

Awareness of the Use of Zinc in the Treatment of Pediatric Diarrhoea

By

Anshuka Nailwal

*Dissertation submitted for the partial fulfillment of the
MBA Pharmaceutical Management*

Academic year, 2017-2019



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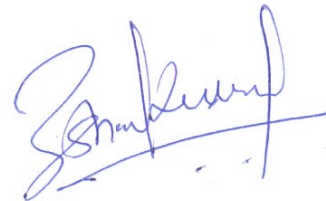
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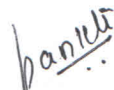
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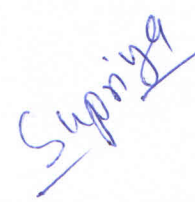
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We wish him/her all the best for future endeavors


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Manager – Human Resources

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ABSTRACT

RESEARCH PROBLEM:

Zinc is not prescribed by the Pediatricians even after being in the guidelines of WHO and UNICEF.

METHODOLOGY:

Objective- To study the usage practices of Zinc during diarrhoea in children among Pediatricians of Thane.

Research Design

Study Type- Descriptive

Study Population- Chemists and Pediatricians

Data Type- Primary and Secondary

Duration- 3 months

Sampling Area- Thane

Sampling Tool- Questionnaire

Sample Size- Pediatricians=40

Sampling Technique- Non Probabilistic Purposive Sampling

KEY RESULTS:

- ORS is the first treatment which is prescribed by Pediatricians to its patients during pediatric diarrhoea.

- There is no updation in the treatment of pediatric diarrhoea. The prescription is based on the traditional benefits of ORS for the treatment.
- Knowing the benefits of zinc, only few doctors prescribe Zinc in the treatment of pediatric diarrhoea.
- Zinc has been prescribed by the doctors in case of Viral diarrhoea.
- Increased immunity and faster relief are the common benefits which the pediatricians are aware about the Zinc.

CONCLUSION:

- There is a set guideline by the WHO & UNICEF for the treatment of diarrhoea which includes ORS+Zinc, inspite of which there is a lesser knowledge and lesser usage of zinc as a treatment in diarrhoea. Only 25% of Pediatricians prescribe Zinc with ORS.
- 35% of Prdiatricians do no prescribe Zinc in their treatment.
- 45% of Zinc is prescribed during Viral diarrhoea..
- There is a need for awareness of benefits of zinc among the patients as well as the prescribers i.e. the pediatricians. The benefits of zinc and ORS combined together must be presented so that there is acquaintance with the fact that by adding zinc, ORS proves to give a faster recovery.
- The traditional use of only ORS as a treatment in diarrhoea has become a barrier in knowing more about the different benefits of zinc for treating diarrhoea thus, less number of prescribers were inclined towards prescribing zinc for pediatric diarrhoea.

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INTRODUCTION

DIARRHOEA

Diarrhoea is a condition in which the bowel is loose or in watery condition and a person tends to pass it 3 to 4 times in a day. Generally, it does not need any medical condition. The diarrhoea which lasts for 1 to 2 days goes away on its own.

This is a very common condition which affects many people on a regular basis.

The diarrhoea which do not lasts for more than two days is called acute diarrhoea. The diarrhoea which lasts for three to four days is called chronic diarrhoea.

Key Facts about Diarrhoea in Children

- Under five years of age, diarrhoea is the second largest disease among children.
- Around 5,25,000 are killed every year under the age of five due to diarrhoea.
- With safe drinking water and maintain proper hygiene, diarrhoea can be prevented.
- All around the globe, there are 1.7 billion cases of pediatric diarrhoea every year.
- Under five year of age, diarrhoea is the leading cause of malnutrition.

DIARRHOEA IN CHILDREN

- India is No-1 in child deaths due to diarrhea.
- Every year, 3,86 000 children die due to diarrhea in India.
- 1044 deaths every day
- 44 deaths every hour
- Every 5th child who die of Diarrhea worldwide is an Indian.
- Diarrhea kills more children than AIDS, Malaria & Measles combined.

Signs and Symptoms

Diarrhoea can be accompanied by:

- ✓ Pain in the abdomen
- ✓ Vomiting
- ✓ Rise in body temperature
- ✓ Bloating
- ✓ Weakness

Symptoms of mild to moderate dehydration include:

- ✓ Dryness in mouth
- ✓ Less amount of urine
- ✓ Irritation
- ✓ Less amount of tears

Causes of Diarrhoea

Infection: The first cause of diarrhoea is infection. The infections can be caused by a bacterial host, viral organisms and parasitic organisms, which spreads through contaminated water. Infection occurs when there is not proper sanitation, proper cleanliness and clean water for cleaning, cooking and drinking. Rotavirus and *Escherichia coli*, are some of the agents which cause diarrhoea due to infection.

Malnutrition: The second cause of diarrhoea is malnutrition. As the diarrhoea leads to malnutrition, there are many children who cannot afford proper diet during diarrhoea, which makes their condition more worst.

Source: There are many sources by which water gets contaminated, these sources can be faeces, human waste, etc. By these, the fresh water gets contaminated which leads to diarrhoea in children.

Other causes: Not only contaminated water, diarrhoea can also spread from person to person due to poor personal hygiene. The food which is prepared from contaminated water or food which is kept open for hours and then consumed, also results in diarrhoea. Sea food from polluted environment also results in the disease.

Types of Diarrhoea

A) **Acute watery diarrhoea**- This includes cholera. The diarrhoea which lasts for less than 14 days is called an acute watery diarrhoea. This results mainly in dehydration and weight loss. The pathogens causing acute watery diarrhoea are *V. cholerae* or *E. coli* bacteria, as well as rotavirus.

B) **Acute bloody diarrhoea**- It is also called dysentery. In this, there is a damage of the intestinal mucosa, sepsis and malnutrition, it may also lead to dehydration.

C) **Persistent diarrhoea**- The diarrhoea which lasts for more than 14 days. It leads to malnutrition, serious non-intestinal infection and dehydration.

D) **Diarrhoea with severe malnutrition**- It leads to severe systemic infection, dehydration, heart failure, vitamin and mineral deficiency. Children having AIDS tend to suffer this type of diarrhoea.

Prevention of Diarrhoea

Water, Hygiene & Sanitation

- Water, hygiene & Sanitation is important because infected water will lead to infection, which will ultimately result in diarrhoea.

- The various campaigns which are carried out for water, sanitation and hygiene helped in reducing the number of cases related to the disease.
- Dirty hands is one of the reason for the increases in number of diarrhoea cases. The studies shows that, if clean hands are used then there will be a huge downfall in the number of diarrhoea cases.

Adequate nutrition

- During the episodes of diarrhoea, it is very important for the child to take adequate nutrition. Inadequate nutrition will result in malnutrition which may further result in the death of the child.

Breastfeeding

- It contains the elements like nutrients, hormones and antioxidants which are important for the child survival. Children who breastfeed for a long time tends to develop an infection.

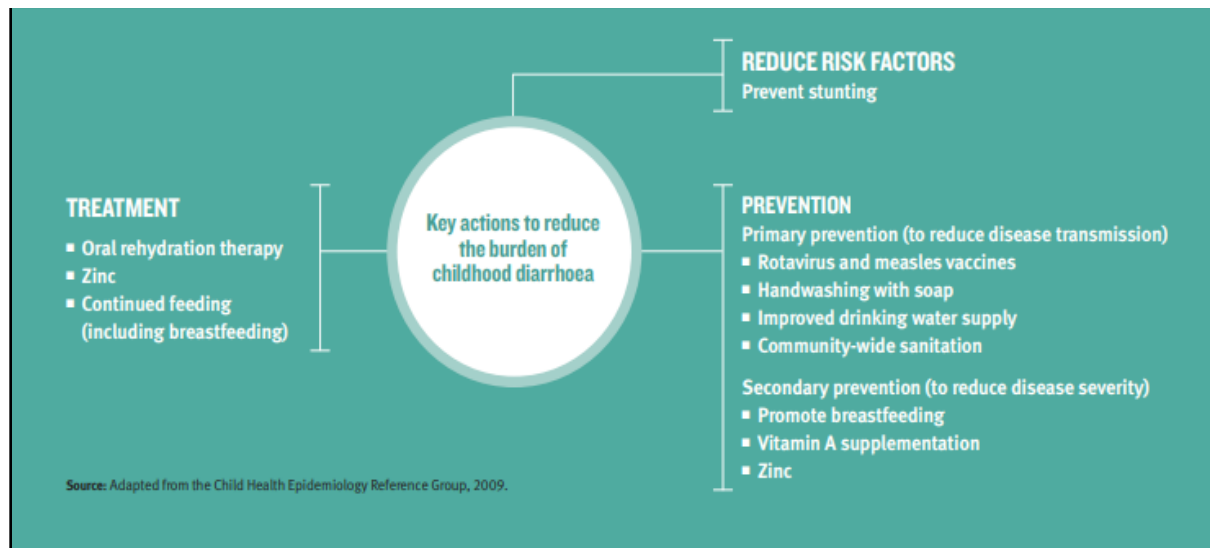
Micronutrient Supplementation

- **Vitamin A** supplementation is a critical preventive measure, and studies have shown mortality reductions ranging from 19% to 54% in children receiving supplements. “This reduction is associated in large part with declines in deaths due to diarrhoeal diseases and measles.” Vitamin A supplementation reduce the severity, complications and duration of diarrhoea.
- **Adequate zinc intake** is very important for the diarrhoea free life. Supplementation of zinc results in less number of diarrhoeal cases.

Immunization

- **Immunizations** help in reducing the chances of occurrence of diarrhoea due to various infections. Rotavirus play an important role in the occurrence of diarrhoea. If the immunity of body is good, then the virus will not be able to easily grow in the body. That's why to increase the immunity, Rota vaccines are given.

- **Measles** is an acute viral infection. Sometimes, the children whose immune system is not that strong, suffers from diarrhoea which even results into their death.



Treatment of Diarrhoea

Key measures to treat diarrhoea include the following:

- **Rehydration:** with oral rehydration salts (ORS) solution. It is a mixture of clean water, salt and sugar. It is a cost effective treatment. It gets absorb in intestine and there it fulfills the need of electrolytes.
- **Zinc supplements:** The use of zinc results in reducing the cases of diarrhoea by 25% to 30%.
- **Rehydration:** In case of emergency, ORS is also given by intravenous route.
- **Nutrient-rich foods:** It is very important to take food which are rich in nutrient during diarrhoea as they help to build a strong immunity of the body and also helps to fight diarrhoea.
- **Consulting a health professional** , whenever there is a blood in the stool or severe dehydration occurs .

ZINC

PAST

- In 2004, WHO/UNICEF issued a joint statement recommending Newosmolarity ORS and Zinc supplementation in the treatment of Diarrhoea.
- Inspite of the recommendations, there is little progress in Prescriptions and availability of Zinc.
- The first brand of Zinc launched in India is Zinconia followed by Z&D.
- In the recent past, Indian govt has included Zinc in the National programme for treatment of Diarrhoea.
- IAP along with NRHM has organized awareness on diarrhoea through an activity called IDCf.

PRESENT

- Inspite of the recommendations, only 1 % of Zinc is prescribed in India.
- Very few brands of Zinc is launched till date (20 brands) with limited market size of 30 cr and 23% Gr.
- Only 2 brands introduced in the last one year.
- No new clinical references in recent past.

TREATMENT OF DIARRHOEA USING ZINC SUPPLEMENT

- Zinc is given in different forms like ZnSO₄, zinc acetate, or zinc gluconate, which are all water-soluble compounds.
- Zinc helps in producing antibodies, increasing the activity of brush border enzymes. It also improves immune system.
- “It has a direct effect on ion channels, acting as a potassium channel blocker of adenosine 3-

5-cyclic monophosphate-mediated chlorine secretion.”

Importance of Zinc in Managing Diarrhoea

Zinc can benefit in the following ways:

- It improves the immunity of the body.
- With the help of zinc, the diarrhoea prevalence is reduced to 25 per cent.
- Daily use of zinc helps in minimizing the cases of diarrhoea by 35 percent within 2 to 3 months.
- It also helps in reducing the diarrhoeal episode severity.
- It prevents the fluid loss by maintain the gut mucosal integrity.
- It helps in the transport of water and electrolytes in intestine.
- Pathogens are cleared properly.
- It helps in the growth of the cell.
- It plays a central role in cellular growth
- Deficiency of zinc, results in the deficiency of brush border enzymes.

USE OF ZINC IN DIFFERENT TYPES OF DIARRHOEA

Acute Diarrhoea

- In acute diarrhoea, zinc supplements have a successful effect on course of acute diarrhoea.
- Stool output and frequency is reduced by the zinc supplements.
- Zinc supplementation helps to reduce the acute diarrhoeal episodes and severity.
- The children suffering from malnutrition, tend to observe a greater effect on diarrhoeal

duration reducing it to a day.

Persistent Diarrhoea

- The children having persistent diarrhoea have 24 per cent less chances of diarrhoea to continue.
- In persistent diarrhoea, there is occurrence of zinc depletion, thus, oral zinc administration improves the condition.
- Zinc supplementation may shorten the average duration of diarrhoea by around half a day and probably reduces the number of children whose diarrhoea persists until day seven.

Dysentery

- In Dysentery, Zinc increases the antigen-antibody responses

THE BLOOM PROCESS

Customers- As the product deals with diarrhoea in children, so the customers are the Pediatricians. The questionnaire containing 5 questions were prepared and the response was collected from 40 Pediatricians. The key points from the survey are as follows.

- Probiotics, ORS and Zinc are the treatments prescribed for children suffering from diarrhoea.
- Most of the Pediatricians use Zinc in their treatment.
- Mostly, the Pediatricians prescribe Zinc in case of Viral diarrhoea.
- Zinc increases mucosal integrity, restores immunity and avoids reoccurrence of diarrhoea in children.
- Reduction in the frequency of stools and rehydration of the child are few of the common clinical outcomes of zinc which are observed by the pediatricians in their practice.

Patients- A survey was conducted, in which the concerns of the patient mothers were observed. The common concerns which the mothers have are for their children are:

- Stomach ache
- Loss of appetite
- Low energy
- Child cannot communicate about the pain
- Swollen anus which is painful
- Rashes/irritation on the skin
- Dehydration
- The mother has to be always available for the child
- Maintaining the cleanliness
- The child does not take medicines during treatment

Channel Members- A survey was conducted amongst the chemists, in which they were asked about the brands which are available with them in the indication of Pediatric diarrhoea. The

brands which were present in the area of Thane were:

S.NO	BRAND NAME	FORMULATION	COMPANY NAME
1	Zinconia	Syrup	Zuventus
2	Rinifol	Dry Syrup	Elan Pharma
3	Rinifol-Z	Dry Syrup	Elan Pharma
4	Zincogut	Oral Solution	Centaur
5	Zincolife	Syrup	Mankind
6	Weltone Z	Drops	Delcure Lifesciences Limited





Markets- The market for zinc medications consist of the following brands in different dosage forms:

- Z & D
- ZINCONIA
- ZN20
- ZN20
- ZINCOLIFE
- ZIORAL
- ZIFRA

LITERATURE REVIEW

1) Topic- Role of Zinc in childhood diarrhoea management: A case of Nepal

- Every year, around 2 million children die because of diarrhoea all around the world
- To overcome this problem, a strategy was made that include giving zinc as a supplement with ORS.
- Zinc is enlisted in WHO essential drug list under medicine for diarrhea where it is indicated in acute diarrhea as an adjunct to oral rehydration salts.
- A trial conducted in nearby country Bangladesh concluded that, the children who took Zinc supplementation, their duration has reduced to 24%, lower incidence of diarrhea by 15% and there was less hospital admissions.
- The study concludes that, if Zinc is regularly prescribed during diarrhea then it will reduce the public health burden in developing countries like Nepal.

2) Topic- Zinc supplementation in young children: A review of the literature focusing on diarrhoea prevention and treatment

- This study is conducted to check the impact of zinc as a supplement, when administered prophylactically and therapeutically during diarrhoea.
- A total of 38 studies were included , 29 studies examined the effect of prophylactic zinc and 9 studies examined the effects of therapeutic use of zinc for treatment of diarrhoea in children under five years.
- The conclusion made was that, Prophylactic zinc has been shown:
 - to be effective in decreasing both prevalence and incidence of diarrhoea
 - reducing respiratory infections and improving growth in children with impaired nutritional status.
- Therapeutic use of zinc for the treatment of diarrhoea in children has been shown:
 - to reduce diarrhoea incidence, stool frequency and diarrhoea duration as well as respiratory infections in zinc deficient children, but stool output is reduced only in children with cholera.

METHODOLOGY

Objective -To study the usage practices of Zinc during diarrhoea in children among Pediatricians of Thane

Problem Statement-Zinc is not prescribed by the Pediatricians after being in the guidelines of WHO and UNICEF

Research Design

Study Type-Descriptive

Study Population-Chemists and Pediatricians

Data Type-Primary and Secondary

Duration-3 months

Sampling Area-Thane

Sampling Tool-Questionnaire

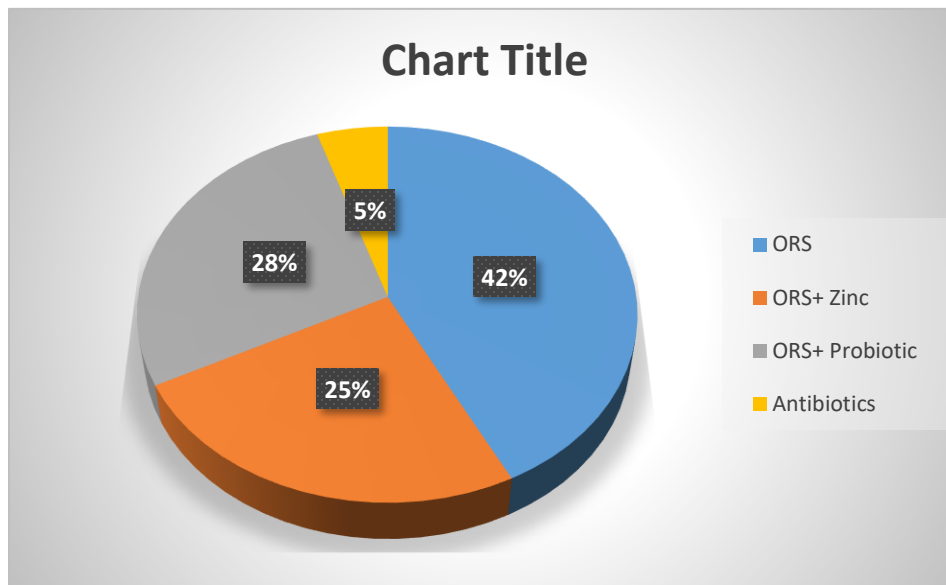
Sample Size-Pediatricians:40

Sampling Technique-Non Probabilistic Purposive Sampling

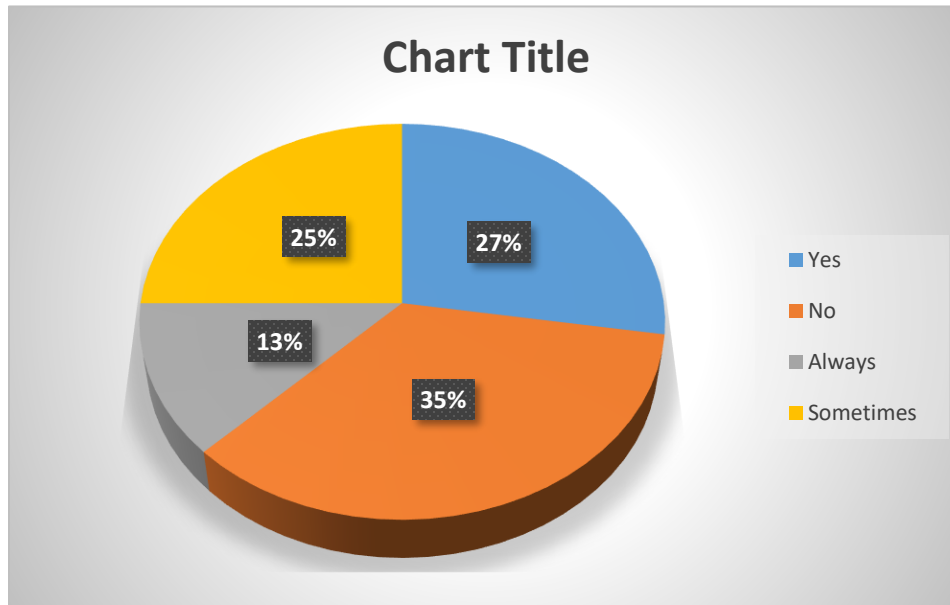
RESULT

On the basis of the survey done with the pediatricians, the following are the findings of the survey and the interpretations drawn from these findings

Q1) What is the treatment you prescribe for a child suffering from diarrhoea?

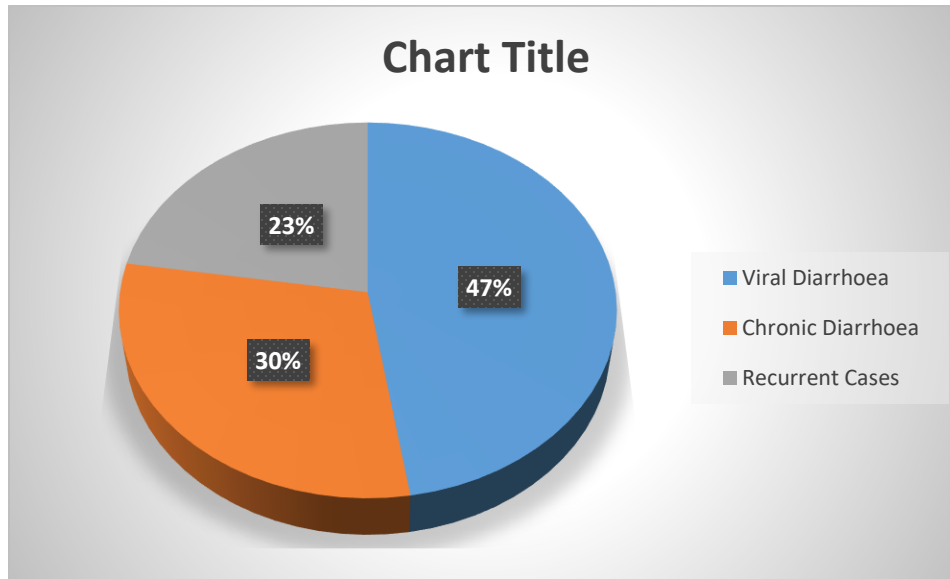


INTERPRETATION: The most common preference of medication among the pediatricians of Thane was of ORS followed by ORS combined with Probiotics. There was not much inclination of the doctors to prescribe zinc for pediatric diarrhoea.

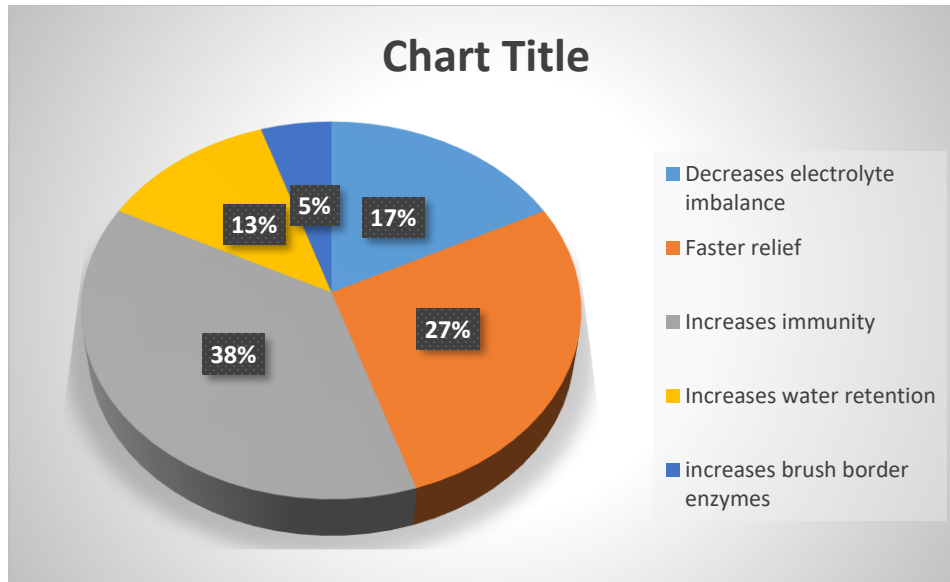
Q2) Have you ever prescribed zinc in your treatment?

INTERPRETATION: There was a maximum account of the Pediatricians not prescribing zinc in the case of pediatric diarrhoea. The percentage of doctors prescribing zinc in diarrhoea was only 27.5%. This graph shows that Zinc has not been added in the treatment regime of pediatric diarrhoea by the doctors.

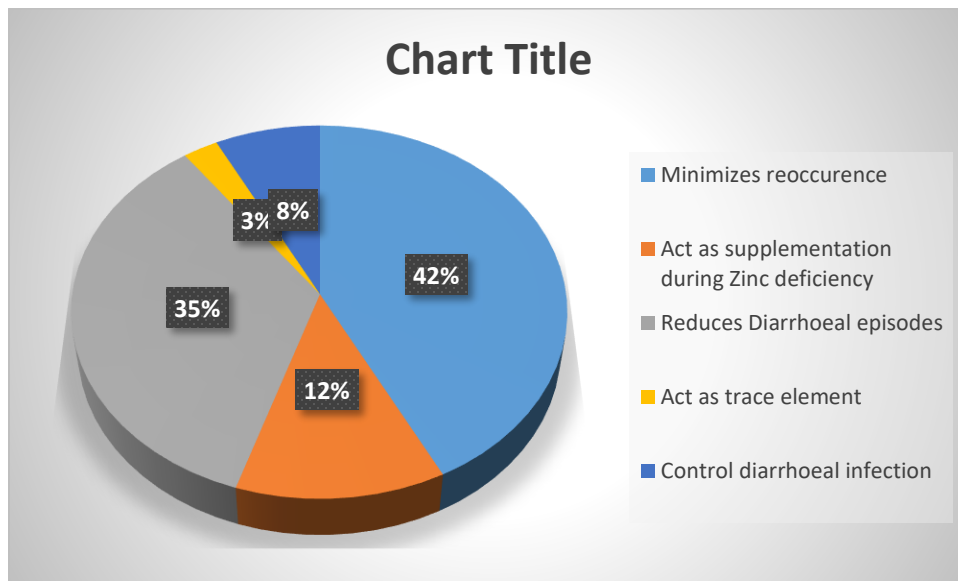
Q3) When do you prescribe Zinc?



INTERPRETATION: The prescribers of zinc in diarrhoea tend to prescribe zinc in cases of viral diarrhoea in children the most followed by recurrent cases.

Q4) What are the roles/benefits of zinc in diarrhoea?

INTERPRETATION: The benefits of zinc were recorded and it was found that the doctors who prescribe zinc in paediatric diarrhoea know about the different roles of zinc mainly as an immunity enhancer and for faster relief in diarrhoea among children.

Q5)What clinical outcomes of zinc have you observed in your practice?

INTERPRETATION: The clinical outcomes of zinc in case of pediatric diarrhoea were noted which shows that Zinc has proved to be efficient in controlling diarrhoeal infection and reducing the frequency of diarrhoeal episodes.

DISCUSSION

Key Insights:

- ORS is the first treatment which is prescribed by Pediatricians to its patients during pediatric diarrhoea.
- There is no updation in the treatment of pediatric diarrhoea. The prescription is based on the traditional benefits of ORS for the treatment.
- Knowing the benefits of zinc, only few doctors prescribe Zinc in the treatment of pediatric diarrhoea.
- Zinc has been prescribed by the doctors in case of Viral diarrhoea.
- Increased immunity and faster relief are the common benefits which the pediatricians are aware about the Zinc.

CONCLUSION

- There is a set **guideline by the WHO & UNICEF** for the treatment of diarrhoea which includes ORS+Zinc, inspite of which there is a **lesser knowledge and lesser usage of zinc** as a treatment in diarrhoea. **Only 25% of Pediatricians prescribe Zinc with ORS.**
- **35% of Prdiatricians do no prescribe Zinc in their treatment.**
- **45%** is the indication of **Viraldiarrhoea**, when doctors prescribe zinc.
- There is a **need for awareness of benefits of zinc** among the patients as well as the prescribers i.e. the pediatricians. The benefits of zinc and ORS combined together must be presented so that there is acquaintance with the fact that by adding zinc, ORS proves to give a faster recovery.
- The **traditional use of only ORS as a treatment** in diarrhoea has become a barrier in knowing more about the different benefits of zinc for treating diarrhoea thus, less number of prescribers were inclined towards prescribing zinc for pediatric diarrhoea.

RECOMMENDATIONS

- Zinc plays a very important role in Pediatric diarrhoea. ORS gives hydration to the body, but when zinc is given with ORS it provides super hydration to the body, giving a complementary effect. So, the benefits of zinc should be made clearer to the doctors and the patients.
- There should be increased promotion through various campaigns describing the WHO and the UNICEF guidelines to build more understanding of the benefits of zinc among people and doctors.
- Spreading the word will help more and more pediatricians to prescribe zinc in the treatment as well as the patients will get inclined towards using zinc.
- The pediatricians can be made aware about the benefits of the Zinc given in combination with ORS during their CME's. The doctors who prescribe zinc should present the clinical benefits observed to the other pediatricians in meetings and CME's.

APPENDIX

Following was the questionnaire

- 1)What is the treatment you prescribe for a child suffering from diarrhoea?
- 2) Have you ever prescribed zinc in your treatment?
- 3) When do you prescribe zinc?
- 4) What are the roles/benefits of zinc in diarrhoea?
- 5) What clinical outcomes of zinc have you observed in your practice?

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