

## A note on the prevalence of *Campylobacters* in chicken flocks in Pakistan

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### ABSTRACT

*Campylobacter* is a leading cause of acute bacterial gastroenteritis in Pakistan, with epidemiologic studies identifying poultry as a leading vehicle in human infection. An investigation of cloacal contents was carried out into the prevalence of *Campylobacter*. A total of 1000 fresh swabs of cloacal contents were collected from live chickens, of which 58.1% were positive for *Campylobacter*. The species distribution was, %: *Camp. jejuni* 88, *Camp. coli* 9.9 and *Camp. lari* 1.8. The results of this study indicate that transmission of *Campylobacter* in Pakistan may greatly be influenced by the use of poultry products.

KEY WORDS: *Campylobacter jejuni*, broiler chicken, Pakistan

### INTRODUCTION

Campylobacteriosis is an infectious disease caused by bacteria of the genus *Campylobacter*. *Campylobacters* are major public health concern in Pakistan, as they are the leading cause of human food-borne bacterial gastroenteritis and most common identified cause of food poisoning. *Campylobacter* species are predominantly associated with sporadic illness rather than large outbreaks. *Campylobacter jejuni* is one of the most common pathogens associated with infectious childhood

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diarrhoea worldwide (Albert et al., 1999). Infection usually is limited to children, suggesting that a high level of exposure in early life leads to the development of protective immunity (Fernandez et al., 1994). The foods most commonly involved in outbreaks of *C. jejuni* food borne illness include: meat, unpasteurized milk and unchlorinated water. Poultry meat is considered to be an important source of infection (Friedman et al., 2000). Cross-contamination of foods with poultry meat has been a factor in many of the reported outbreaks. The presence of free-range domestic poultry increases children's exposure to *C. jejuni*. (Grados et al., 1988; Marquis et al., 1990). High isolation risks have been found in faecal samples from both healthy and diseased companion animals. Surveys from developed countries attribute 5-6% of human cases to contacts with pets (Tauxe, 1992; Skirrow, 1994). In developing countries, however, the epidemiology of human campylobacteriosis and the role of companion animals are not clear. Food from animal origin is widely regarded as the main source of food-borne infection due to the presence of the organisms as part of the intestinal flora of many animals (Pearson et al., 1996).

*Campylobacter* species infect majority of chicken flocks in Pakistan and have a relatively low infectious dose (Khalil et al., 1993). Attempts to control *Campylobacter* infections in broilers are hindered by the fact that the epidemiology of this organism in broiler production is largely unknown. Meat from broiler chicken is a main source of animal protein in Pakistan. As a consequence of an increase in the number of registered human enteric infections in Pakistan our team decided to initiate a strategy for the control of pathogenic microorganisms in foods, on the principles of Food Safety Risk Analysis. The purpose of this study was to evaluate the occurrence of *Campylobacter* species in broiler chickens in Pakistan.

## MATERIAL AND METHODS

Twenty broiler farms situated in eight different localities in Lahore, having more than 10,000 broilers were selected. From each farm, fifty broiler birds around an age of 6 to 7 weeks were randomly selected for sampling. The sampling procedure consisted of collecting swabs of cloacal content and mucosa, which were then immersed in 10 ml of Cary-Blair transport medium (Oxoid) in screw capped glass tubes (Stern et al., 1992). Each cloacal swab was streaked directly onto plates of *Campylobacter* "Blood Free Selective agar" (Oxoid) that also contained CCDA Selective Supplement (Oxoid) having cefoperazone (32 mg/l) and amphotericin B (10 mg/l). After inoculation, all the streaked plates were incubated at 42°C for 48 h under microaerophilic condition that was achieved by placing the plates in anaerobic jar together with a gas pack. *Campylobacters* were identified on the basis of colony morphology, gram staining, and motility under phase contrast microscope.

RESULTS AND DISCUSSION

*Campylobacter*-free poultry cannot be produced under current production conditions and therefore the approaches to be taken are to reduce the incidence to the lowest level achievable in poultry and alert everyone in the food chain, including consumers, to the fact that poultry meat may carry this germ and needs to be handled hygienically and thoroughly cooked before eating. *Campylobacter* infection has serious economic and social impact in Pakistan. It is vital that all stakeholders put measures and recommendations in place from farm through catering and the retail sector as well as the regulatory bodies to reduce the cases of *Campylobacter* infection.

The prevalence of *Campylobacters* in twenty broiler chicken farms ranged from 28 to 74%, with a mean value of 58%. The species distribution was, %: *Camp. jejuni* 88, *Camp. coli* 9.9 and *Camp. lari* 1.8. In four farms, the proportion of *Campylobacter*-positive birds was more than 70%. No farm was found to be negative for *Campylobacter* (Table 1). *Campylobacter* is naturally occurring bacteria found in the intestinal tract of livestock and poultry used for food production and can therefore be transmitted through a variety of foods from animal origin.

TABLE 1

The prevalence of *Campylobacters* in twenty broiler chicken farms

Farm No.	No. of swabs	Age of chickens days	No. of positive cases	Isolated species			percentage of positive cases
				<i>Campylobacter</i>			
				<i>jejuni</i>	<i>coli</i>	<i>lari</i>	
1	50	46	26	18	6	2	52
2	50	42	31	24	7	0	62
3	50	45	35	28	4	3	70
4	50	44	14	14	0	0	28
5	50	46	29	26	3	0	58
6	50	42	33	28	4	1	66
7	50	45	27	27	0	0	54
8	50	45	25	25	0	0	50
9	50	43	33	30	1	2	66
10	50	46	36	32	4	0	72
11	50	45	35	28	7	0	70
12	50	42	32	29	3	0	64
13	50	47	37	31	4	2	74
14	50	46	26	22	4	0	52
15	50	44	21	21	0	0	42
16	50	43	33	28	4	1	66
17	50	46	32	31	1	0	64
18	50	47	29	25	4	0	58
19	50	43	25	23	2	0	50
20	50	46	22	22	0	0	44

In developing countries, most reported *Campylobacter* infections are in children. Previously reported prevalence of *Campylobacter* spp. in children in Southeast Asia ranged from 2.9 to 15%. The frequency and pattern of occurrence of *Campylobacter* spp. differ between developed and developing countries, especially in the number of cases reported in adults and the presence of any seasonal patterns in occurrence (Padungton and Kaneene, 2003). Zeenathul in 1994, reported 97% prevalence of *Campylobacter* spp. in broiler chickens and 51.5% in village chickens. In another study, 81.9% *Campylobacter* spp. were isolated in village chickens (Saleha et al., 1996). Uyttendaele et al. (1999) isolated *Campylobacter* species from 36.5% broiler farms, in Belgium. In England, between 1992 and 1999, 1426 food-borne outbreaks of infectious intestinal disease (IID) were reported, one-fifth outbreaks were associated with the *Campylobacter* species from poultry (Kessel et al., 2001). Since its recognition as a human pathogen in the early 1970s, *Campylobacter* has now emerged as a leading bacterial cause of food-borne gastroenteritis in developed countries. Poultry, particularly chickens, account for the majority of human infections caused by *Campylobacter* (Sahin et al., 2002).

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## STRESZCZENIE

### **Występowanie *Campylobacters* w stadach kurcząt w Pakistanie**

*Campylobacter* jest główną przyczyną ostrego bakteryjnego zapalenia żołądka i jelit w Pakistanie, a badania epidemiologiczne wskazują na drób jako główne źródło zakażenia u ludzi.

Oznaczono występowanie *Campylobacter* w 1000 świeżych wymazach treści steku, pobranych od żywych kurcząt. Obecność bakterii stwierdzono w 58,1% próbach, z czego *Camp. jejuni* stanowił 88%, *Camp. coli* 9,9%, a *Camp. lari* 1,8%. Wyniki badań wskazują, że w Pakistanie na przenoszenie *Campylobacters* duży wpływ może mieć spożywanie produktów drobiowych.