CAMPYLOBACTER ENTERITIS IN GHANA

By

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Summary

An investigation was carried out over a period of one year on the isolation of Campylobacter jejuni from children with and without diarrhoea in an urban and a rural area in Ghana. From a total of 836 stool specimens examined over this period, the isolation rate of C. Jejuni was 6.6% (30/455) and 12.8% (36/281) from the urban and rural areas respectively. The incidence for the control group was 4% (4/100). C. Jejuni was found to be rather prevalent in children aged between 7-12 months. There appears to be no relationship between the rain-fall pattern and the incidence of C. jejuni infection during the period of this study.

Key Words: Campylobacter Enteritis, Ghana

Introduction

Since the development of selective media for the culture of *Campylobacter jejuni*[1], this agent has been recognised as a common cause of diarrhoea throughtout the world and is the most frequently reported bacterial agent of enteritis in parts of Europe and North America. Enteric infection with this organism is particularly prevalent in children[2,3], among whom it appears to rank as the third most common cause of acute diarrhoea, after rotavirus and enterotoxigenic *Escherichia coli*[4,5], in developing countries.[6-9] A significant proportion of children living in these areas are also asymptomatic carriers of *C. jejuni*.[6,7,9]

As far as we know, there are no published report on the role of *Campylobacter* species in gastrointestinal diseases in children in Ghana. Earlier investigations of the aetiology of bacterial diarrhoeal diseases were limited to such enteropathogens as enteropathogenic *E. coli*, *salmonella* species and *shigella* species.[10-13] This paper reports on the incidence of *C. jejuni* from diarrhoeal and non-diarrhoeal paediatric patients in an urban and a rural area in Ghana.

Materials and Methods

Stool specimens were obtained from 736 children, aged 0 to 5 years, with diarrhoea attending Labadi Polyclinic, a clinic in Accra and Gomoa Fetteh Health Centre (a rural health centre, about 30km west of Accra); Stool samples were also collected from a control group of 100 children without diarrhoea. After defaecating, stool samples were collected and immediately innoculated into Cary-Blair transport medium and transported to the laboratory. All the specimens were examined for *Campylobacter, Vibrio, Salmonella, Shigella, Yersinia enterocolitica,* enteropathogenic *E. coli* and enterotoxigenic *E. coli* using methods recommended by WHO[14] and those reported by Takeda *et al* [15] and Honda *et al*[16].

For the isolation of *Campylobacter jejuni,* the skirrow selective medium was used. This consisted of Oxoid Blood Agar Base No.2, 5% defibrinated horse, sheep or rabbit blood and the following concentrations of antimicrobial agents per litre: 10mg of vancomycin, 5mg of trimethoprim and 500 IU of polymyxin B2. After the inoculation of the stool specimens onto this medium, all the plates were incubated for 48 hours at 42 °C under microaerophilic condition using either the BBL gas generating kit or a candle jar. *C jejuni* strains were identified using their characteristic odour and such features as non-haemolytic, greyish flat, wet glossy colonies with tendency to spread along the track of the inoculating loop. These organisms were also oxidase positive,

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catalase positive, and failed to grow on MacConkey agar under aerobic and microaerophilic conditions at 37 °C and 42 °C for 48 hours, thus ruling out *Pseudomonas* species.

From January 1986 to December 1986, 836 faecal specimens were examined: 455 from the urban community and 281 from rural Ghana.

Results

The isolation rate from a control group of 100 children who were apparently healthy was 4% (4/100). The isolation rate of *C. Jejuni* from the two communities is shown in Table 1; Table 2 shows the age distribution of all the patients with *Campylobacter* enteritis from the urban and rural areas of Ghana. Figure 1 shows the rainfall pattern in relation to the incidence of *C. jejuni* infection during the period of the investigation.

Table 1

Isolation of *Campylobacter jejuni* from Urban and Rural Health Centres in Ghana

Subjects	No. of Samples Examined	No. Positive for *C. jejuni*
Males	254	15 (5.9%)
Females	201	15 (7.5%)
Total	455	30 (6.6%)

Labadi Health Centre (Urban)

Subjects	No. of Samples Examined	No. Positive for C. jejuni
Males	153	15 (9.8%)
Females	128	21 (16.4%)
Total	281	36 (12.8%)

Gomoah-Fetteh Health Centre (Rural)

Table 2

Age and Sex Distribution of Patients with Campylobacter

Age (Months)	Male	%	Female	%	All Sexes	%
0 - 6	1/63	1.6	3/49	6.1	4/112	3.5
7 -12	11/96	11.5	8/68	11.8	19/164	11.5
13 -18	1/50	2.0	1/50	2.0	2/100	2.0
19 -24	2/32	6.3	3/27	11.1	5/59	8.5
25 -30	0/4	-	0/1	-	0/5	-
31 -36	0/2	-	0	-	0/2	-
36	0/7	-	0/6	-	0/13	-
Total	15/254	5.9	15/201	7.5	30/455	6.6

Labadi Health Centre (Urban)

Age (Months)	Male	%	Female	%	All Sexes	%
0 -6	3/27	11.1	2/26	7.7	5/53	9.4
7 -12	8/40	7.5	14/47	24.8	22/80	19.5
13 -18	1/27	3.7	2/10	20.0	3/37	8.1
19 -24	1/24	4.2	1/28	3.6	2/52	3.8
25 -30	1/11	9.1	0/10	-	1/21	4.7
31 -36	1/14	7.1	1/2	50.0	2/16	12.5
36	0/10	-	1/5	20.0	1/15	6.6
Total	15/153	9.8	21/128	16.4	36/281	12.8

Gomoa-Fetteh Health Centre (Rural)

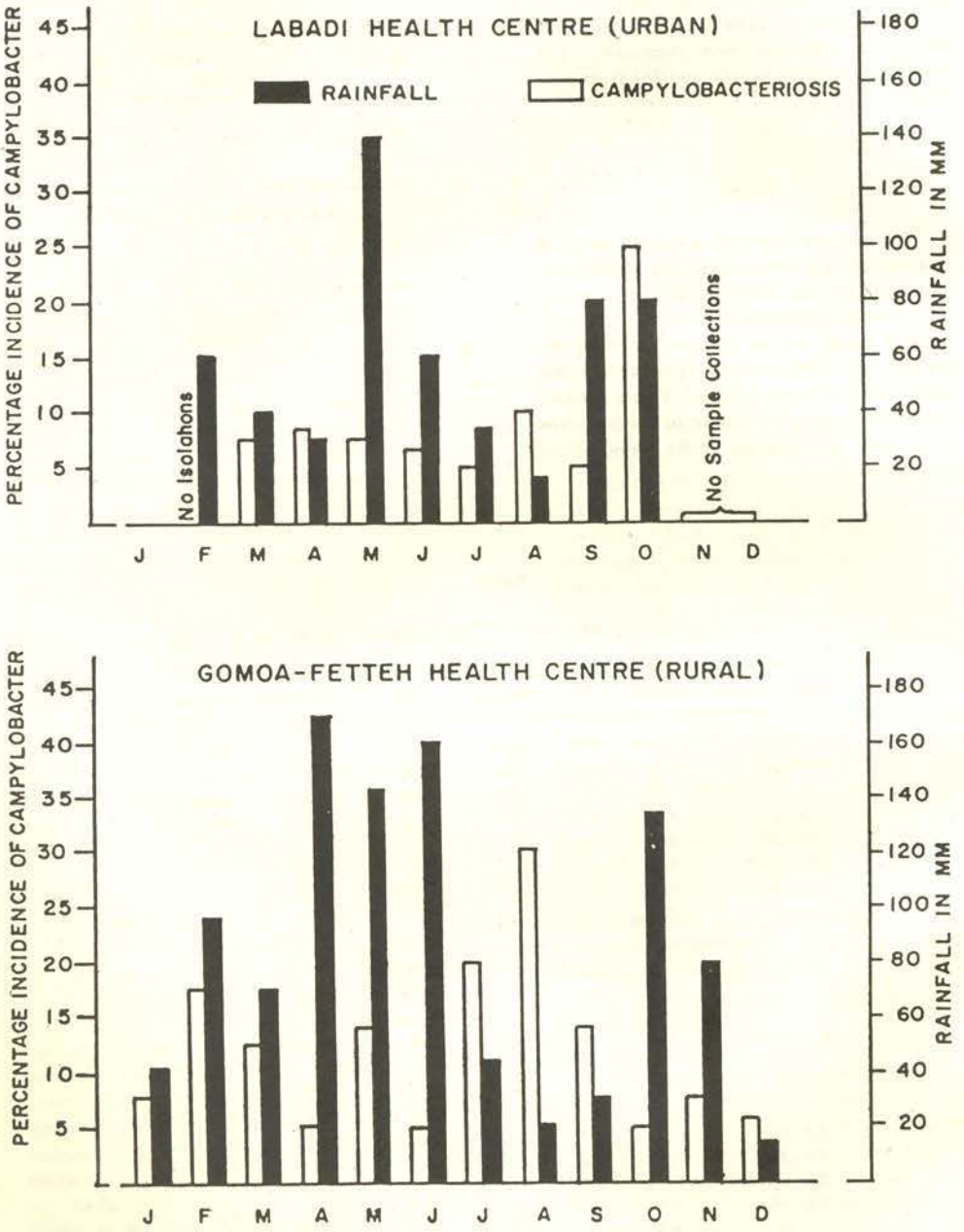

Fig. 1. Incidence of Campylobacter Infection in relation to Rainfall

Discussion

Campylobacter enteritis is one of the most common forms of acute infective diarrhoea worldwide. Studies carried out in some African countries on *Campylobacter* enteritis showed an isolation rate of 0.6% to 14.3% from children with diarrhoea and 0% to 4.2% from children without diarrhoea.[17,18] The overall isolation rate of 8.9% and 4.0% of *C. jejuni* from diarrhoeal (Table 1) and apparently healthy children in this study confirms the results obtained from similar studies in other developing tropical countries, and goes also to prove the presence of *C. jejuni* in both urban and rural areas of Ghana.

The isolation rate of *C. jejuni* from the rural area is significantly higher than from the urban community. This difference in the isolation rate could be attributed to lack of potable water in the rural community, poor standard of hygiene, abundance of flies and close contact of the human population in the rural area with domestic animals. *C. Jejuni* was not isolated from children above 24 months of age in the urban areas whereas it was isolated from children older than three years in the rural community (Table 2). This observation is in agreement with Blasser's inference that in areas of developing countries where hygiene is poor, the vast majority of *Campylobacter* infections occur in the first five years of life, but especially in the first two.[19] Of the total number of isolates, 7.4% (30/407) and 10.9% (36/329) were from males and females respectively. This shows no significant difference with regard to the incidence of *Campylobacter* infection in males and females. This finding agrees with the observation of Blaser *et al* [19] that males are likely to harbour *C. jejuni*, but the isolation rates are approximately the same for males and females. It, however, contrasts with reports from Nigeria[18] and Saudi Arabia[20] where the incidence of *C. jejuni* infection was found to be higher in males than in females. It is interesting to note that two of the isolates were from children aged 3 and 6 weeks respectively from the rural area.

There appears to be no relationship between the rainfall pattern and the incidence of *C. jejuni* infection in this study. Studies in England, Belgium, the United States and South Africa, for example, have shown a summer peak of *Campylobacter* infection.[21-23]

In Zaire, where the mean temperatures are constant throughout the year, isolation of Campylobacter from patients with diarrhoea was much more frequent in the wet than in the dry season.

This study has shown that *C. jejuni* is an an important cause of diarrhoea in children in Ghana. Most of the strains isolated were biotype 2. It is therefore recommended that *C. jejuni* be added to the list of bacterial enteropathogens, and be looked for routinely in microbiology laboratories in Ghana.

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