



A randomized clinical trial on the effect of honey in the acute gastroenteritis

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ABSTRACT

Acute gastroenteritis is one of the hygienic challenges of the 21st century and one of the 6 major causes of death in children and adults in developed and developing countries. With respect to prevalence of this illness in Iran, the purpose of this study is to investigate the effectiveness of honey in treating diarrhea in Kashan, Iran. In this randomized clinical trial study, the participants were chosen from the children who were admitted to pediatric clinics. 150 children who met the criteria were divided into 3 groups. After a systematic treatment process and writing down the details, the first group received honey added to ORS (dissolved in ORS), the second group received honey separate from ORS and the control group received ORS with no honey. All the patients were under the close watch of the researchers until complete recovery. Then the data were analyzed with statistical tests and SPSS18 software. In general, among the 150 children who were studied there were 80 boys with the average age of 33.19 months and 70 girls with the average age of 29.84 months. The average diarrhea period from the beginning of treatment until complete recovery was 4.68 days for the first group, 3.725 for the second group and 5.60 for the control group. Thus there was a significant difference between the groups that received honey and the control group ($p=0.001$). The average number of bowel movements from the beginning of treatment until complete recovery was 4.22 for the first group, 3.50 for the second group and 4.90 for the control group. There was a significant difference in this respect ($p<0.001$). Generally, with regard to the findings of this study prescription of honey for diarrhea can reduce the number of bowel movements and diarrhea period. Similar studies could be done about other diseases to further investigate the effectiveness of honey in treating other health problems, not necessarily as a substitute treatment, but a supplementary treatment.

Keywords: Honey, Diarrhea, Gastroenteritis.

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INTRODUCTION

Acute Gastroenteritis in children is known as a disease which characterized by diarrhea with or without vomiting, nausea, abdominal pain and fever [1]. World Health Organization has defined diarrhea as the condition of having at least three loose or liquid bowel movements a day. However the changes in shape and color have been considered more important factors than

frequency of bowel movements. [2] This condition is one of the major causes of death in children below the age of 5 in the United States, and each year it causes approximately 300 deaths, more than 1.5 million outpatient visits to health centers and 200,000 hospitalizations [1]. The first comprehensive study on this subject in Iran was conducted in September 1986, which showed that approximately 34000 children under 5 years old are affected by this condition. Today, it is estimated that 22 million cases of childhood diarrhea happen each year in children under 5 years old, and the number of deaths caused by childhood diarrhea have been decreased to less

than 1500 cases. [3] The main treatment methods that the World Health Organization has recommended for controlling acute gastroenteritis are using rehydration liquid with decreased osmotic concentration and in case of need using intravenous and supplementary fluids. [2]

Although the ORS saline solutions significantly decrease the risk of death caused by diarrhea, they have no effect on the frequency of diarrhea. [4,6] One of the methods that have been emphasized in traditional medicine for treatment of diarrhea is eating honey. [7,9] Honey is one of rich nutrients that contains carbohydrates, enzymes, amino acids, organic acids, minerals, aromatic compounds, pigments and pollen. Honey has an anti-bacterial effect on the intestines bacteria which cause diarrhea, such as *Salmonella*, *Shigella*, *Ecoli*, and *Vibrio Cholerae*. Studies have showed that honey added to ORS solutions, can shorten the period of acute diarrhea in children. It can also control different kind of bacteria and infectious diseases. [10-14] Considering the availability of honey in Iran and different study results about the effectiveness of honey in treating acute diarrhea, this study has been designed with the purpose of measuring the effectiveness of honey in treating diarrhea among children between the ages of 1 to 5 who were admitted to Kashan pediatric clinic.

MATERIALS AND METHODS

Trial design

This intervention (done between December 2015 through February 2016) was designed as a randomized, double-blind clinical trial.

Participants

Children were entered in the our clinical trial study if they were at ages between 1 to 5 years with acute diarrhea referred to the pediatric clinics of Shahid Beheshti Hospital in Kashan (located in Esfahan province), Iran. Documents of these patients were recorded for analysis when the following criteria were fulfilled: gender, age, frequency of diarrhea in the past 24 hours and the duration of diarrhea prior to admission. The children were excluded from the study under following conditions: Fever higher than 38, severe dehydration and bloody diarrhea, severe malnutrition and using antibiotics and anti-diarrhea drug.

Ethics statements

This study was performed according to the Declaration of Helsinki, and informed consent and signature were received from all parents of children before beginning the intervention. The ethical committee of Kashan University of Medical Sciences (KUMS) approved this study. In addition, it is registered in the Iranian website for registration of clinical trials (IRCT2015030911145N14).

Study design

Subjects were then randomly divided into 3 groups including, two treatment groups: ORS solution and 50 cc of Honey per liter (Mahram Company, Iran) separately, 5 cc of Honey in ORS solution and control group with ORS. Daily follow-up process from first day was performed and treatment process was evaluated. The criteria for end of intervention were frequency of bowel movements under 3 times in day or the normal soft stools.

Assessment of outcomes

The frequency of diarrhea and duration of diarrhea in end of study were evaluated.

Sample size

For sample size calculation, we regulated based on type 1 error (alpha) of 0.05 and type 2 error (beta) of 0.20 (power=80%). As suggested by prior reports. Accordingly, 50 cases were required in each group.

Randomization

Randomization as blinding was done using computer-generated random numbers by a trained staff at the clinic.

Statistical methods

All data were analyzed by statistical tests such as T-test, Chi-squared test, Tukey's range test and Variance analysis by using SPSS18 software.

RESULTS

Among 150 children who were enrolled to study, there were 80 male children with the average age of 33.19 months and 70 female children with the average age of 29.84 months. There was a significant difference between the two groups based on sex($p=0.0$).

The average diarrhea period before starting treatment in the groups who received honey added to ORS solutions was 2.76 days, and in the second group that received honey separate from ORS it was 2.28 and in the control group (only ORS) 2.66 days. No significant difference was seen between the groups regarding diarrhea period. ($p=0.63$). Also the frequency of bowel movements in the first group (honey with ORS) was 6.10 times, the second group (honey separate from ORS) 5.72 and the control group 5.66. There wasn't a significant difference among the groups in this respect ($p=0.42$). On the other hand the average diarrhea period from the beginning of treatment until recovery was 4.68 days for the first group, 3.725 for the second group and 5.60 days for the control group. Therefore there was a significant difference between the groups who received honey and the control group ($p=0.001$). The average frequency of bowel movements from the beginning of treatment until recovery was 4.22 for the first group, 3.50 for the second group and 4.90 for the control group, there was a significant difference in this respect as well ($p<0.001$). It is worth mentioning that from the beginning of treatment until complete recovery the average frequency of bowel movements for the boys was 4.29 and for the girls 4.11. Regarding the average diarrhea period from the beginning of treatment until recovery the number of days for the boys was 4.79 and for the girls 4.53.

DISCUSSION

The findings of the present study showed that the groups which received honey showed significant difference with the control group in terms of the period of illness and the frequency of bowel movements and thus it can be said that honey can reduce the illness period and the frequency of bowel movements in patients with diarrhea. Also the results showed there is a significant difference between honey added to ORS and separate from ORS in comparison to the control group. The group that received honey with ORS solutions had a lower frequency of bowel movements compared to control group, however regarding diarrhea period there was not a significant difference

between the two groups. The group that received honey separate from ORS had fewer bowel movements and a shorter diarrhea period compared to control group. Acute gastroenteritis is one of the hygienic challenges of the 21st century and one of the 6 major causes of death in children and adults in developed and developing countries. Each year on average 111 million cases of diarrhea and 2 million related hospitalizations and more than 500,000 related deaths occur in children below 5 years old, 85 percent of such deaths happen in developing Asian and African countries [15].

The ORS solutions are known as the main treatment for dehydration in children who suffer from acute gastroenteritis, using antibiotics is a common treatment for bacterial cases as well. It is important to note that using honey for treatment of stomach ulcers and other gastrointestinal problems was common in ancient Greece and Egypt [16-20]. Also honey is a very common medicine in Islamic traditional medicine. One of the contexts in which honey could be very useful according to physicians is in treating gastrointestinal problems. Its antimicrobial features could be very useful as well [21-28]. In our study the group who received honey added to ORS had fewer bowel movements but the diarrhea period in the two groups showed no significant difference, this contradiction could be explained by the following statement; Adding honey to ORS would decrease bowel movements but does not have any significant effect on the period of diarrhea.

CONCLUSION

Generally, with regard to the previously mentioned results we can conclude that prescribing honey for diarrhea can decrease the number of bowel movements. The results of the study confirm the therapeutic effect of honey in treating gastroenteritis. Similar studies could be done about other diseases to further investigate the effectiveness of honey in treating other health problems not necessarily as a substitute treatment, but a supplementary treatment.

Table 1: Comparison of the duration and frequency of diarrhea

Group	Duration of diarrhea	P value	Frequency of diarrhea	P value
Honey added to ORS	4.68±2.49	0.001	4.22±1.64	
Honey separate from ORS	3.72±2.18		3.5±1.5	0.001
Control	5.6±2.5		4.9±1.64	

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Conflict of Interest

The authors have no conflict of interest to disclose.

Authors' Contribution

Alireza Sharif developed the study concept and design and the acquisition of data, interpretations of data, and drafting of the manuscript. Akram Noorian, Mohammad Reza Sharif, Abbas Taghavi Ardakani, Abolfazl Zahedi and Davood Kheirkhah developed the protocol, analysis of data and drafting of the manuscript.

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