

Gastroenteritis in the Eastern Province : A survey of hospitalised children

Epidemiology and Aetiology

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SUMMARY

The hospital records of 1618 children admitted with the clinical diagnosis of gastroenteritis in five major hospitals in the Eastern Province of Saudi Arabia were reviewed. Gastroenteritis accounted for 19.2% of all paediatric admissions. 89% of the patients were less than two years of age. The male to female ratio was 1.45 : 1. 91.5% were Saudi children. 53% of the cases were admitted during the winter months compared to 35.6% admitted during the summer. The average hospital stay was 4.1 days.

A bacterial pathogen was found in 7% and *Giardia lamblia* in 0.8% of the 249 stool specimens examined.

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INTRODUCTION

Gastroenteritis is a known cause of morbidity in both developing and developed countries. However, whereas the mortality rate in developed countries has decreased, the disease remains a major cause of death in developing countries. In the latter, poor sanitation and malnutrition, geographical, socioeconomic, racial and regional factors were found to contribute to the high mortality rate from gastroenteritis¹.

Non bacterial causes of gastroenteritis are the most common, accounting for 65%—85% of cases in children². The most important pathogens are viruses; of these, rotaviruses cause the majority of cases³.

The scarcity of published data on gastroenteritis in children in Saudi Arabia has prompted this retrospective survey with the following objectives : to collect baseline data, to stimulate

further research on the subject, and to suggest means and ways to improve the health care of our children. With the realisation of the limitations pertaining to retrospective surveys in general, only the epidemiological and aetiological findings of this survey are presented in this paper. Clinical aspects will be published in another report.

PATIENTS AND METHODS

The medical records of 1618 children admitted with gastroenteritis to the Paediatric wards of five main hospitals in the Eastern Province of Saudi Arabia were reviewed. Three of these five hospitals are run by the Ministry of Health: namely, Dammam Central Hospital in Dammam, Qatif Hospital in Qatif and Hofuf General Hospital in Al-Hasa. Of the remaining two hospitals one is private—Dr. Fakhry Hospital in Al-Khobar; the fifth hospital is run by King Faisal University the Al-Khobar Teaching Hospital.

The Ministry of Health hospitals provide free medical care to Saudis as well as non-Saudi government employees. They are the main health facilities not only for the cities where they are located, but also for the surrounding villages. The major population attending these three Ministry of Health hospitals are of low socio-economic status. Dr. Fakhry' Hospital, on the other hand, being a private hospital, serves mainly patients of a higher socio-economic status and employees of companies whose hospital fees are paid by their sponsors. Al-Khobar Teaching Hospital is basically a referral hospital, except for patients who are brought to the Emergency Department. It also provides free medical care and is available for referral of patients from any location in the Kingdom.

Al-Khobar Teaching Hospital is fairly new, being operational since May 1981 (Rajab 1401). Hence the period covered by this study extended from May 1981 to January 1982 (Rabi I 1402). Each record was studied for age, sex, nationality, domicile of child, date of admission and duration of hospital stay. Stool culture results and stool examination for ova and parasites were obtained from the records of only two hospitals where these investigations were routinely performed. Data on feeding practices, socio-economic status and

sanitation were not available in most of the records.

RESULTS

Epidemiological Pattern :

Age distribution : The 1619 children studied were between 2 weeks and 12 years of age : 1443 (89%) were less than two years of age and 1186 (73.2%) were less than 1 year of age.

Sex distribution : The male to female ratio was 1.45 : 1. (Table 1).

Nationality : The percentage of Non-Saudi children varied from hospital to hospital (Table 2).

TABLE 1. Sex distribution of children admitted to Hospital with acute gastroenteritis :
AKTH : Al-Khobar Teaching Hospital
F. H. : Fakhry's Hospital

Hospitals	Males	Females	Male-Female Ratio
AKTH	21	24	0,8:1
F. H.	121	82	1,5:1
QATIF	175	110	1,6:1
DAMMAM	230	165	1,3:1
HOFUF	413	277	1,5:1
TOTAL	960	658	1,5:1

TABLE 2. Numbers of Saudi vs non-Saudi children admitted to the five hospitals with acute gastroenteritis.

Hospitals	Total	Saudi	Non-Saudis	% Of Non-Saudis
AKTH	45	39	6	13.3%
F. H.	203	149	54	26.6%
QATIF	285	272	13	4.6
DAMMAM	395	337	58	14.7
HOFUF	690	685	5	0.7%
TOTAL	1618	1482	136	8.4%

TABLE 3. Hospital distribution of non-Saudi children by nationality

Nationality	AKTH	Fakhry	Dammam	Qatif	Hofuf	Total	% Relative to total non-Saudi
EGYPTIAN	1	25	12	4	2	44	32.6
YAMANI	2	6	28	—	2	38	27.9
PAKISTANI	1	8	4	—	—	13	9.6
INDIAN	1	7	3	—	—	11	8
PALESTINIAN	—	—	1	—	—	1	0.7
JORDANIAN	—	2	6	4	—	12	8.8
LEBANESE	—	2	—	2	—	4	2.9
SUDANESE	—	1	2	3	—	6	4.4
AMERICAN	1	—	—	—	—	1	0.7
SYRIAN	—	2	1	—	1	4	2.9
SOMALIAN	—	—	1	—	—	1	0.7
BRITISH	—	1	—	—	—	1	0.7
TOTAL	6	54	58	13	5	136	
% OF TOTAL NON-SAUDI	4.4	39.7	42.6	9.6	3.7		

Of the 1618 cases, non-Saudi were only 136 (8.4%). Table 3 shows the details of the distribution of cases in the five hospitals nationality-wise.

Seasonal incidence: The incidence of admission in the five hospitals was similar month by month. However, a higher incidence of admission (53%) was found during the months of October, November, December and January (the cold season) compared to 35.6% during the months of June, July, August and September (the hot season).

Duration of hospitalisation: The duration of hospital stay ranged from 2 to 15 days. When all the cases are considered, the average period of hospitalisation was 4.1 days.

Hospital admission rate: 8412 children were admitted to the five hospitals from May 1981 to January 1982. The 1618 children admitted with acute gastroenteritis during this period, therefore, accounted for 19.2% of the total admission to the paediatric wards.

Aetiology: The search for aetiological agents was not done in all five hospitals. In some a rectal swab was done systematically to "rule out" cholera; in others it was not done at all. In two hospitals stool culture for pathogens, with the exception of *E. Coli*, and stool examination for ova and parasites were carried out as a routine. Of 249 specimens cultured and examined for parasites, 18 cases (7.2%) were positive: 14 were salmonella, 2 were shigella and 2 were vibrio cholerae. Two specimens only were positive for *Giardia Lamblia* and no entamoeba organisms were reported. Viral serology or cultures were not available in any of the hospitals. Fungal studies were not reported.

DISCUSSION

The high incidence of gastroenteritis in infants less than one year of age (73%) and the greater male to female ratio, 1.45 to 1, are comparable to the observations of Middleton⁴, and Miglani⁵. A

low incidence (8.5%) of gastroenteritis in non-Saudi children may be a reflection of population composition rather than predisposition; most of the non-Saudis residing in the Kingdom are unaccompanied by their families. On the other hand, it is probable that many of the non-Saudi children living in the Kingdom do not, for various reasons including socio-economic factors, report to the above hospital in the case of illness. In this study seasonal incidence, characterised by a higher number of cases occurring in the cool season of the year (53%) than during the hot season (35.6%), was found; this seasonal pattern is different from that of most developing countries where gastroenteritis is generally known to be more frequent during the hot summer months. However, this pattern is similar to that of some developing countries (Costa Rica) and most developed countries such as U. S. A., England, Australia⁴. The average duration of hospital stay (4.1 days) is similar to that reported by Rodriguez⁷.

Acute gastroenteritis accounted for 19.2% of all paediatric admissions during the nine months period covered by this study. This figure is slightly higher than that reported by Soriano from the USA (16%). This difference may be explained by the better sanitary conditions and the well established child health care system prevailing in developed countries.

The present findings show that the aetiology of acute gastroenteritis was identified in only a small percentage of cases (7%). This is significantly lower than most other reports. In two fairly recent publications from Saudi Arabia, bacterial pathogens were detected in 9%⁷ and 20%⁸ of diarrhoeal patients. Nategh et al⁹ reported that

35 out of 273 diarrhoeal cases were positive for bacteria (12.8%).

In Canada, a bacterial pathogen was reported in 25% of patients with diarrhoea². The low isolation rate of bacterial pathogens reported in this paper may suggest prior use of antibiotics, or suboptimal specimen processing and culture techniques, or a predominance of viral causes. Al-Nakib and associates¹⁰ detected rotavirus in the stools of 42 out of 274 infants with gastroenteritis (15.3%). They have also reported the highest virus excretion rates (76.1%) in specimens collected during the autumn and early winter months, which coincided with the annual gastroenteritis season in Kuwait. These findings would suggest that the similarly high incidence of gastroenteritis reported in the Eastern province of Saudi Arabia in winter is caused by some virus. On the other hand, Nategh et al⁹ found that the seasonal distribution of viruses of diarrhoeal infants showed a high rate of infection during summer and winter. Nevertheless, most of the cases of acute gastroenteritis are considered to be of viral origin as shown by many investigators.

Of interest is the finding of two cases of cholera during the month of November in children aged 15 months and 11 years suggesting that sporadic cases are always possible and worth looking for in the stools of patients with gastroenteritis.

Further studies are needed to assess, *E. Coli* pathogenicity, toxin production and invasiveness as well as the role of viruses and fungi as causes of gastroenteritis in Saudi Arabia. A community based, prospective approach, is needed to evaluate many other epidemiological factors involved in acute gastroenteritis.

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