Contributors

Dr Chauvin coconceived and codeveloped the idea for the paper, codeveloped the intellectual content, and wrote the successive drafts. Dr Valleron coconcieved and codeveloped the idea for the paper, corefined the intellectual content, and contributed to the successive drafts.

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Peptic Ulcer Disease and Exposure to Domestic Pets

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A B S T R A C T

Objectives. This study assessed whether an association exists between household pets and peptic ulcer disease.

Methods. Canadian adults (n = 15 779) were asked about cats or dogs in their household and about history of peptic ulcer disease. Logistic regression was used to assess the association between pet ownership and a history of peptic ulcer disease, after adjustment for sociodemographic differences.

Results. No relationship was observed between report of household pets and a history of peptic ulcer disease (adjusted odds ratio = 1.14, 95% confidence interval = 0.95, 1.36).

Conclusions. In a large sample of Canadian adults, no association was observed between pet ownership and a history of peptic ulcer disease. (*Am J Public Health.* 1999;89:81–84)

While treatment of *Helicobacter pylori* has become a standard part of peptic ulcer disease management, questions remain about how infection occurs.[1–3] Human-to-human transmission appears most likely,[4,5] but it has been suggested that the current evidence is also consistent with a common source of infection.[1,6] Designing effective prevention strategies requires an understanding of the route by which humans acquire this infection.[3–8]

H pylori has been found in nonhuman primates,[9–15] and *Helicobacter*-like organisms causing gastritis have been found in domestic pets.[13,16–18] This raises the possibility that some human gastrointestinal illnesses may have a zoonotic basis.[13,16,17,19–21] Most studies have either found no correlation[22] or a decreased prevalence of *H pylori* infection[23,24] with pet ownership. However, these studies were generally small and may have lacked power to detect modest associations that could still have public health relevance.

Previous studies have most often considered serologic evidence of infection. There have been no studies of whether clinical disease is more frequent in pet owners. To assess this possibility, we examined a national, population-based survey that asked adults about pet ownership and peptic ulcer disease.

Methods

The 1994 National Population Health Survey was a cross-sectional survey of household residents in Canada. Its purpose was to provide comprehensive health information

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about the population to assist in public health planning.[25] A stratified, 2-stage cluster sampling design was used. This was more cost-efficient than simple random sampling but resulted in differing probabilities for inclusion in the survey. Sampling weights were determined by Statistics Canada to reflect the nonrandom sampling scheme.

The public use file was obtained for this analysis. There were 26 430 households surveyed, and the overall response rate was 88%. One household member was interviewed in person about others at that residence. A comprehensive questionnaire assessed a variety of characteristics, including sociodemographic status, health behaviors, health problems, and health service use.[26] Although the survey was not specifically designed to assess the relationship between pets and peptic ulcer disease, questions about both were included.

Persons were asked whether they had ever been diagnosed by a health professional as having stomach or intestinal ulcers.[26] They were also asked whether there were any pets in their household. A derived variable included in the public use file grouped dogs and cats together. Other animals accounted for less than 0.1% of all pets and were not considered further. Variables epidemiologically associated with peptic ulcer disease or *H pylori* were included as possible confounding influences.[1,2,4–6,8,15] These variables included age, sex, marital status, employment status, immigration status, education level, household income, smoking, alcohol use, and self-reported health status. The number of persons and bedrooms in the house was also assessed.

Only adults, defined as persons 20 years of age or older, were considered, owing to the low prevalence of peptic ulcer disease in children.[1,2,4–6,27] The association between pet exposure and a self-reported history of peptic ulcer disease was assessed via weighted logistic regression to produce odds ratios (ORs) and 95% confidence intervals (CIs).[28,29] Multiple logistic regression (maximum likelihood estimation) was used in adjusting for possible confounding variables related to the primary outcome ($P < .05$).[29] Other variables were forced into the final model to assess the stability of the odds ratio estimate for the primary association.

Results

Of the 15 779 surveyed adults 20 years of age or older, 54.8% were female and 45.2% were male. Of these individuals, 4.2% reported a history of peptic ulcer disease (Table 1). Such a history was more likely in

older adults, those reporting poorer health, current smokers, and ex-drinkers. A history of peptic ulcer disease was less likely in single adults and those residing in larger households. Education and household income were inversely related to a history of peptic ulcer disease. There was no association with gender or number of bedrooms.

A dog or cat was reported in 40.1% of households. No association was found between the presence of a cat or dog and a history of peptic ulcer disease (OR = 1.08, 95% CI = 0.91, 1.27). However, there was a

direct association between pet ownership and household income (OR = 2.24 for an income of more than $60 000, 95% CI = 1.29, 1.37), as well as education (OR = 1.27 for postsecondary education, 95% CI = 1.16, 1.40). Since socioeconomic status is inversely related to peptic ulcer disease,[2] we assessed the possibility of confounding by socioeconomic level.

Table 2 displays the results from the multiple logistic regression model adjusted for age, education level, household income, general health status, marital status, number

TABLE 1—Sample Characteristics and Associations With a History of Peptic Ulcer Disease: Canada, 1994

Characteristic	Sample, No. (%)	Ulcer, %	Odds Ratio	95% Confidence Interval
Age, y				
20–39	6 686 (42.4)	3.1	1.00	...
40–59	5 007 (31.7)	4.7	1.62	1.32, 1.97
≥60	4 086 (25.9)	5.5	2.05	1.66, 2.53
Sex				
Male	7 126 (45.2)	4.2	1.00	...
Female	8 653 (54.8)	4.2	1.09	0.92, 1.29
Marital status				
Single	3 015 (19.1)	2.6	1.00	...
Married/common law	9 483 (60.1)	3.9	1.59	1.21, 2.09
Widowed/divorced	3 277 (20.8)	6.5	3.28	2.42, 4.44
Education level				
Not high school	4 674 (29.6)	6.0	1.00	...
High school	7 908 (50.2)	3.9	0.61	0.51, 0.73
Postsecondary	3 173 (20.1)	2.6	0.34	0.26, 0.44
Household income, $				
0–19 999	4 322 (28.6)	5.8	1.00	...
20–39 999	4 568 (30.2)	4.4	0.71	0.57, 0.88
40–59 999	3 341 (22.1)	3.5	0.54	0.42, 0.68
≥60 000	2 903 (19.2)	2.6	0.43	0.33, 0.55
Household size				
1–3 persons	11 931 (75.6)	4.6	1.00	...
≥4 persons	3 848 (24.4)	3.2	0.55	0.45, 0.67
No. of bedrooms				
≤2	5 818 (36.9)	4.8	1.00	...
≥3	9 952 (63.1)	3.9	0.78	0.91, 1.27
Health status				
Excellent	3 588 (22.7)	1.3	1.00	...
Very good	5 800 (36.9)	2.9	2.69	1.88, 3.85
Good	4 244 (26.9)	5.1	5.34	3.77, 7.55
Fair	1 669 (10.6)	9.4	9.36	6.46, 13.55
Poor	478 (3.0)	16.8	17.61	11.56, 26.84
Smoking status				
Never smoker or ex-smoker	10 733 (68.1)	3.5	1.00	...
Current	5 039 (31.9)	5.8	1.90	1.61, 2.24
Alcohol use				
Regular	8 885 (56.4)	3.6	1.00	...
Occasional	3 303 (21.0)	4.7	1.25	1.01, 1.58
Ex-drinker	2 241 (14.2)	5.7	1.61	1.28, 2.04
Abstinent	1 330 (8.4)	4.2	1.29	0.96, 1.72
Cat or dog in house				
No	9 444 (59.9)	4.2	1.00	...
Yes	6 327 (40.1)	4.3	1.08	0.91, 1.27
Total sample	15 779 (100)	4.2	...	...

TABLE 2—Multiple Logistic Regression Model of the Association Between Pet Ownership and Peptic Ulcer Disease, Adjusted for Sociodemographic Differences: Canada, 1994

Factor	Odds Ratio[a]	95% Confidence Interval
Age, y		
20–39	1.00	. . .
40–59	1.17	0.94, 1.36
≥60	1.02	0.78, 1.33
Household income, $		
0–19 999	1.00	. . .
20–29 999	0.98	0.78, 1.23
30–59 999	0.93	0.71, 1.22
≥60 000	0.94	0.70, 1.27
Education level		
Not high school	1.00	. . .
High school	0.88	0.72, 1.07
Postsecondary	0.64	0.47, 0.87
Marital status		
Single	1.00	. . .
Married/common law	1.59	1.17, 2.15
Widowed/divorced	2.42	1.73, 3.38
No. in household		
1–3	1.00	. . .
≥4	0.72	0.58, 0.89
General health status		
Excellent	1.00	. . .
Very good	2.37	1.65, 3.40
Good	4.37	3.07, 6.23
Fair	6.96	4.74, 10.22
Poor	11.68	7.48, 18.24
Smoking status		
Never smoker or ex-smoker	1.00	. . .
Current	1.72	1.43, 2.07
Cat or dog in house		
No	1.00	. . .
Yes	1.14	0.95, 1.36

Note. Values were adjusted for the variables shown.
[a]$\rho^2 = 0.0831$ for the model.

gests that risk may be species specific.[3,37] However, cats and dogs accounted for the majority of pets in this population and were thus relevant from a public health perspective. Finally, although we did not adjust for the cluster sampling design, this would have increased the sample variances and resulted in wider confidence intervals. Thus, the conclusion would remain the same.

This study suggests that animal-to-human transmission of *H pylori* from pets probably does not account for a significant portion of human disease. Prospective evaluation in noninfected populations might better address this question but may not be feasible owing to the time between infection, which may occur in childhood, and adult life, where clinical disease may manifest. As a result, additional surveys may be of value in confirming the results of this study. However, validation of peptic ulcer disease history and better measures of the degree of species-specific animal exposure over time are needed. □

of persons in the household, and smoking. The odds ratio for the association between household pets and peptic ulcer disease remained nonsignificant (OR = 1.14, 95% CI = 0.95, 1.36).

Discussion

This study found no association between having a cat or dog and a history of peptic ulcer disease. Our results agree with research assessing serologic evidence of infection with *H pylori* and animal exposure.[22–24] None of these studies found an increased risk from cats or dogs. Two studies reported a lower prevalence of infection with pet ownership.[22,23] One study found an increased risk of infection with sheep exposure in children.[3]

Helicobacter organisms have been found in animals and have been shown to produce type B or chronic antral gastritis in humans.[30–33] Gastritis commonly accompanies peptic ulcer disease.[2] If transmission of

H pylori from animals accounts for a significant portion of peptic ulcer disease in humans,[13,19] then it would be expected to be evident in such a large sample, one in which 40% of persons had household pets. This was not the case. However, certain limitations could have contributed to the negative result.

First, adults were asked about current pet ownership. Acquisition of *H pylori* is believed to occur early in life.[2,4,6,24,34,35] However, a childhood study also found no increased risk of infection with household pets.[24] Second, the diagnosis of peptic ulcer disease was not independently validated. Although the self-reported measure used in the study was appropriately associated with factors linked epidemiologically to peptic ulcer disease,[1,2,4–6,8,15] some misclassification of outcome and exposure was probably present. This would have decreased the ability to detect an association.[36]

The survey was not specifically designed to address the research question, and cats and dogs were grouped together. Research sug-

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