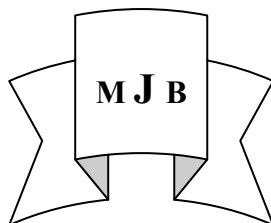


Risk Factors for Development of Dehydration in Children Below Five Years with Acute Diarrhea

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Abstract

Background: Dehydration is the leading cause of death in diarrheal diseases. Poverty, lack of safe water and sanitation, early motherhood, inadequate health care, and lack of breast feeding have been associated with a poor prognosis for diarrhea among young children.

Aim: To identify risk factors for development of dehydration in children below five year old with acute diarrhea.

Patients and method: A case- control study was conducted to determine the risk factors for development of moderate to severe dehydration. A total of 200 children comprising 100 cases (moderate or severe dehydration) and 100 controls (non or mild dehydration) up to 5 years of age suffering from acute diarrhea were studied. Fourteen variables were investigated as risk factors.

Results: By univariate analysis, Infancy, malnutrition, cessation of breast feeding, cessation or reduction of fluid and ORS during diarrheal episode, and no washing of mothers hand before preparation of food, after defecation and after disposal of feces, were identified as significant risk factors for development of moderate to severe dehydration in acute diarrhea.

Conclusion: These findings may be useful for formulating intervention strategies for preventing death due to diarrheal dehydration.

عوامل الاختطار لتنمية الجفاف لدى الأطفال المصابين بالإسهال الحاد دون سن الخامسة من العمر

الخلاصة

الخلفية: الجفاف هو السبب القيادي للموت في أمراض الإسهال، الفقر، قلة الماء وتصريف المجاري الآمن، الأمومة المبكرة، الرعاية الصحية الناقصة، وقلة الرضاعة الطبيعية ارتبطت بتوقع سيء للإسهال لدى صغار الأطفال.

الهدف: لتمييز عوامل الاختطار لتنمية الجفاف في الأطفال المصابين بالإسهال الحاد دون سن الخامسة من العمر.

المرضى وطريقة العمل: أجريت هذه الدراسة لفهم عوامل الاختطار لتنمية الجفاف المعتدل و الشديد. اشتملت الدراسة على 200 طفل يعانون من الإسهال الحاد دون سن الخامسة من العمر 100، منهم لديهم جفاف معتدل أو شديد و 100 طفل اختيروا كمجموعة قياسية ممن لا جفاف لديهم أو لديهم جفاف بسيط. تمت دراسة 14 متغيرا كعوامل اختطار.

النتائج: إن فترة الرضاع، سوء التغذية، انسحاب الرضاعة الطبيعية، التوقف أو تخفيض السوائل ومحلول الامعاء الفموي أثناء فترة الإسهال، عدم غسل اليدين من قبل الأمهات قبل تحضير الغذاء، بعد التغوط وبعد التخلص من الغائط، مُيزت كعوامل اختطار هامة لتنمية الجفاف المعتدل والشديد في الإسهال الحاد.

الاستنتاجات: هذه النتائج قد تكون مفيدة لصياغة إستراتيجيات التدخل لتقليل الوفيات الناتجة عن الجفاف بسبب الإسهال.

Introduction

The term diarrheal disorders is more commonly used to denote infectious diarrhea in public health settings, although several

noninfectious causes of gastrointestinal illness with vomiting and/or diarrhea are well recognized.[1] Every child encounters 2.6diarrheal episodes per year [2,3]. The incidence of intestinal infections in some developing

countries may reach even 6–10 episodes per child annually in children <3 years of age[4,5] Most diarrheal episodes in young children are self-limited. It is estimated that only 2 to 3% of diarrhea will lead to moderate or severe dehydration.[6] Diarrheal diseases are a leading cause of childhood morbidity and mortality, specially in developing countries . About 4 million children, aged less than 5 years, die due to diarrhea annually. Dehydration is still the leading cause of death in diarrheal diseases.[7] Poverty, lack of safe water and sanitation, early motherhood, and inadequate health care have been associated with a poor prognosis for diarrhea among young children.[8] Lack of breast feeding also increases the risk of diarrhea mortality.[9,10] The early identification of children with diarrhea who are at a high risk of becoming dehydrated would allow doctors and health workers in developing countries to treat these children more intensively and to keep them under close, active surveillance. For that this study was done.

Aim: To identify risk factors for development of dehydration in children below five year old with acute diarrhea.

Patients and Method

Hospital based matched case-control study was conducted at Babylon maternity and children teaching hospital in Hilla, Iraq, between June 2008 to March 2009. The study included 100 patients with acute diarrhea having severe or moderate dehydration and 100 controls suffering from acute diarrhea with mild or no dehydration. All Patients were below five years of age. In the current study, we investigate the age, gender, residence, nutritional status, cessation of breast feeding or other feeding during diarrheal episode, fluid intake

during diarrhea, ORS and homemade food intake during diarrhea, washing of hands by mother before preparation of food, after defecation, and after disposal of feces, history of measles in the previous six months, frequency of stools /day, frequency of vomiting/ day and temperature, as risk factors for development of dehydration.

Statistical analysis:

By using computerized SPSS version 12, univariate analysis included OR, 95% CI for OR and Chi-square test was applied to detect the level of significance, where the 5% level was chosen as a level of significance.

Results

Table 1 shows the variables of cases and controls with their corresponding odd ratios. The risk of developing diarrhea with dehydration was greater in patients below one year of life. Gender and residence were not associated with the risk of dehydration. The current study identified the significance of malnutrition, cessation of breast feeding, cessation or reduction of fluid and ORS during diarrheal episode, no hand washing by mothers before preparation of food, after defecation and after disposal of feces, and low grade fever, in the outcome of development of moderate or severe dehydration. Other investigated variables were of no significance including: cessation of other feeding with no introduction of homemade food during diarrheal episode, history of measles in the previous six months, frequency of stool and vomiting/ day, and moderate to high grade fever.

Discussion: These results suggest that infancy is a risk factor for diarrhea with dehydration, where the diarrhea and its complications are more at this age group.[2] This is similar to other studies done in India and Brazil.[11-13] Malnutrition is associated with an

increased risk of death from diarrhea and the risk varies by type of diarrhea and dehydration. All of the community-based studies reported an increased risk of mortality from diarrhea among children who had low weight for their age.[14,15] In the current study, malnutrition proved to be a significant risk factor for dehydration, as in other studies.[11-13] Poverty, lack of safe water and sanitation, early motherhood, and inadequate health care have been associated with a poor prognosis for diarrhea among young children.[16] No hand washing by mothers before preparation of food, after defecation and after disposal of feces, is a risk factor for dehydration, which goes with other similar case-controlled studies.[11,12] Lack of breast feeding increases the risk of diarrhea mortality.[17] In an earlier Brazilian study completely weaned infants had 14.2 times the risk of death from diarrhea compared with breast fed infants.[18] This protection can be explained by the anti-infective properties of breast milk, lower exposure to contaminated food and water, and improved nutritional status.[19,20] Significant risk was detected in this study for cessation of breast feeding during diarrheal episode, which goes with other

studies.[11-13,21-23] This is also true for cessation or reduction of fluid and ORS during diarrheal episode, and in consistence with the above mentioned studies.[11-13] The gender had no significant risk for moderate to severe dehydration, which is in consistence with other study conducted in Porto Alegre, Brazil.[13] Other variables in the current study proved to have no risk including the residence, cessation or reduction of fluid and other feeding with no introduction of homemade food during diarrheal episode, history of measles in the previous six months, frequency of purging and vomiting, and moderate to high grade fever. These results differ from other studies where they appeared to have high risk.[11,12,23]

Conclusion and Recommendation

1- The risk factors for development of moderate to severe dehydration in acute diarrhea are, Infancy, malnutrition, cessation of breast feeding, cessation or reduction of fluid and ORS during diarrheal episode, and no washing of mothers hand before preparation of food, after defecation and after disposal of feces

2- We recommend that, these findings may be useful for formulating intervention strategies for preventing death due to dehydration.

Table 1 Risk factors for development of moderate-sever dehydration in children below five years with acute diarrhea

Variables	Moderate-Severe Dehydration	Mild or No Dehydration	Odds ratio (95% confidence interval)	P
< 1 year Age ➤ > 1 year ➤	69 31	43 57	2.95 (1.65 to 5.26) 0.33 (0.18 to 0.60)	< 0.001
Gender Male Female	55 45	65 35	0.65 (0.37 to 1.16) 1.51 (0.85 to 2.68)	> 0.05
Residence Rural Urban	38 62	30 70	1.43 (0.79 to 2.57) 0.69 (0.38 to 1.25)	> 0.05
Malnutrition	38	19	2.61 (1.37 to 4.96)	< 0.01
Cessation of Breast feeding during diarrheal episode	51	27	2.81 (1.55 to 5.07)	< 0.001
Cessation of other feeding during diarrheal episode	68	55	1.73 (0.97 to 3.09)	> 0.05
Cessation or reduction of Fluid during diarrheal episode	81	38	6.95 (3.65 to 13.22)	< 0.0001
No ORS during diarrheal episode	30	77	0.12 (0.06 to 0.24)	< 0.0001
No Homemade food during diarrheal episode	71	65	1.31 (0.72 to 2.39)	> 0.05
No hand washing by mothers before preparation of food, after defecation and after disposal of feces	41	19	2.96 (1.56 to 5.61)	< 0.001
History of measles in the previous six months	2	3	0.65 (0.10 to 4.03)	> 0.05
Frequency of stools/ day 1-3 4-7 ≥ 8	14 41 45	15 53 32	0.92 (0.41 to 2.02) 0.61 (0.35 to 1.07) 1.73 (0.97 to 3.09)	> 0.05 > 0.05 > 0.05
Frequency of vomiting/ day 1-3 4-7 ≥ 8	60 31 9	65 20 15	0.80 (0.45 to 1.43) 1.79 (0.94 to 3.43) 0.56 (0.23 to 1.34)	> 0.05 > 0.05 > 0.05
Temperature ≤ 37.5 C 37.5-38.4 C 38.5-39.4 C ≥ 39.5 C	50 42 6 2	66 25 7 2	0.51 (0.29 to 0.91) 2.17 (1.18 to 3.96) 0.84 (0.27 to 2.61) 1 (0.13 to 7.24)	< 0.05 < 0.01 > 0.05 > 0.05

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