

Abstract

Campylobacteriosis is one of the most widespread infectious diseases of veterinary and public health significance. In humans, the disease presents as gastroenteritis with diarrhoea, nausea, vomiting, abdominal cramps and fever. However, in rare cases, the disease may enter the bloodstream and cause life-threatening extra-intestinal infections and autoimmune disorders such as Guillain-Barré syndrome and Miller-Fisher syndrome. Globally the incidence of campylobacteriosis has increased over the last two decades in both developing and developed countries. While the disease is mainly foodborne transmitted, other environmental reservoirs of its causative agent, *Campylobacter* spp., include animals. Squamates (lizards, snakes and amphisbaenians) are a potential reservoir and source of transmission of campylobacteriosis to humans. More people are now keeping lizards and snakes as pets, a trend that has zoonotic and public health implications.

A systematic search of literature was carried out to examine studies from the last 20 years that have reported human campylobacteriosis linked to squamates globally. The literature review examined six case reports and eight environmental surveillance studies that identified lizards and snake species, and the associated *Campylobacter* species that they were shown to carry and potentially spread to humans. The review demonstrated the need to carry out further investigation of *Campylobacter* associated with lizard faeces. Therefore, faeces collected from Australian sleepy lizards (*Tiliqua rugosa*) from South Australia were examined by extracting DNA from all the samples and conducting quantitative PCR to detect presence of *Campylobacter jejuni*.

Of the 60 lizard faecal samples examined, none were positive for *C. jejuni*. This is in contrast with other studies, where the presence of *C. jejuni* in lizards' faecal samples confirms potential zoonotic and public health implications of *Campylobacter* spp. in squamates. It is hypothesized that the

wild sleepy lizards' faecal samples were collected far from areas of human habitation and that might be the reason for there being no detection of *C. jejuni*.

From the systematic literature review, it was found that *C. fetus* subsp. *testudinum* and *C. fetus* subsp. *fetus* were the most frequently isolated species in squamates and the predominant cause of human campylobacteriosis from a squamate host. *C. jejuni* and *C. iguaniorum* were also isolated from lizard faecal samples and reported to pose potential health risks to humans. The common squamate hosts identified included bearded dragons (*Pogona vitticeps*), green iguana (*Iguana iguana*), western beaked gecko (*Rhynchoedura ornate*) and botched blue-tongued skink (*Tiliqua nigrolutea*). One environmental surveillance study reported presence of *Campylobacter jejuni* in lizard faeces collected from Central Australia.

People with underlying chronic illnesses, young children below the age of five years, the immunocompromised and the elderly were identified as the most vulnerable populations. Exposure to pet squamates, wild animals, consumption of reptilian cuisines and cross contamination with untreated water were risk factors associated with campylobacteriosis. Proper hand hygiene practices, responsible pet ownership, and 'One Health' education and awareness on zoonotic diseases, will help reduce the public health risks arising from *Campylobacter* exposure through squamates. Continued surveillance using molecular diagnostic methods will also enhance detection and response to squamate-linked campylobacteriosis.