mediated absorption.

Home Made ORS solution

- Home prepared solutions are recommended for use by parents to give to their child immediately after an attack of Diarrhea or vomiting starts before any signs of dehydration occur.
- Basically it prevents dehydration and preserves good nutritional status by maintaining fluid and food intake
- Costless and easy to prepare at home and less need of hospitalisation.

How to Prepare ORS at home

- If ORS packets are not available, you can prepare it at home as well.
- Home ORS solution is easy to prepare, effective and can be used in emergency but be careful to mix the exact amounts. Too much sugar can make Diarrhea worse and too much salt can be dangerous because of hypernatremia due to excess sodium.

Ingredient	Qty	Qty
Clean Boiled Drinking Water	1 litre	250 ml
Sugar	6 Levels Tea Spoon (1 Teaspoon=5 gms)	1 Levels Tea Spoon
Salt	Half Level Tea Spoon	One Pinch
Lemon	Few Drops (Optional)	
Stir the mixture till sugar dissolves		

Type of ORS - Home Made ORS Continued....

Home Made Oral Rehydration Solutions

Sugar

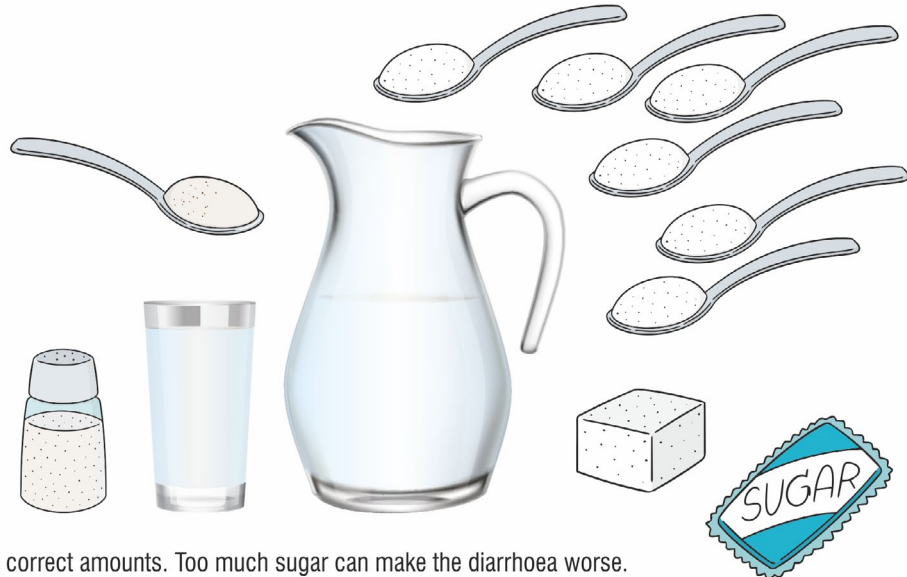
6 Level Teaspoons

Salt

1/2 (Half)
Level Teaspoons

Water

1 Litre
Boiled Cooled Water
or 5 Cupfuls
(Each cup: 200 ml)



Note

Be very careful to mix the correct amounts. Too much sugar can make the diarrhoea worse. Too much salt can be extremely harmful to the child. Making the mixture a little too diluted (with more than 1 litre of clean water) is not harmful.

How to prepare solution



1. Wash your Hand
2. Pour the water in the Glass Jar till it is a little shy of completely full.
3. Add the sugar and salt and mix well till all the sugar particles have dissolved.
4. If you wish to change the taste a little bit add lemon drops
5. Drink this homemade ORS several times

Type of ORS Continued....

Super ORS

- *These are special types of ORS which instead of mono sugars contain more complex sugars.*
- *They are Complex sugar based such as rice or amino acids (Glycine or Alanine) based and provide more calories (180kcal/ litre) apart from rehydration.*
- *Gradual release of glucose prevents secondary disaccharide intolerance.*
- *The disadvantages are short self-life (not more than 10 hrs) and should be prepared 2-3 times a day.*

Super Super ORS

- *Addition of Zinc to Super ORS provides results in more absorption of sodium and water by the intestine.*
- *Faster regeneration of gut mucosal epithelium.*
- *Increase levels of brush border enzymes.*
- *Enhanced immune response leading to increase clearance of pathogens.*

How to Prepare ORS

1. Put the contents of ORS in a clean container. Add the exact amount of clean water as indicated on the packet, usually one litre.
2. Add Water only, never add Fruit Juice, Coke, Milk or Soup etc.
3. Ready made ORS preparations are also available in various flavours and acceptance is very good in children.

ORS Administration

1. Should begin immediately
2. Can be given by spoon, dropper, cup, tumbler, syringe or nasogastric tube.
3. A Child Less than 2 years a Teaspoon every one to two minutes and one fourth to half a cup (250 ML) of ORS after every loose stool. Give 1- 2 teaspoon every 2-3 minutes.
4. A Child above 2 years or older give half to one cup (250 ml) with each loose stool.
5. Vomiting if occurs wait for 10 minutes. Vomiting usually stops. Give a Tea Spoonful every 2-3 minutes.
6. Breast feeding to continue

Storage of ORS

The solution should be kept covered and not used more than 24 hours because of the risk of bacterial contamination.

Can the ORS be used for everyone?

ORS is safe and can be used to treat anyone suffering from Diarrhea, before a detailed diagnosis is done by the doctor. Adults need rehydration treatment as much as children, although children must always be treated immediately because they become dehydrated more quickly.

What happens if the ORS is prepared with dirty water?

The benefits of fluid replacement would be lost if you use contaminated water. Boil and cool the water before use. In situations, where it is difficult to boil water, use the filtered water / portable water which is available.

Contraindications of ORS



Protracted Vomiting



Ileus



Severe Dehydration



Shock



Unconsciousness



Intussusception



High stool output (>10 ml/kg/hr)



Diarrhea

Diarrhea is defined as passage of liquid or watery stools that occur more than 3 times a day. In vast majority the episode of acute Diarrhea subsides in 7 days

Cause of Acute Diarrhea

Bacterial

Escherichia coli: Enterotoxigenic, enteropathogenic, enteroinvasive, enterohemorrhagic and enteroaggregative types Shigella: S. sonnei, S. flexneri, S. boydii and S. dysenteriae

Vibrio cholerae serogroups 01 and 0139

Salmonella: Chiefly S. typhi and S. paratyphi A, B or C Campylobacter species

Viral

Rotavirus

Human caliciviruses: Norovirus spp.; Sapovirus spp.

Enteric adenoviruses serotypes 40 and 41

Others: Astroviruses, coronaviruses, cytomegalovirus, picornavirus

Parasitic

Giardia lamblia

Cryptosporidium parvum

Entamoeba histolytica

Cyclospora cayetanensis

Isospora belli

Persistent Diarrhea is defined as Diarrhea which persists more than 2 weeks.

Main Objective of Diarrhea Management by WHO

1. To prevent dehydration if child doesn't show signs of dehydration.
2. To treat dehydration, if present.
3. To prevent nutritional damage by feeding during & after diarrheal episode.
4. To reduce the duration and severity of diarrhea and future episodes of diarrhea.

Clinical Signs Associated with Dehydration

Symptoms	No Dehydration	Some Dehydration	Severe Dehydration
Mental Status	Well; Alert	Normal, Fatigued or Restless, Irritable	Apathetic, Lethargic Unconscious
Thirst	Drink Normally, might refuse Liquids	Thirsty, eager to drink	Drink poorly, unable to drink
Heart Rate	Normal	Normal to increase	Tachycardia / Bradycardia
Quality of Pulse	Normal	Normal to decrease	Weak, Thready or impalpable
Breathing	Normal	Normal / Fast	Deep
Eyes	Normal	Slight Sunken	Deeply Sunken
Tears	Present	Decreased	Absent
Mouth & Tongue	Moist	Dry	Parched
Skin Fold	Instant Recoil	Recoil in <2 Sec	Recoil in >2 Sec
Capillary Refill	Normal	Prolonged	Prolonged; Minimal
Extremities	Warm	Cool	Cold; mottled; cyanotic
Urine Output	Normal to decreased	Decreased	Minimal

Reference: Modified from centre for disease control and prevention: Managing acute gastroenteritis in children: Oral Rehydration, maintenance and nutritional therapy MMWR Recomm Rep 52(RR-16):1-16, 2003; and World Health Organization.

Oral Rehydration Therapy

Clinical Evaluation of Dehydration in a Child. WHO has classified in to three type



No Dehydration

- No Symptoms



Some Dehydration

The WHO defines Some Dehydration as presence of two or more following signs

- Restlessness / irritability
- Sunken eyes
- Drinks eagerly
- Thirsty
- Skin pinch goes back slowly but less than 2 secs

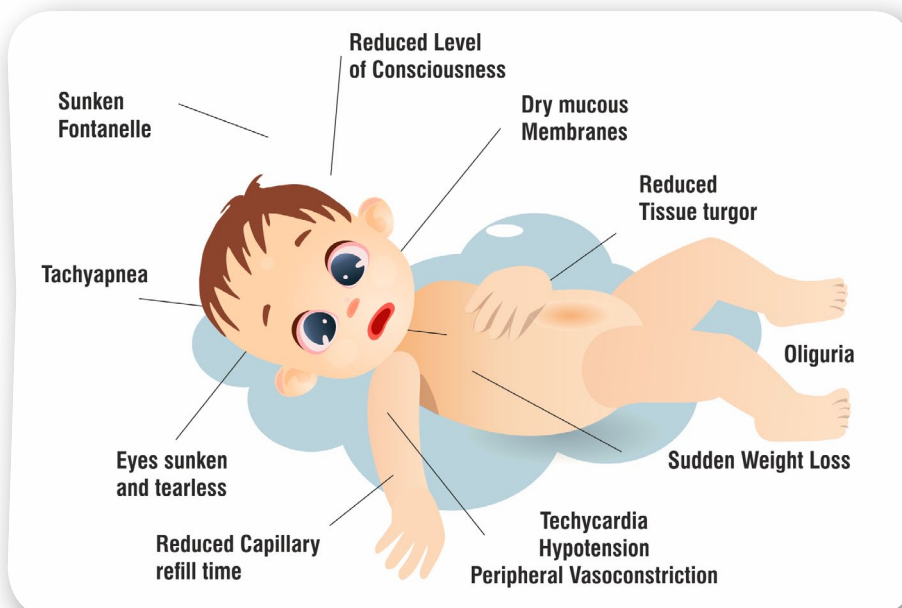


Severe Dehydration

The WHO defines Severe Dehydration as presence of two or more following signs

- Lethargy/unconsciousness
- Sunken eyes
- Unable to drink
- Skin pinch goes back more than 2 secs
- Skin pinch goes back slowly but more than 2 secs

Clinical Signs in an Infant with Severe Dehydration



ORT to prevent Dehydration

No Dehydration

ORS is given to prevent dehydration along with normal diet, breast feeding to continue along with complimentary foods. Point to be noted in no Dehydration category is that ORS is given as replacement therapy for ongoing stool losses only. Simultaneously parents or caregivers must be explained the danger signs requiring medical attention which are

1. Continuing Diarrhea for more than 3 days
2. Increased frequency of stools
3. Repeated vomiting
4. Refusal to faeeds
5. Blood in the stools
6. Fever



Age	Infants (<2 Yr)	Children (2-10 Yr)	Children (10 Yr >)
ORS is given after each loose stool.	50-100 ml	100-200 ml	Ad Lib
Total Quantity	500 ml/ Day	1000 ml/ Day	2000 ml/ Day

Some Dehydration

Rehydration therapy includes ORS 50-100 ml/ Kg over 3-4 hours, continue breast feeding. If ORS can not be taken orally use nasogastric tube. If after 4 hours while assessment child has still some dehydration ORT is repeated as above for 4 hours. The therapy is effective in 95% of cases but may not be true with high stool purge rate >5ML/ kg / hour, persistent vomiting, paralytic ileus and incorrect preparation of ORS is an indication of intravenous fluids therapy.

Replacement of losses

Infants and Children Less than 10 kg :

- 50-100 ml ORS for each loose stool or Vomiting episode up to 500 ML per day

More than 10 kg body weight

- 100-200 ML ORS for each loose stool or vomiting episode up to 1 litre per day.

Maintenance therapy should begin when signs of dehydration disappear, usually within 4 hours and ORS should be given equal to Diarrhea losses usually to a maximum of 10 ml/ kg per stool.

Breastfeeding and semisolid foods are continued during maintenance therapy.

Severe Dehydration:

Intravenous isotonic saline / plain Ringer solutions the fluid of choice and never use 5% dextrose alone. 100 ML/ kg of fluid is given over 6 hours in children < 12 months and over 3 hours above 12 months as shown in the table below.

Age	30 ml / kg	70 ml / kg
< 12 months	1 Hour.*	5 Hours
>12 months	30 minutes*	2 Hrs & 30 min.

** The above can be repeated if child continues to have feeble or non palpable radial pulse.*

If IV fluids can not be given due to any reason because of transport, IV access difficulties ORS can be given 20 ML/ kg / hours for 6 hours (Total 120 ML/ kg) by nasogastric tube but child requires frequent assessment every 1-2 hours and if no improvement in hydration after 3 hours or abdominal distension or vomiting occurs switch to IV fluids.

The child should be reassess every 15-30 minutes for pulses , oral mucosa , respiratory rate, urine output, stool water loss after the first bolus of 100 ML/ kg of intravenous fluid.

Further Management after the 100 ML / kg of IV fluids has been given includes

- 1. Persistence of severe dehydration:** Intravenous infusion is repeated
- 2. Hydration is improved but some dehydration is present:** IV fluids are discontinued and ORS is continued over 4 hrs as in some dehydration
- 3. No dehydration:** IV fluids are discontinued and ORS continued as per plan in no dehydration.

Replacement of losses in severe dehydration is same as in child with some dehydration

Infants and children: less than 10 Kg 50-100 ML for each loose stool or vomiting episode up to 500 ML per day

More than 10 Kg: 100 to 200 ML ORS for each loose stool or vomiting episode up to 1 Ltr per day

Adolescents and Adults: Ad libitum up to 2 Ltr per day. Replace the losses as long as Diarrhea or vomiting continues.

Nutrition in Diarrhea

- All infants to continue breast feeds even during rehydration therapy.
- Lactose free milk not mandatory unless child has established evidence of lactose intolerance. Home made cereals mix with milk can be given.
- Home made / seasonal foods can be given. The meals can be given immediately after rehydration therapy after around 4 hours.

Foods to avoid during Diarrhea

- Dairy Products except for curd and buttermilk
- Sweetened drinks or carbonated drinks like soda
- All fruit juices
- Dry fruits and nuts
- High fiber foods
- Sugar
- Sweets
- Raw salads and sprouts

Diarrhoea Foods *for* Baby & Toddlers



Watery rice gruel



Barley Water



Vegetable Soup



Banana Mash



Lassi



Dal Soup



Steamed Apple



Carrot Mash



boiled potato



Idli



Curd Rice



Rice Porridge



Idiyappam



Moong Dal Khichadi



Bread with Honey



Sabudana Kheer

Management of Nutritional Deficiencies

Zinc: advantages are

- Reduces the duration of Diarrhea episode by 25%
- Reduces the stool volume by 30%
- Reduces the likelihood of subsequent occurrence in next 2-3 months
- Dose for kids above 6 months: 20 mg daily for 14 days
- Dose for kids below 6 months: 10 mg daily for 14 days

Vitamin A supplements

It is Crucial for cellular and humoral cell responses. Consequently vitamin A deficiency is linked to impaired intestinal immune responses as well as increased mortality associated with gastrointestinal infections.

A Cochrane review showed vitamin A supplementation helped in preventing morbidity and mortality associated with Diarrhea in children between 6 months to 5 years. However there are conflicting reports of supplementation below 6 months. Therefore the benefits of vitamin A in Diarrhea need to be explored further.

Medium Chain Triglycerides and Nucleotides

There is insufficient evidence to suggest their benefit in management of Diarrhea.

Prebiotics and Probiotics

Prebiotic usefulness reports have revealed mixed results and ESPHAGAN does not recommend in treatment of Diarrhea

Probiotics Research has shown useful effects.

Lactobacillus rhamnosus GG, Sachromyces boulardi, Bifidobactrium are useful agents and recommended by ESPHAGN but not by FAO, NASPHAGN

Antibiotics:

Say no to Antibiotics.

Majority of cases of Diarrhea are due to viral etiology and self-limiting and ORS is must to prevent dehydration as it is the most important cause of mortality in children.

Antibiotics themselves diminish gut flora

Increasing prevalence of Antibiotics resistance

Indications of Antibiotics Therapy

WHO clearly instructs use of broad spectrum antibiotics with Diarrhea in malnourished children.

If on further testing Cholera is detected give specific antibiotics therapy but ORS use is mandatory for rehydration along with.

Child with bacillary dysentery is another indication of antibiotic.

Preterm and young infants are at high risk of sepsis with Diarrhea and antibiotics have definitely an important role in this group.

Microbiologic (culture) confirmation should be sought prior to antibiotics therapy.

Antisecretory Agents:

Racecadotril is an Antisecretory drug that exerts anti-Diarrheal effects by inhibiting intestinal enkephalinase. Recent studies have some evidence in favour of racecadotril in reducing stool output and duration but more data on efficacy is needed before it can be recommended for routine use in children with acute Diarrhea.

ORT in Malnourished children

Clinical assessment of dehydration is very important in malnourished children. Dehydration is overestimated in wasting and underestimated in kwashiorkor. Dryness of oral mucosa which can be palpated by rolling finger, presence of thirst, hypothermia, weak pulses are the signs of dehydration in severely malnourished children.

Salient Features

Clinical assessment of dehydration is very important

Dehydration is overestimated in wasting and underestimated in kwashiorkor

Lethargy, cool extremities, weak pulses and low urine flow are the common signs of dehydration.

Severely malnourished child with severe dehydration without history of watery Diarrhea should be treated for septic shock.

Standard and low osmolarity ORS are not ideal.

RESOMAL: Dehydration solution for malnutrition except in severely malnourished child with severe watery Diarrhea.

WHO guide lines for treating dehydration with ORS in children with SAM (Severe Acute Malnutrition).

- a Children with SAM who present with some dehydration or severe dehydration but who are not in shock should be rehydrated using ORS.
- b Nasogastric route is preferred route for ORS for malnourished children, if child is not able to take orally and rehydration is done slowly.
- c Full strength, Standard WHO low-osmolarity ORS should not be used for children with SAM who present with some or severe dehydration.
- d Choice of ORS in children with SAM are
 1. Half strength standard ORS WHO ORS with added potassium and glucose unless child is having profuse watery Diarrhea or Cholera. Simple way to prepare is to dissolve one sachet of standard WHO low-osmolarity ORS in 2 Litres of water instead of one Litre, and then add 50 g of sugar (sucrose) along with 45 ML of syrup potassium chloride (10% solution in a sugarless base).

2. ReSoMal is the ORS meant for use in malnourished children. The components are

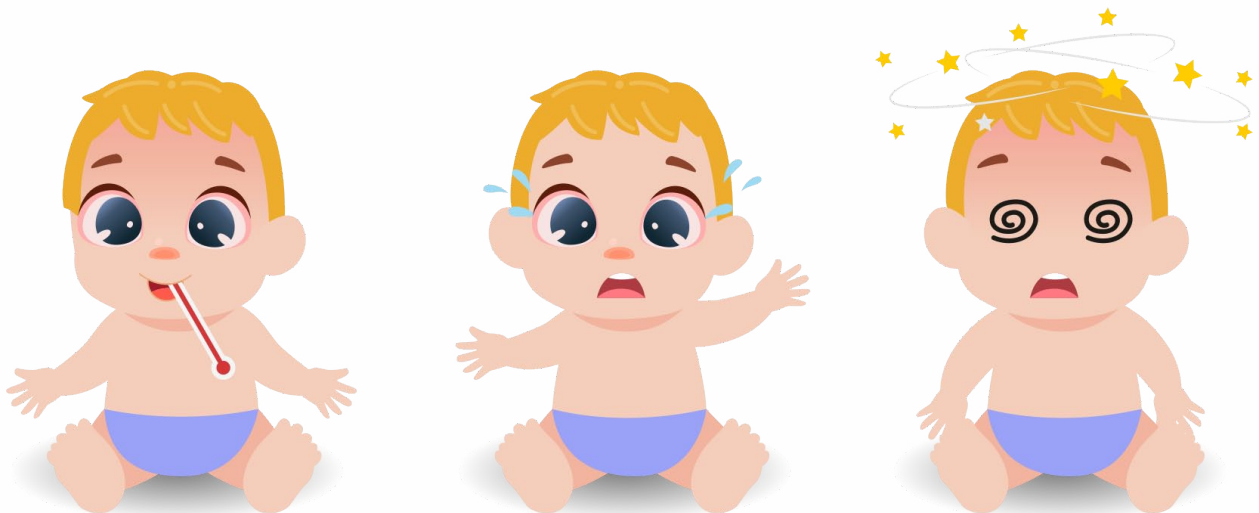
Ingredient	mmol / Litre	mmol / Litre	mmol / Litre
Glucose	55	Citrate	7
Saccharose	73	Magnesium	3
Sodium	45	Zinc	0.03
Potassium	40	Copper	0.045
Chloride	70	Osmolarity	294 mEq/litre

- e ORS is given slowly at the at 5-10 ml / kg / hr up to a maximum of 12 hours and dehydration is slowly corrected over 12 hours.
- f Breast feeding should be continued in rehydration therapy. Refeeding must be initiated with starter F-75 formula with in 2-3 hours of starting rehydration therapy. The feed must be given on alternate hours along with ORS.
- g The progress of rehydration must be monitored every half hourly for first 2 hours and then hourly for next 10 hours. Pulse rate, respiratory rate, oral mucosa, urine frequency, volume of water loss in stools should be monitored. One must do careful evaluation of signs of over hydration suggested by tachypnea, tachycardia, increased edema and facial puffiness as it can be dangerous and if appear one should immediately stop ORS. On the other hand once if any signs rehydration (moist oral mucosa, passing urine, appearance of tears, faster skin pinch) appear ORS for rehydration is stopped and ORS is continued for replacing ongoing losses.
- h Severe dehydration in malnourished children with shock should be treated with intravenous fluids. The choice of fluid is Ringer lactate with 5% dextrose or if not available half normal saline with 5% dextrose. The method is to give 15 ml per kg per hour in first hour and if there is improvement at the end of first hour, it is repeated at the same rate over next hour and followed by reduced osmolarity ORS at 5-10 ml / kg / hour either orally or nasogastric tube. If there is no improvement or worsening at the end of first hour of intravenous infusion child is considered in septic shock and managed accordingly.

ORS use in fever in children

There is always a risk of dehydration due to fever in a child because of sweating causing fluid and electrolyte loss and simultaneously there is poor intake of food and liquids as child is feeling unwell. The combination of sweating and reduced fluid intake can cause dehydration. Data in children suggests that every degree rise in temperature above 38° requires additional 10% of recommended maintenance fluids.

So it is important to monitor sign and symptoms of dehydration in any child with fever. All children with fever sips of ORS can encourage drinking also and prevent Dehydration. One should avoid use of Glucon-D, Coke, Frooty, Redbull and other caffeine beverages because these themselves can increase osmolarity and aggravate dehydration. ORS remains the ideal choice with appropriate glucose and electrolytes, cheap and easily available and even home made ORS can serve the purpose in preventing dehydration in children with acute febrile illness. The administration of ORS apart from preventing dehydration will improve the effectiveness of antipyretic medication and rapid recovery of the child. In places with limited resources even tepid sponging for fever and ORS will help the patients in febrile illnesses.



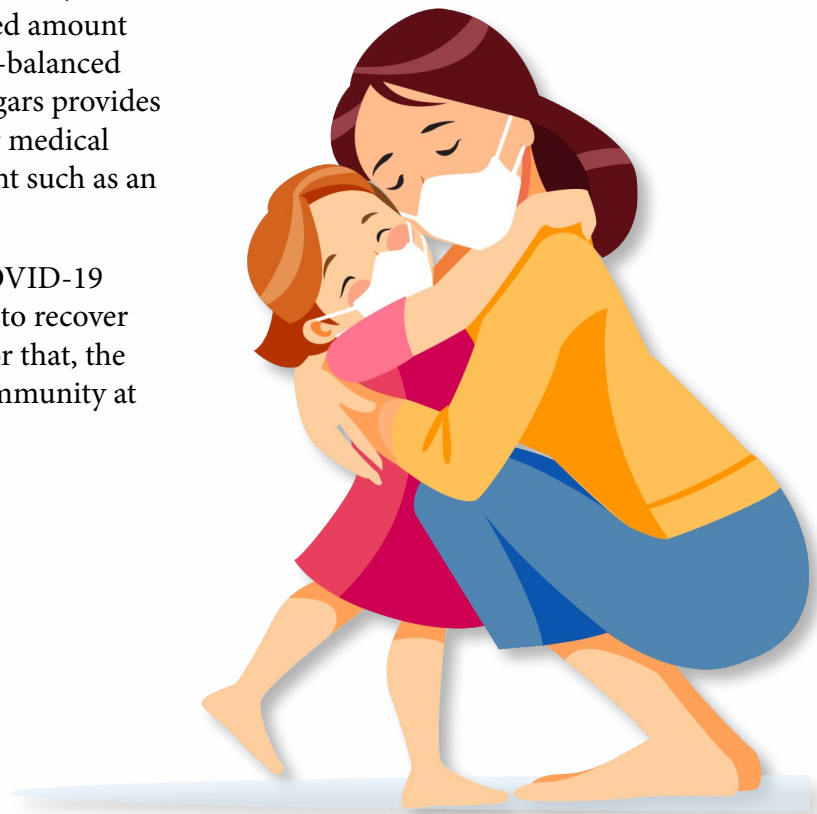
ORS use in COVID-19

COVID-19 symptoms include many that mirror those of the standard cold or flu. Fever, runny nose, vomiting, and diarrhea all can lead to dehydration—a complication that can require IV therapy and lands thousands in the hospital each year. In the case of COVID-19, dehydration can escalate rapidly, since some dehydration symptoms, such as fatigue and headache, are associated with COVID-19 in the first place. Other signs of dehydration can include dizziness, dry mouth or skin, and muscle cramps. ORS is the most useful agent that can prevent dehydration in mild disease at home and by preventing dehydration reduce the need of hospitalisation in the mild cases and avoid burden on the health care system

Prevent Dehydration:

Oral Rehydration Solution, provide a practical and simple way to prevent dehydration. Just mix a ORS packet with the indicated amount of water and drink up. Its precisely-balanced combination of electrolytes and sugars provides dehydration relief fast. No need for medical professionals, specialized equipment such as an IV, or a hospital stay.

ORS can help treat and prevent COVID-19 related dehydration—and allow you to recover in the comfort of your own bed. For that, the healthcare community, and the community at large, will thank you.



References

- 1 Oral Rehydration therapy. Available at <http://en.Wikipedia.org/wiki/oral-rehydration-therapy>
- 2 World ORS Day 2020. Available at https://www.nhp.gov.in/world-ors-day-2020_pg
- 3 World ORS Day 2019. Available at https://www.nhp.gov.in/ors-day-2019_pg
- 4 Definition of Oral rehydration salts. Available at https://www.medicinenet.com/oral_rehydration_salts/definition.htm
- 5 Types of ORS. Available at <http://www.annalsofcommunityhealth.in/ojs/index.php/AoCH/pages/view/ors>
- 6 Risk of dehydration in Fever. Available at <https://hydralyte.com/pages/fever>
- 7 Oral Rehydration Salts ORS-Expert consultation on Oral Rehydration Salts. Available at www.rehydrate.org/ors/expert-consultation
- 8 WHO Guideline updates on the management of severe acute malnutrition in infants and children, 2013.
- 9 Bhatnagar S, LodhaR, Choudhary P, Sachdev HPS, Shah N, Narayan S et al. IAP Guidelines 2006 on management of acute Diarrhea. *Indian Pediatr* 2007; 44:380
- 10 GHAI Essential Pediatrics 9th Edition. Vinod K Paul, Arvind Bagga. Acute Diarrhea page 282-287
- 11 Modified from Duggan C, Santosham M, Glass RI: The management of acute Diarrhea in children: Oral Rehydration, maintenance and nutritional therapy, *MMWR Recomm Rep* 41(RR-16): 1-20, 1992; and World Health Organisation
- 12 The treatment of Diarrhea: a manual of physicians & other senior health workers, Geneva, 1995, World Health Organisation; & Centres for Disease control and prevention: Diagnosis & management of foodborne illnesses, *MMWR* 53(RR-4): 1-33, 2004
- 13 Modified from Centers for Disease Control and Prevention: Managing acute gastroenteritis among children :oral rehydration, maintenance and nutritional therapy *MMWR Recomm Rep* 52 (RR-16) 1-16, 2003 and World Health Organization.
- 14 Kliegman , St Geme, Blum, Shah, Taskar, Wilson. *Nelson Text book of Pediatrics Edition 21: Acute Gastroenteritis in children* 2012- 2032
- 15 Tanchoco CC, Cruz AJ , Rogaccion JM, et al. Diet supplemented with MCT oil in the management of childhood Diarrhea. *Asia Pac J Clin Nutr.* 2007; 16(2): 286-292
- 16 Imdad A, Herzer K, Mayo- Wilson E, et al. Vitamin A supplementation for preventing and morbidity in children from 6 months to 5 years of age. *Cochrane Database of Systemic Reviews* 2010, issue12 Art No: CD008524

- 17 World Health Organisation. Vitamin A supplementation and Neonatal mortality in the developing world: A meta regression of cluster randomised trials. Bulletin of the World Health Organisation 2010; 88: 697-702.
- 18 Guarino A, Ashkenazi, Gendrel, D et al. European society for pediatric gastroenterology , hepatology and nutrition/ european society for pediatric infectious diseases evidence based guidelines for management of acute gastroenteritis in children in Europe: Update 2014. J Pediatr Gastroenterol Nutr 2014; 59: 132-152
- 19 WHO Diarrheal Disease. Available at <http://www.int/mediacentre/factsheets/Fs330/en>
- 20 WHO Diarrheal Disease. Available at <https://www.who.int/news-room/fact-sheets/detail/Diarrheal-disease>
- 21 ORS and Zinc: Evidence based miracles that defeat Diarrheal disease. Available at <https://www.defeatdd.org/blog/ors-and-zinc-evidence-based-miracles-defeat-diarrheal-disease>.
- 22 Summary of recommendation of copackage of zinc and ORS in essential list of medicines for children. Available at https://www.who.int/selection_medicines/committees/expert/22/s17.5_ORZ-zinc.pdf?ua=1
- 23 Home Remedies for Loose motions in babies and Toddlers. Available at <https://gkfooddiary.com/diarrhea-foods-for-baby-toddler-kids>
- 24 RaSoMal (REhydration Solution for Malnutrition) Oral- essential drugs Available at <https://medicalguidelines.msf.org/viewport/EssDr/english/resomal-rehydration-solution-for-malnutrition-oral-16684569>.
- 25 Dawlett M, Kalia A, Fluid and Electrolyte Therapy, in: Niebuhr V, Urbani MJ, editors, Core Concepts of Pediatrics, 2nd edition (Internet), United States. UTMB Pediatric Department, 2008 (cited 2020 Jan 21). Chapter 6, Page 7

IAP Delhi Office Bearers 2021



Dr Lalit Mendiratta
President



Dr Manish Gupta
Secretary



Dr Anil Vaishnavi
Vice President



Dr Deepak Gautam
President Elect.



Dr Pankaj Garg
Treasurer

Executive Body Members



Dr Ravindra Kumar
IAP Delhi North Zone



Dr M S Tomar
IAP Delhi North Zone



Dr Vipul Jain
IAP Delhi West Zone



Dr Mukesh Verma
IAP Delhi West Zone



Dr Nomeet S Gupta
IAP Delhi South Zone



Dr Praveen Khilnani
IAP Delhi South Zone



Dr Yogesh K Sarin
IAP Delhi Central Zone



Dr Shikha Mahajan
IAP Delhi Central Zone



Dr Piyush Jain
IAP Delhi East Zone



Dr Rajeev Gupta
IAP Delhi East Zone

IAP Delhi Ex-Officio



Dr R K Nabh
Past President, IAP Delhi



Dr Smita Mishra

Past Secretary, IAP Delhi

Office Bearers (Central IAP) 2021-22



Dr Piyush Gupta
President, Central IAP



Dr G V Basavraja
Hony Secretary, CIAP



Dr Sangeeta Yadav
Vice President, CIAP



Dr Harish K Pemde
Jt. Sec.-Liaison CIAP

Executive Body Members



Dr Anuarg Agarwal



Dr Peeyush Khanna



Dr Ajay K Gupta

Editor in Chief, Indian Pediatrics



Dr Devendra Mishra

IAP Delhi City Branches



Dr Naveen Rana
President
IAP Delhi North Zone



Dr Shekhar Biswas
Secretary
IAP Delhi North Zone



Dr Alok Bhandari
President
IAP Delhi West Zone



Dr Dinesh Goel
Secretary
IAP Delhi West Zone



Dr Poonam Bhatia
President
IAP Delhi South Zone



Dr Sankalp Dudeja
Secretary
IAP Delhi South Zone



Dr Dheeraj Bahl
President
IAP Delhi Central Zone



Dr Naresh Lal
Secretary
IAP Delhi Central Zone



Dr Ajay K Gupta
President
IAP Delhi East Zone



Dr Punit K Sharma
Secretary
IAP Delhi East Zone

IAP Delhi Co-Opted Members



Dr Ratan Gupta



Dr Prashant Seth



Dr Sandeep Taneja



Dr Tarun Kumar Ravi

WORLD ORS DAY

Spread Awareness, Save Lives!



ORT

is the main strategy recommended
by the WHO to reduce Diarrhea related
Deaths & Malnutrition in Children



Indian Academy of Pediatrics Delhi

(Registered under Society Act S-29229 of 1996)

21, Rajendra Place, New Delhi- 110008, India
11 3-114, First Floor, (Punjab & Sind Bank Building),

Tel. +91-11-45048966 Mob 8447441560

E.mail: iapdelhi2@gmail.com

www.iapdelhi.org