

THE ROLE OF DOMESTIC CHICKENS IN HUMAN CAMPYLOBACTERIOSIS IN NIGERIA

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Abstract

Campylobacteriosis is the leading cause of acute gastroenteritis in man and animals throughout the world. Epidemiological studies has shown that *Campylobacter* species are widely spread within the animal kingdom both as pathogens and commensals. Avian species are well documented reservoirs for *Campylobacter*, and may play an important role in the epidemiology of human enteric diseases either directly or indirectly through contamination of food items. The paper discusses the role of the domestic chicken in the epidemiology of human campylobacteriosis.

Introduction

Bacteria of the genus *Campylobacter* are of world-wide importance in human and animal diseases. It has been estimated that about 3000 cases per month are reported in the United Kingdom (Skirrow, 1987, Healing, Greenwood & Pearson, 1992). It is estimated to be responsible for 7 per cent of all cases of gastroenteritis in Great Britain (Porter & Duguid, 1989). Various studies have shown that *Campylobacter jejuni* is one of the most common causes of acute gastrointestinal infection in humans, even exceeding rates of illness caused by both *Salmonella* and *Shigella* (Lior, 1994). In addition to *C. jejuni*, the closely-related species *C. coli* and *C. laridis* have also been implicated as agents of gastroenteritis in humans (Coker & Adefeso, 1994).

C. coli represented only approximately 3 per cent of the *Campylobacter* isolates obtained from patients with *C. enteritis* (Griffiths & Parks, 1990).

C. jejuni has been isolated from cases of bacteremia, appendicitis, and recently, has been associated with Guillian-Barré syndrome (Allos & Blaser, 1994; Vonwulffen, Hartard & Scharein, 1994; Phillips, 1995). From 50 to 70 per cent of human cases of campylo-bacteriosis are linked to poultry (Bryan & Doyle, 1995), from which *C. jejuni* is frequently isolated, whereas *C. coli* is mainly isolated from pork (Lammerding *et al.*, 1988).

Epidemiological studies have shown that

Campylobacter species are widely spread within the animal kingdom both as pathogens and as commensals (Simbert, 1978). The rate of isolation of *Campylobacter* from the various animals species have been variable (Shane & Montrose, 1985), although the reported frequency of isolation of *Campylobacter* species from diarrhoeic and apparently healthy animals has not been found to be significantly different (Manser & Dalziel, 1985).

Reservoir of Human Campylobacteriosis

Domestic chickens and wild animals are reservoirs for *Campylobacter* (Kapperud & Rosef, 1983), and may play an important role in the epidemiology of human enteric diseases either directly or indirectly through foodstuffs, water, dust, or other environmental sources (Skirrow, 1991).

Several food-borne outbreaks of *Campylobacter* enteritis caused by *C. jejuni* have been associated with ingestion of raw milk, uncooked chicken and pork (Doyle, 1981). A report of point outbreak of *C. jejuni* enteritis affecting 11 children was known to have been pecked by magpies (Riordan, Humphrey & Foweles, 1993).

Cabrita *et al.* (1992) reported the incidence of *C. jejuni* and *C. coli* in 188 wild and 681 food-producing animals in Portugal. The study was carried out to determine the importance of animals as potential reservoirs of *Campylobacter* infection. The organisms were isolated from 59 chick-

ens (60.2 %), 61 sparrows (45.5 %) and 21 ducks (40.5%).

Another study, conducted in the city of Barcelona in Spain, reported the isolation of *C. jejuni* from 105 (26.2%) pigeons with a greater incidence in the district of the city with high density of pigeons. In that study, *Salmonella* spp. was isolated from six pigeons (1.5 %) and *Yersinia* spp. from only one pigeon (Casanovas *et al.*, 1995).

Oosteron *et al.* (1985) carried out an epidemiological investigation in the Netherlands over the years 1983-1985 which indicated that poultry and poultry products were the major sources of human campylobacteriosis while pigs were also involved.

Campylobacter spp. are part of the natural intestinal flora of many wild and domestic birds. Hence, contamination of meat during slaughter and water sources are probably the most common sources of this food-borne infection (Franco, 1988; Butzler & Oosterom, 1991; Park, Griffith & Moren, 1991).

Human campylobacteriosis caused by *C. jejuni* and *C. coli* manifests by intestinal syndrome. The pathological consequences in the humans are unpleasantness with acute abdominal pain, followed by profuse inflammatory diarrhoea usually seen in children, and a non-inflammatory watery diarrhoea commonly observed in adults (Karl *et al.*, 1997).

The role of avian species in human campylobacteriosis in Nigeria

The majority of *Campylobacter* infections in developing countries are apparently sporadic, but they occur constantly (Cover & Blaser, 1989; Griffiths & Park, 1990). In Nigeria, campylobacteriosis has been reported from various parts of the country. Its importance in causing economic losses is poorly defined due to poor disease reporting and surveillance system (Raji, Kwaga & Bale, 1997).

Gastroenteritis due to the *C. jejuni* was first reported in the northern part of Nigeria in 1981 (Lawande & Hall, 1981) and, subsequently, in the

southern part of the country in Ile-Ife in 1983 (Olusanyo, Adebayo & Williams, 1983).

The major clinical symptoms of *Campylobacter* infection in humans reported in Nigeria is enteritis (Coker & Dosumun-Ogunbi, 1986; Alabi *et al.*, 1986). *Campylobacter enteritis* affects all age groups, but with the highest incidence in children under the age of 5 years (Coker & Adefeso, 1994; Adegbola *et al.*, 1991).

Incidence rates of 5 per cent and 10 per cent respectively have been reported by Dosumun-Ogunbi (1983, 1984). Recently, Coker & Adefeso (1994) reported a changing pattern of *Campylobacter* infections in Lagos. In that study an incidence of 15 per cent was reported. Another study by Olubumun & Adeniran (1986) reported a 7 per cent incidence rate in Ile-Ife. Diarrhoea caused by *C. jejuni* and *C. coli* is still reported to be more common in males than females with a ratio of 2:1 (Coker & Adefeso, 1994). The most common species of *Campylobacter* identified in humans were *C. jejuni* biotype I and II, *C. coli* biotype I, and *C. laridis*, which have been isolated in almost equal proportions from patients as well as from asymptomatic carriers (Adegbola *et al.*, 1991).

The antibiotics of choice for the treatment of human campylobacteriosis include kanamycine, tetracycline, nalidixic acid, gentamycine and erythromycin (Coker & Adefeso, 1994; Dosumun-Ogunbi, 1986). But recently, antibiotic resistance especially involving erythromycin have been reported (Coker & Adefeso, 1994).

The colonization of poultry by large number of *Campylobacter* species was demonstrated by Adegbola *et al.*, 1991, who reported 85 per cent, isolation rates from the poultry faecal samples. Adekeye (1986), in Zaria, collected faeces from 368 ducks usually congregating in groups around eleven different wells, which he cultured for *Campylobacter fetus* subsp. *jejuni*. Water samples from the well samples were similarly cultured. The prevalence rates of the organism were 54.6 per cent in ducks faeces and 36.4 per cent in the well water. It was suggested that well water possi-

bly contaminated by duck faeces can be potential sources of human campylobacteriosis in this area.

In another study by Adekeye, Abdul & Bawa (1989), a survey for *C. fetus* subsp. *jejuni* was carried out using cloacal swabs from 487 live birds in 36 flocks and poultry carcasses. The organism was isolated from 12.3 per cent of the birds in 19 flocks and from five of 70 poultry carcasses. Low numbers of the organism contaminating poultry carcasses was attributed to hot water treatment of the carcasses and prolonged immersion in this water. Despite the low counts obtained with poultry carcasses, they may still pose a hazard to the consumers.

Elegbe, Juba & Adebayo (1987) carried out an epidemiological survey of the *Campylobacter* spp. in poultry farms in Ile-Ife, in which they demonstrated that domestic chickens are important reservoirs of *Campylobacter* spp. Olubnmi & Adeniran (1986), in the same area, isolated *Campylobacter* from 24 (15.4 %) of a total of 156 poultry faecal samples. The sources and poultry involvement in human campylobacteriosis has long been established in Nigeria. Alabi *et al.* (1986) and Adegbola *et al.* (1990) found that common serogroups 2, 4, 29 and 36 constituted the majority of serogroups in animals especially poultry (61.7 per cent). This pattern of distribution strongly suggests that there is a possibility of cross infection between humans and animals.

Conclusion

Domestic chickens examined in the review are mostly free range. This emphasizes the high risk to which people are exposed to *Campylobacter* infection, particularly the children who, most of the time, play on the ground and eat contaminated foods.

For adequate prevention and control of this important agent of gastroenteritis in Nigeria, good hygienic measures are strongly recommended to prevent gross contamination of foods and water. In addition, proper treatment of foods particularly poultry and poultry products for the destruction of these organisms is called for.

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