Quantitative assessment of the risk of acquiring campylobacteriosis from consumption of ready-to-eat beef in Arusha municipality, Tanzania

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Worldwide, thermophilic Campylobacter is one of the most important causes of food borne illness. We carried out a risk assessment for campylobacteriosis acquired through consumption of ready-to-eat beef in Arusha, Tanzania. Between January and March 2010, 18 beer bars serving ready to eat beef were surveyed: 45 roast beef (nyamachoma in Swahili language) and 42 skewer beef (mishikaki) were collected and cultured for thermophilic Campylobacter. The number of customers and average sales per day were also assessed. A second survey was conducted in September 2010 to obtain the most probable number (MPN) of thermophilic Campylobacter and 30 roast beef and 10 roast chicken samples were examined. A risk model was developed based on public and survey data and dose-response relationship was modeled using medical records obtained from a separate study and literature. Monte Carlo simulation was run for 5,000 iterations and sensitivity analysis was run for 500 iterations. Bayesian inference from two surveys showed that the contamination rates of nyamachoma and mishikaki were 7.7% (90%CI: 4.3%-11.8%) and 34.7% (90%CI: 21.3%-49.1%) respectively. The MPN was 0.37 (95%CI: 0.07-1.0). Every day, 1.4% (90% CI: 0.8-2.3%) of customers consuming either nyamachoma or mishikaki in pubs in Arusha was estimated to develop campylobacteriosis. The annual incidence was 248 (95%CI: 127-406) per 1000 people among whole population of Arusha Municipality and one forth of people was estimated to become sick once a year. The most sensitive factors were contamination rate of ready-to-eat beef and the MPN. From observation, beef was well roasted and the high prevalence could be due to post-roast contamination. Hygiene training focused on such contamination could reduce the incidence greatly.