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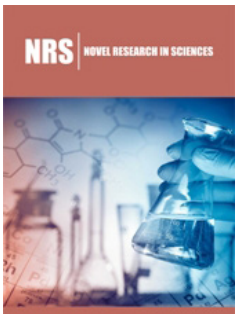
Mini Review

Occurrence of *Campylobacter Jejuni* in Poultry Meats

Mohamed-Yousif Ibrahim Mohamed*

Department of Veterinary Medicine, United Arab Emirates



***Corresponding author:** Mohamed-Yousif Ibrahim Mohamed, Department of Veterinary Medicine, College of Food and Agriculture, United Arab Emirates

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Abstract

Campylobacter jejuni is a prominent bacterial cause of human gastroenteritis. It is well recognized that *C. jejuni* is one of the main causes of gastroenteritis in humans, and poultry meat is reported to be the main source. A number of studies in several countries have shown the occurrence of *C. jejuni* in chicken and chicken meat. This review simply describes the occurrence, and epidemiological investigations of *C. jejuni* in poultry meats.

Keywords: *Campylobacter jejuni*; Poultry meat; Epidemiological investigations

Introduction

Poultry is considered to be the main source of *C. jejuni* infection in human beings, and chickens in countries worldwide have been reported to be colonized with this organism [1-2]. The occurrence of *C. jejuni* in poultry in Europe has ranged from low to high. In Italy, the occurrence of *C. jejuni* in poultry products has been at a low level of 1.4% [3]; however, in Iceland, ninety-five percent of the broilers were positive for *Campylobacter species*, especially *C. jejuni* [4]. Also, in the UK, the occurrence of *C. jejuni* between two groups of 60-farmed ducks was high (93.3-100%) [5]. Studies suggested that the big difference in the occurrence of *C. jejuni* in poultry in Europe is due to seasonal influences [6-7]. According to Weber et al. [8], who investigated the seasonal influences of *C. jejuni* infections in four poultry species Pekin duck flocks, broiler flocks, turkey flocks, and Muscovy duck flocks the occurrence of *C. jejuni* was high in summer in all poultry species; however, only broilers and Pekin ducks have been shown to be statistically significant in summer. A number of investigations were also conducted in France between 2007 and 2011, which showed the varied prevalence rates of *C. jejuni* in chickens. Also, in the United States, the seasonality of the occurrence of *C. jejuni* in poultry appears to have changed and has been observed to be prominent in summer. Furthermore, poultry in Europe and the United States have shown a high occurrence of *C. jejuni* during summer and *vice versa* in winter, which may be due to the low temperature, which prevents the hosts of *C. jejuni* in poultry houses, such as insects or parasites [9-10]. Moreover, in New Zealand, the occurrence of *C. jejuni* has shown to be 20% among 906 duck fecal samples and 9% of 23 goose fecal samples [11]. According to a report on Campylobacter in ducks in Thailand, 31% were found positive with 34 samples for *C. jejuni* and only 10 for *C. coli* [12]. Those bacteria could be detected in the duck carcass, eggs, and the environment at almost all duck ages sampled. To control these bacteria, duckling selection should be conducted from parent stock without *Campylobacter spp.* [13].

Fundamentally, poultry in villages could be infected from the environment, which is a possible source of *C. jejuni*, although the role of Viable but Nonculturable (VBNC) Campylobacter needs more research. Insects and flies are implicated as sources of *C. jejuni* [14]. Also, wild animals have been reported to be vectors for transmitting the *C. jejuni* to poultry. In particular, wild birds have been identified as reservoirs of *C. jejuni* as their

intestinal environment provides favorable conditions for them to live, thereby resulting in large numbers excreted in droppings. Therefore, bird droppings are suggested as being a vehicle for the introduction of *C. jejuni* to poultry houses in farms and villages, and the environment by contaminating the soil, feed, and water [1]. In Malaysia, *Campylobacter jejuni* is commonly reported in the poultry population [1,14,15]. The prevalence of *C. jejuni* and C. coli was at 39.2% among the ducks according to a study conducted in Kuala Lumpur, Malaysia [15]. It is probable that free flying birds are the source of spreading such organisms to poultry farms.

According to epidemiological investigations, the occurrence of high similarities in the *C. jejuni* genotype detected in poultry meat with that of human infection, indicate that poultry meat could serve as a vehicle for human infection [16-17]. In developed countries, raw retail poultry meat is one of the main agents of *C. jejuni*, and, recently, there has been a significant correlation between eating raw poultry meat or undercooked meat and handling meat and the cases of *C. jejuni* infection in humans [18]. According to Dorota et al. [19], in Poland, there is a prevalence of *C. jejuni* in retail chicken (46.6%); however, *Campylobacter coli* was the highest isolate in turkey meat (71.2%). Interestingly, the prevalence of *C. jejuni* in fresh chicken meat of Estonian origin was lower compared to that of other EU countries, but higher than that formerly reported by the EFSA [20]. While in the United States, there is strong molecular characterization evidence for the transmission of *C. jejuni* from the poultry meat to humans, which indicates that *C. jejuni* is a significant threat to public health [21]. *Campylobacter jejuni* has the capability of proliferating in slaughterhouses and contaminating the products and equipment [22]. According to Noppon et al. [23], from a comparison of the isolation rates of *C. jejuni* and *C. coli* isolated from chicken meat in retail markets in Japan and Thailand, 60.7% out of 164 chicken meat samples in Japan showed positive for *Campylobacter spp.*, with *C. jejuni* and *C. coli* identified at 93.8% and 6.2%, respectively; whereas in Thailand, the occurrence rate was lower at 13.3%; *C. jejuni* and *C. coli* were determined at 42% and 25%, respectively. In China, more than 20 areas identified a low rate of *C. jejuni* in raw chicken meat between 2007 and 2010, ranging from 0.29% to 2.28% [24]. In Malaysia, according to a report in modern chicken meat treating plants, 61% of the chicken carcasses were found to be contaminated with *Campylobacter spp.*, and *C. jejuni* was identified at 70.9% [25]. Consequently, due to the increasing number of campylobacteriosis in humans, and the significance of poultry as a source of *C. jejuni* infection, further comparable data related to the spread of *C. jejuni* in poultry meat are needed.

Conclusion

Foodborne infections caused by *C. jejuni* are a common cause of human illness, with a substantial burden resulting in public health consequences and economic loss. The current evidence presented in this review points out that the detection of *C. jejuni* is frequent in poultry meat. The further study certainly needs to be done on *C. jejuni* in chicken and the sources of this pathogen on the poultry farms in particular the environment, water, insects, wild birds, and the presence of other animals on the farms such as rodents and require investigation into their role in the transmission and spread of *C. jejuni* in poultry populations. To address the question of whether isolates from the environments a source of infection for poultry are, there is a need to characterize the isolates by molecular typing. Surveillance data are also crucial to monitor policy decision-making and to evaluate and validate their results. A combined approach is essential to be able to use and interpret these data, and this type of approach involves numerous sectors: healthcare organizations and public health, animal food production, food processing, and distribution.

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