

A Cross-Sectional Mixed-Methods Population-Based Study to Assess the Barriers to Utilization of Oral Rehydration Solution and Zinc in Managing Diarrhea among Under- 5 Children in Bihar Region

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Abstract

Aim: This study aims to assess the barriers to utilization and sources of ORS/zinc in Bihar Region.

Material & Methods: A cross-sectional mixed-methods population-based study was conducted in the Department of Pediatrics, ANMMCH, Gaya, Bihar, India over a period of one year, using both quantitative and qualitative Methods. A total of 60 mothers/guardians selected using three-stage cluster sampling (wards/communities/households) participated in the study.

Results: Out of 60 participants, majority of them (29) informed the unavailability of ORS/Zincs followed by Unaffordability (19). Of the 30 with recent U5C Diarrhea who used ORS/zinc in the quantitative study, 10 obtained the commodity from private chemists, and 3 each from government hospitals and government health centers.

Conclusion: There is a need to design community-level behavior change components to enhance awareness, elimination and management of diarrhea. There are needs for hospital management to ensure that ORS/zinc stock-outs in public hospitals are eliminated.

Keywords: oral rehydration solution, zinc, diarrhea

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Introduction

Diarrheal disease remains one of the leading causes of death globally [1]. In high-income countries, mortality rates have decreased significantly over the past few decades, however mortality remains high in low and middle-income countries [1]. Countries in the regions of Africa,

South America and Asia that have the lowest GDP hold the highest mortality rates among children under five due to diarrheal disease [2].

In 1968, glucose-electrolyte solutions were found to successfully treat cholera in patients [3].

This solution is described as oral rehydration solution (ORS), and is a type of oral rehydration therapy (ORT) used commonly to treat dehydration [4]. Today, ORS is described as any packaged rehydration solution containing a form of sugar, together with additional electrolytes, such as sodium or potassium.

An alternative form of ORT also exists, described as Recommended Home Fluids (RHF). RHF includes any non-packaged home fluid alternative ORT treatment such as cereal-salt, rice-water or sugar-salt solutions, as well as other common home fluids such as juice or tea [4]. To reduce the incidence and prevalence of diarrheal diseases, WHO and United Nations Children Fund (UNICEF) in year 2004 recommended zinc (daily 20 mg zinc supplements for 10-14 days for children with acute diarrhea of age more than 6 months and 10 mg per day for infants below six months of age) with ORS in [5] treatment and prevention of diarrheal episodes. Though some contradictory results have been published by about the [6] zinc supplementation for acute infectious diarrhea. Still various studies have shown that more than three-quarters of all diarrhea deaths could be reduced with combined utilization of Oral Rehydration Salt (ORS) and adjunct zinc [7] supplementation.

Despite of these recommendations, the most recent National Family Health Survey (NFHS 4) reported [8] ORS coverage of 26% and zinc coverage of less than 1%. Thus, we aim to assess the barriers to utilization and sources of ORS/zinc in Bihar Region.

Material & Methods:

A cross-sectional mixed-methods population-based study was conducted in the Department of Pediatrics, ANMMCH, Gaya, Bihar, India over a period of one year, using both quantitative and qualitative Methods. A case study approach where health programmers and pediatricians were actively engaged in the

study planning and implementation. A total of 60 mothers/guardians selected using three-stage cluster sampling (wards/communities/households) participated in the study.

Methodology

Inclusion criteria: All the children in the age group of 6-59 months coming to Department of Pediatrics, ANMMCH, Gaya, Bihar, India.

Exclusion criteria: Children who were terminally ill, suffering from genetic diseases, mentally retarded and having cardiac problems were excluded from the study.

Ethical approval was taken from the Departmental Ethical Committee before the commencement of the research work. A questionnaire was prepared to collect the data on the socio-demographic profile of children.

Descriptive statistics such as frequencies and percentage were used for univariate variables. Chi-square test was used to assess the association of malnutrition with study variables at 5 and 1% level of significance.

Results:

Out of 60 participants, majority of them (29) informed the unavailability of ORS/Zincs followed by Unaffordability (19). [Table 1]

Of the 30 with recent U5C diarrhea who used ORS/zinc in the quantitative study,

10 obtained the commodity from private chemists, and 3 each from government hospitals and government health centers [Table 2].

Table 1: Reasons for not using ORS/zinc

Reasons	Used recently* (n=30)	Didn't use recently* (n=30)	All* (n=60)
Unavailability	15	14	29
Unaffordability	12	7	19
Unawareness	0	3	3
Spousal approval	0	6	6

Others	0	2	2
None	0	1	1
Total	30	30	
*Multiple responses. ORS, oral rehydration solution.			

Table 2: Distribution of places where ORS/zinc was obtained

Place	N
Government hospital	3
Government health center	3
Public mobile clinic	1
Other public sectors	1
Private hospital, clinic	9
Pharmacy	5
Private chemist/ PMS	3
Itinerant drug seller	1
Others	2
Any	9
None	10
Total	60
ORS, oral rehydration solution; PMS, Patient Medicine Sellers.	

Discussion:

Role and effects of Zinc and ORS: Zinc supplementation has shown a substantial decline in the proportion of children who experienced recurrent diarrhea, suggesting that zinc is an important underlying factor in preventing and controlling diarrhea. Previous studies have shown that the diarrheal mortality has a skewed distribution and also many children experience exceptionally high diarrhea morbidity. The mechanisms in which Zinc acts- a)improves the absorption of water and electrolytes, improves regeneration of the intestinal epithelium, increases the levels of brush border enzymes, and enhances the immune response, allowing for a [9] better clearance of the pathogens. b)It also plays a critical role in metallo enzymes, polyribosomes and the cell membrane and cellular function, giving credence to the belief that it plays a central role in cellular growth and in the [10] function of the immune system. [11]

Lack of awareness and training were found to be the main reason for not using or

delaying the use of zinc supplement during diarrhea. A positive impact was observed on training the [12] caretakers and healthcare workers. Another significant finding was lack of knowledge regarding importance of breast [13]

Factors affecting availability of ORS in rural and isolated areas do vary, and can include issues with supply, procurement and distribution [14]. These contributing factors are also not static and often times sporadic, thus highlighting that for ongoing interventions, accurate forecasted demand data can assist implementors to ensure sufficient coverage within areas of high demand and prevent overstocking within low-demand areas. The mix of strategies chosen must depend on local assets, opportunities, and resources that exist or could be mobilized. In situations where ORS is available, cost can be a barrier to purchase, thus limiting accessibility particularly among the poor and those living in rural areas [15]. Pricing of ORS product can affect ORS use, therefore ORS availability does not equal

accessibility if users cannot access it due to high cost. Conversely, too low of a price could disincentivize manufacturers and distributors and affect availability [16,17].

Conclusion:

There is a need to design community-level behavior change components to enhance awareness, elimination and management of diarrhea. There are needs for hospital management to ensure that ORS/zinc stock-outs in public hospitals are eliminated.

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