1-4 years old infant's acute diarrhea treatment with zinc sulfate and ORS solution: A case study at Eshkenan city, Fars province, Iran

Hakimeh S. Sajjadi [1], Ali Akbar Shaikhi Fini [2], Abdolvahab S. Samavi [2]

[1.] Hormozgan University of Medical Sciences, Ostandari Blvd, Bandar Abbas, Iran
[2.] University of Hormozgan, Minab Street, Bandar Abbas, Iran
hakimeh.sajjadi@yahoo.com

Abstract: An experiment was conducted to evaluate effects of treatment efficiency of zinc sulfate and ORS solution in combination or with ORS (only) on intensity and duration of diarrhea in 1-4 years old infants. A total of one hundred two of 1-4 years old cases were treated in two groups, control group (52 cases) and experimental group (50 cases). Treatment period were done at health-care center of Eshkenan city, Fars province, Iran. Obtained data were evaluated by t-test for detection of significant difference. Findings showed that zinc sulfate in combination with ORS had better treatment efficiency on shortening of acute diarrhea and lowering its intensity, in comparison with ORS, alone. From the results of this study, it is concluded that zinc sulfate is a suitable completive treatment accompanying with ORS in treating infant's diarrhea term. [Hakimeh S. Sajjadi, Ali Akbar Shaikhi Fini, Abdolvahab S. Samavi. **1-4 years old infant's acute diarrhea treatment with zinc sulfate and ORS solution: A case study at Eshkenan city, Fars province, Iran.** Life Science Journal. 2011; 8(3):367-369] (ISSN:1097-8135). http://www.lifesciencesite.com.

Key words: 1-4 years old infants; diarrhea; zinc sulfate; ORS solution

1. Introduction

Diarrhea, is a common disorder among infants world widely, and is a major reason of mortality in 1-4 years old in Iran that has a heavy economic costs on public health (King et al., 2003; Zhang and Junling Li, 2009). It is a main agent of grow delay and early mortality in developing countries (Bettger and Odell, 1981). In United States of America 2.1 to 3.7 million diarrhea cases were diagnosed annually and 300-400 cases of annual mortality were recorded because of acute diarrhea (Behrman et al., 2004). Patient with diarrhea causes high economic costs for developing countries, for example about 30 present of hospital beds in these countries were occupied by diarrhea suffered infants (Prasad, 1998). In Iran, diarrhea is a main reason of mortality for 1-4 years old group (Shams, 2001). In other word, about 12% 1-4 years old of infants in cities and 14% in villages were suffering from diarrhea (Iranian health ministry, 2002). Main reason of diarrhea related mortality is incidence of dehydration that commonly liquid intravenous injection was used for treatment (Arcasoy et al., 1990). In a research it is observed that treatment with only solution injection may cause lowering mortality incidence but can't decline duration of diarrhea period (Richard et al., 1993). Because of negative effect of acute diarrhea on body weight and immune system (Baqui et al., 1993), suggested treatment is including zinc sulfate syrup and ORS solution (Black et al., 1984). Efficiency of this kind of treatment was documented in researches (Reinhold and Charami, 1981; Al-Sonboli et al., 2003). Also, some studies decelerated that zinc supplementation can prevent respiratory disorders and can help for diarrhea period declining in acute or chronic diarrhea (Bhandari et al., 2002; Behrman et al., 2004; Raqib et al., 2004). With attention to effectiveness of ORS and zinc sulfate treatment, in present study, effect of both of treatments in 1-4 year old infants were compared.

2. Material and methods

This study conducted with clinical based diagnosis on patients (1-4 year old infants) at health-care center of Eshkenan city. The investigable patients have these parameters; 1-4 years old, suffering from diarrhea without hemorrhage and without antibiotic usage from began to end of treatment.

Patients with lower and higher ages (lower than one or higher than four), diarrhea with hemorrhage or without parents allowance were removed from our experimental groups.

Totally, 102 infant were divided in two experimental groups; 52 of them as control group and 50 of them as experimental or treatment group. In control group we had used only ORS and in experimental group, we had used ORS with zinc sulfate syrup according to hospital treatment protocol. Data were collected via communications with patient's parents, documents or disease history review and co-worker doctor's reports in same research project.

Data were analyzed by SPSS Ver. 16 software and t-test was done for comparison of two groups and detection of significant differences.

3. Results

Findings show 27.5 percent of diarrhea suffered infants were boy and 72.5 percent were girl. Age mean of infants was 2.41 years old and around 52.9 percent had lower than two years old. Demographic information of samples is presented as table 1. Diarrhea frequency and duration in control and experimental group are presented in tables 2 and 3. In both of parameters, superiority of experimental group was observed. Statistical analysis for diarrhea intensity show t-value: 11.45 with df: 100 and $p<0.001$. Also, Statistical analysis for diarrhea duration shows t-value: 7.17 with df: 100 and $p<0.001$. Comparative statistical description for treatments is presented in table 4.

According to tables 1-4, mean diarrhea frequency after zinc sulfate syrup and ORS was 2.24 time/ day that in comparison with control group (4.17 time/ day) had considerable declines. For treatment period duration, efficiency of treatment with both of zinc sulfate and ORS in comparison with only ORS, it was observed that mean healing period in experimental group was 2 day that was 3.21 day for control group.

Table 1. Demographic information of studied sample

Traits	Gender			Age (*months old)*				
	girl	boy	total	12	13-24	25-36	37-48	total
Number	74	28	102	24	30	30	18	102
Percent	72.5	27.5	100	23.5	29.4	29.4	17.6	100

Table 2. Diarrhea intensity (time/day) in control and experimental group

Group \ Time		2	3	4	6	≥ 6	Total
Control	No.	2	5	32	8	5	52
	%	3.8	9.6	61.5	15.4	9.6	100
Experimental	No.	38	6	6	0	0	50
	%	76	12	12	0	0	100

Table 3. Diarrhea duration (day) in control and experimental group

Group \ Day		1	2	3	≥ 3	Total
Control	No.	3	8	16	25	52
	%	5.8	15.4	30.8	48.1	100
Experimental	No.	12	29	6	3	50
	%	24	58	12	6	100

Table 4. Comparison of diarrhea duration and intensity of groups via *t*-test

Trait	group	mean	S.d	*t*-value	df	significance level
Intensity	control	4.17	0.87	11.45	100	p<0.001
	experimental	2.24	0.82			
Duration	control	3.21	0.91	7.17	100	p<0.001
	experimental	2.00	0.78			

4. Discussion

Findings of present study showed that synchronic application of ORS and zinc sulfate syrup in comparison with only ORS application is more efficient for both treatment parameters (declining of diarrhea frequency and shorting of healing period), qua in control group only 5.8% of infants in first 24 hours and 15.4% in 48 hours of treatment have healing signs, but in experimental group 24% of infants in first 24 hours and 58% of them in 48 hours had healing signs. About diarrhea intensity similar trend was observed; diarrhea frequency was 2 time/day in control group it was 3.8% and in experimental group it was 76%.

Obtained findings were according to past related studies (Sazawal et al., 1997; Dutta et al., 2000). In Sazawal et al. (1997) and Dutta et al. (2000), treatment with zinc sulfate and ORS solution could lower diarrhea intensity and duration and in overall it had healing effect on acute diarrhea in infants. It is concluded, zinc sulfate is a suitable completive treatment for ORS in term of infant's diarrhea treatment.

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Corresponding Author:
Dr. Hakimeh S. Sajjadi
Center of emergency care
Hormozgan University of Medical Sciences,
Ostandari Blvd, Bandar Abbas, Iran.
E-mail: hakimeh.sajjadi@yahoo.com

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