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Campylobacter jejuni as a bacterial cause of diarrhoea in Ile-Ife, Nigeria

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SUMMARY

A total of 495 diarrhoea and non-diarrhoea patients whose ages ranged between 5 and 39 years were examined for the presence of *Campylobacter jejuni*, *Salmonella* and *Shigella* species. About 12% of the specimens from diarrhoea patients were positive for *Campylobacter jejuni* compared with 6% and 10% for *Salmonella* and *Shigella* species. In contrast 2%, 0% and 1% of the samples from non-diarrhoea patients were positive for *Campylobacter jejuni*, *Salmonella* and *Shigella* species respectively.

Most (62%) of the *Campylobacter jejuni* from diarrhoea patients were isolated from children under the age of 10 years. This compared with 26% and 37% for *Salmonella* and *Shigella* species in this age group. The frequency of isolation of *Campylobacter jejuni* in diarrhoea patients was highest during the dry months of the year. This study demonstrates the importance of *Campylobacter jejuni* as a major bacterial cause of diarrhoea in this part of the world.

INTRODUCTION

Campylobacter jejuni was discovered by Jones *et al.* in 1931. Since then it has been associated with human enteritis by King (1962) and it is currently a confirmed important bacterial cause of diarrhoea in some parts of the world (Dekeyser *et al.* 1972; Steele & McDermott, 1978; Linquest, 1979; Pai *et al.* 1979 and Butzler, 1973). Data as to its presence and implications in diarrhoea in Nigeria is lacking. This investigation therefore was carried out to determine the prevalence of *Campylobacter jejuni* in diarrhoea cases and to compare its prevalence with the commonly implicated enteritic pathogens like *Salmonella* and *Shigella* species. The results obtained have demonstrated that *Campylobacter jejuni* is a major cause of diarrhoea in Nigeria.

MATERIALS AND METHODS

Stool samples were obtained from 412 patients with diarrhoea whose ages ranged between 5 and 39 years and 83 patients without diarrhoea of the same ages with sickle cell crisis, hypertension, diabetics and renal disease among others. All the samples were collected between February and December, 1982, from the Ife University Teaching Hospitals Complex, Ile-Ife. About 45% of the samples from patients with diarrhoea were examined during the dry season when temperatures

Table 1. *Prevalence of different isolates*

Total screened	Positive for *Campylobacter jejuni*		Positive for *Salmonella* spp.		Positive for *Shigella* spp.	
	No.	%	No.	%	No.	%
Patients with diarrhoea, 412	51	12·37	23	5·58	43	10·19
Patients without diarrhoea, 83	2	2·40	0	0	1	1·20

reached up to 33 °C; the remaining samples were examined during the wet season. All samples from patients without diarrhoea were examined during the dry season. Samples were specifically examined for the presence of *Campylobacter jejuni*, *Salmonella* and *Shigella* species within 2 h of collection. *Escherichia coli*, which is not pathogenic to the age group screened, was not sought.

Screening for Campylobacter jejuni

Samples were plated on Columbia blood agar base supplemented with 5 % lysed sheep blood and the following antimicrobial agents: vancomycin, 10 mg/l; polymyxin, 2500 i.u./l; and trimethoprim, 5 mg/l as described in the Oxoid Manual (1979). The inoculated plates were incubated at 42 °C for 48 h under reduced oxygen tension. Identification of the organism was based on the method described by Smibert (1975). Essentially the procedures included determination of motility and Gram staining property, production of H_2S, oxidase and catalase; ability to grow at 25 °C, 37 °C, 42 °C and in the presence of 3·5 % and 6·5 % NaCl.

Screening for Salmonella *and* Shigella *species*

For the presence of these organisms, the samples were cultured on selenite 'F' broth (SF) and salmonella–shigella agar (SS). These were incubated at 37 °C for 24 h aerobically. The SF was subcultured on SS agar and incubated for another 24 h at 37 °C aerobically. All the suspected salmonella and shigella organisms were identified by standard methods (Lennette *et al.* 1974).

RESULTS

Fifty-three (10·7 %) of the samples examined had Gram-negative curved rods which were motile, oxidase and catalase positive. They grew at 37 °C and 42 °C but not at 25 °C. They did not grow in the presence of 3·5 % and 6·5 % NaCl but produced H_2S in triple sugar iron slope. These organisms were therefore identified as *Campylobacter jejuni* (Smibert, 1975).

Fifty-one (12·37 %) of the 412 samples from diarrhoea patients had *Campylobacter jejuni*. In comparison 23 (5·58 %) and 43 (10·19 %) of the samples had *Salmonella* and *Shigella* species respectively. In the 83 patients without diarrhoea two (2·40 %) were positive for *Campylobacter jejuni*, none (0 %) for *Salmonella* species and one (1·20 %) for *Shigella* species (Table 1).

Table 2. *Age prevalence of the different isolates*

Age group yrs	No. examined	Positive for *Campylobacter jejuni*	Positive for *Salmonella* spp.	Positive for *Shigella* spp.
5–9	120 (30)	32 (1)	6 (0)	16 (0)
10–19	104 (22)	10 (1)	7 (0)	12 (1)
20–29	97 (16)	7 (0)	5 (0)	9 (0)
30–39	91 (14)	2 (0)	5 (0)	6 (0)

Data in brackets are those for patients without diarrhoea.

Table 3. *Seasonal pattern of the isolates from diarrhoea patients*

	Dry season			Wet season		
Types of organism	No. examined	No. positive	Per cent	No. examined	No. positive	Per cent
Campylobacter jejuni	184	29	15·76	228	22	9·65
Salmonella spp.	184	13	7·06	228	10	4·39
Shigella spp.	184	22	11·96	228	20	8·77

All the samples from patients without diarrhoea were examined in the dry season.

Age prevalence of the isolates

More than 62 % of the *Campylobacter jejuni* isolates were from diarrhoea patients aged 5–10 years old. This compares with only 26 % for *Salmonella* and 37 % for *Shigella* species from the same age group (Table 2).

Seasonal pattern of the different isolates

Each of the three organisms were found to be more prevalent in the dry season than wet season among diarrhoea patients (Table 3).

DISCUSSION

A prevalence of 12·4 % *Campylobacter jejuni* compared with 5·6 % for *Salmonella* species and 10·2 % for *Shigella* species in diarrhoea patients, which agreed with the result of similar studies in Sweden (Svedham & Kaijser, 1980), is of considerable diagnostic and epidemiological significance. The rather striking similarity in this study with the Bangladesh data (Blazer *et al.* 1980) may be explained by the fact that Nigeria and Bangladesh share the same biome.

The isolation of the organism in 2·4 % of patients without diarrhoea is equally noteworthy and may underscore the relative importance of the agent in our environment, where hitherto it is not considered in clinical management of diarrhoea or any other disease.

The higher prevalence of *Campylobacter jejuni* in the drier months is probably attributable to lack of adequate bacteriologically satisfactory water supply at these times and perhaps equally on the optimal growth requirements of the organism, which is favoured by higher warm weather conditions. The overall poor

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hygienic condition of the affected people, mainly of a low socio-economic group, may equally and additionally account for the higher prevalence.

The result which appears to indicate that there is a decline in the prevalence of *Campylobacter jejuni* with increase in age of the patient with diarrhoea is interesting. It is clear that this organism is particularly important in infantile diarrhoea.

Our investigation showing *Campylobacter jejuni* as a possible major bacterial cause of diarrhoea is significant especially since the organism has never been and is not presently being considered in the diagnostic and clinical management of these diseases in Nigeria.

The need, therefore, for clinicians and diagnostic laboratories to think of and look for *Campylobacter jejuni* in patients with diarrhoea, especially in infants, cannot be over-emphasized.

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