

CAMPYLOBACTER IN VILLAGE CHICKENS : PREVALENCE AND BIOTYPES

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SUMMARY

Campylobacters were isolated from more than 80.0% of the cloacal swab samples obtained from 138 village chickens. Of these 65.5% was *Campylobacter jejuni* and 34.5% *Campylobacter coli*. *C. jejuni* was characterised further with regard to their biotypes: *C. jejuni* biotype 1 and biotype 2 comprised 94.6% and 5.4%, respectively. *C. lari* was not isolated. With the increase in the number of village chicken in the future, the owner and consumer are at a great risk of acquiring the infection, thus, there is a need to educate them on public health significance of *Campylobacter*.

Keywords: *Campylobacter jejuni*, *Campylobacter coli*, village chickens, biotypes, biotyping schemes.

INTRODUCTION

Within the last two decades *Campylobacter* species, particularly *Campylobacter jejuni*, has been regarded as an important cause of acute enteritis in man (Stern, 1992). Studies in several areas have shown that infections caused by *C. jejuni* may be as important or more important than those caused by *Salmonella*, in terms of frequency of occurrence and severity of symptoms (Skirrow, 1991). It was reported that 50 to 70% of cases of human campylobacteriosis were associated with poultry (Stern, 1992).

Campylobacters are commonly found as commensals in the intestinal tracts of domestic and wild animals as well as avian species (Franco, 1998). All breeds of commercial poultry have been shown to be infected with *Campylobacters*. The prevalence of *Campylobacters* in broiler chickens range from 6% in Sweden to 96% in Chile (Aho and Hirn, 1988).

Chicken carcasses sold for consumption are contaminated with *C. jejuni* because during slaughtering and processing, *Campylobacters* can be transferred from the intestines to the surfaces of the carcasses (Oosterom *et al.*, 1983). *Campylobacters* have been isolated from fresh and frozen poultry meat and carcasses sold at retail markets (Aho and Hirn, 1988).

In Malaysia, broiler chickens are reared commercially under intensive system while village chickens (commonly known as ayam kampung) are usually reared in small flocks under free-range or backyard system.

The village chickens are free to roam and they scavenge for most of their food in the village environment; at times they receive a small supplement of household food scraps. Village chickens are reared

to provide eggs and meat for the family, for social and traditional values and also reared for generating revenue - meat and eggs command premium prices. Most of the owners (90.0%) keep a flock of between 10-30 chickens but some farmers keep up to 1000-3000 birds (Supramaniam, 1987).

To date, there are limited data on the prevalence of *C. jejuni* in village chickens in Malaysia. Thus, the main purpose of this study is to determine the prevalence of *Campylobacter* in village chickens and to biotype these isolates.

MATERIALS AND METHODS

Village chicken flocks

The village chickens in this study were from 10 flocks, each flock consisting between 10-30 chickens. These flocks were located in seven different villages in Selangor.

Collection of samples

Samples were collected over a period of 24 weeks. From each flock, the chickens were selected at random and cloacal samples were taken using sterilised cotton swabs.

A total of 138 cloacal swab samples were obtained from the 10 chicken flocks.

Each swab was placed in a transport medium (Cary Blair Medium, Oxoid) and transported immediately to the laboratory, within 2 h of sampling.

Isolation and identification of *Campylobacter*

Each cloacal swab was streaked directly onto *Campylobacter* Blood Free Selective Agar (Oxoid) supplemented with CCDA *Campylobacter* Selective

Supplement (Oxoid). The plates were then incubated at 42°C for 48 h under microaerophilic conditions by using an anaerobic jar containing a gas generating pack (CampyPak plus, BBL).

Plates were examined for *Campylobacter* morphology namely, round colonies, 1-2 mm in diameter, raised, convex and glistening with an entire edge and a tendency to spread along streak lines. Suspect colonies were then examined for gram-negative slender, spirally curved rods which also appear S-shaped and gull-winged, typical corkscrew/twirling and darting movement, catalase and oxidase activities.

Two to three colonies were selected and transferred onto Columbia Blood Agar (Oxoid) plate. These plates were then incubated at 37°C for 24 h under microaerophilic condition.

Biotyping of *Campylobacter*

Biotyping was performed on colonies isolated from the blood agar plates by testing for hippurate hydrolysis, H₂S production and nalidixic acid sensitivity. Tests for hippurate hydrolysis and H₂S production were carried out according to that of Skirrow and Benjamin (1982). These tests differentiated *Campylobacter* into *C. jejuni* biotypes 1 and 2, *C. coli* and a nalidixic acid-resistant strain of thermophilic *Campylobacter* sp (NARTC) or *C. lari* (formerly *C. laridis*).

RESULTS

Campylobacter was isolated from 113 of 138 (81.9%) samples of cloacal swab. Of these isolates, 74 or 65.5% were identified as *C. jejuni* and 39 or 34.5% were *C. coli*. *C. lari* was not isolated.

C. jejuni was biotyped particularly on the basis of H₂S production; 70 (94.6%) of the 74 *C. jejuni* isolates were identified as *C. jejuni* biotype 1 compared to only 4 (5.4%) as *C. jejuni* biotype 2.

DISCUSSION

Although Zeenathul and Ibrahim (1994) reported that the prevalence of *Campylobacter* in village chickens was high, the village chickens in this study, were found to be heavily infected with *Campylobacter* (81.9%). The higher prevalence of *Campylobacter* isolated in this study was probably due to better isolation procedure and also more samples were collected.

The typing, including biotyping, of *Campylobacter* is particularly essential in epidemiologic studies, as it can provide information on relationships between isolates, determine the extent of disease outbreaks and identify sources of the organism and the modes of transmission (Patton and Wachsmuth, 1992).

There are at least six known schemes available for

C. jejuni, *C. coli* and *C. lari*. Most of the biotyping schemes recognised the three species of *Campylobacter*, however only one differentiated all the three species into biotypes. In this study, the biotyping scheme of Skirrow and Benjamin (1982) was used as it is simple, inexpensive, commonly used in other studies and widely accepted (Bolton *et al.*, 1984).

The prevalence of *C. jejuni* and *C. coli* is similar to the findings of Zeenathul and Ibrahim (1994). Other studies also showed that in chickens *C. jejuni* was more frequently isolated than *C. coli* while *C. lari* was rarely isolated. Biotype 1 was most common among the *C. jejuni* isolates followed by biotype 2. Such results were also shown in the studies by Lior (1984) and Kapperud *et al.* (1984). The four isolates of *C. jejuni* biotype 2 were from chickens in two different villages. Lior (1984) also found that *C. jejuni* biotype 2 was most common among human isolates.

Similarly in Malaysia, Tay *et al.* (1955) reported that in man, *C. jejuni* was the most frequently isolated among *Campylobacter*s while *C. coli* and *C. lari* were less common cause of enteritis.

Supramaniam (1987), estimated that the population of village chicken in 1985 to be approximately 6.5 million birds (13% of the total standing population of chickens). The population of village is likely to increase to 10 million in 1990. The owner and the consumer must be educated on the public health significance of *Campylobacter*s since the risks of exposure and acquiring the disease are likely to be on the increase.

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RINGKASAN

CAMPYLOBACTER DALAM AYAM KAMPUNG : PREVALENS DAN BIOTIP

Campylobacter telah dipencil daripada lebih 80.0% sampel swab kloaka diperolehi daripada 138 ekor ayam kampung. Daripadanya 65.5% ialah *Campylobacter jejuni* dan 34.5% *Campylobacter coli*. *C. jejuni* telah dicari lebih lanjut lagi mengikut biotipnya: *C. jejuni* biotip 1 dan biotip 2 masing-masing terdiri dari 94.6% dan 5.4%. Tiada *C. lari* dipencil. Dengan meningkatnya bilangan ayam kampung pada masa depan, pemilik dan pengguna akan berisiko memperoleh jangkitan ini, oleh itu adalah perlu untuk mendidik mereka dalam keertian kesihatan umum *Campylobacter* ini.