

Prevalence of rhinitis, pillow type and past and present ownership of furred pets

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Summary

Background There has been no previous work investigating the effects of furred pet ownership and pillow type on the risk of developing rhinitis. Recently, unexpected and unexplained associations of asthma with nonfeather pillows have been reported.

Objective We developed a questionnaire-based cross-sectional survey to determine whether the past or present ownership of cats or dogs, or the use of nonfeather pillows contributes to the development of seasonal or perennial rhinitis.

Methods We surveyed 2555 accompanying friends and relatives of patients attending the outpatients departments at one London hospital in 1996. Individuals with rhinitis were defined as those suffering with three or more symptoms of rhinitis either throughout the year (perennial) or for part of the year (seasonal). Present or childhood ownership of cats or dogs was recorded.

Results A strong association was seen with nonfeather pillow use and both seasonal [odds ratio (OR) 1.85; 95% confidence interval (CI) 1.43–2.5] and perennial (OR 2.63; CI 1.67–5.0) rhinitis. However, more than one-third of rhinitics had changed their pillow type. After restricting the data to exclude subjects who changed their pillow to avoid allergies, the strong association of nonfeather pillow use with perennial rhinitis remained (OR 2.44; CI 1.25–5.0). Adjusting the data to the extreme situation where all former pillow type was feather changes the apparent risk to 0.99 (CI 0.67–1.43). No associations for either seasonal or perennial rhinitis were seen for feather pillows. A weak association of current dog ownership is demonstrated for seasonal rhinitis (OR 1.47; CI 1.01–2.14). No associations were seen for childhood dog ownership or cat ownership at any time with either type of rhinitis.

Conclusions Feather pillow use and the ownership of furred pets appears unlikely to increase the risk of developing perennial or seasonal rhinitis. In fact, in contrast with currently held views, there is evidence that the use of nonfeather pillows may increase the risk.

Keywords: rhinitis, atopy, indoor allergens, animal dander

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Introduction

While hypersensitivity to allergens of the indoor environment have been shown to be associated with asthma and rhinitis [1], there has been very little epidemiological work assessing effects of the home environment on symptoms of seasonal and perennial rhinitis in the general population.

This is especially important when we consider that many people spend more than 90% of their time indoors [2]. Early exposure to allergens is suspected to increase prevalence of allergic disease [1,3], and many measures have been described to reduce the indoor allergen load [4].

We set out to determine the relationships between symptoms of perennial and seasonal rhinitis and pillow type and the past and present ownership of furred pets, paying particular attention to possible biases arising from avoidance of allergens by allergic individuals [5].

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Materials and methods

A one-page questionnaire was personally handed out to the adult relatives and accompanying friends of patients attending the outpatients departments at West Middlesex Hospital, London between November 1995 and March 1996 by members of the Women's Royal Voluntary Service (WRVS). The relatives and friends of respiratory medicine and otolaryngology clinic attenders were excluded from the study. The questionnaires were collected immediately after they had been completed. Sixteen (0.6%) of the individuals approached refused to fill out the questionnaire and this was thought to be mainly as a result of language difficulties. In total, 2555 questionnaires were completed of which 1022 (40%) were men and 1533 (60%) were women. The questionnaire determined age, sex, and the presence of either seasonal or perennial symptoms of rhinitis (detailed below). Information was collected on whether respondents used feather or synthetic type pillows and whether they kept dogs and/or cats currently or kept them when they were approximately 10 years of age. Subjects were asked to indicate whether they or their households had ever avoided keeping pets or avoided using a pillow type because of problems with nasal or allergic symptoms.

Subjects were asked whether they often suffered with any of the following symptoms: runny nose, blocked nose, excessive sneezing, itchy nose, face and head pains, and sore/itchy eyes when they did not have a cold or influenza. Symptoms were further categorized as seasonal 'for part of the year' and perennial 'throughout the year'. Cases were

defined as those complaining of three or more symptoms throughout the year (perennial rhinitis) or three or more symptoms for part of the year (seasonal rhinitis).

Statistical analysis used cross tabulations and multiple logistic regression models fitted using the Generalized Linear Interactive Modelling (GLIM, Royal Statistical Society, London, UK) package. Adjustment for age used five categories (<20, 20–29, 30–39, 40–49, 50–59, 60+). Gender; current cat ownership; current dog ownership; cat ownership at age 10 years; and dog ownership at age 10 years were modelled as dichotomous variables.

Ethics committee approval was granted for this study by the Chair of the West Middlesex Hospital Ethics Committee.

Results

By our criteria for the diagnosis of rhinitis, (i.e. three or more symptoms), 106 (4.8%) had perennial and 230 (10.4%) had seasonal forms of the condition. Results are presented for the 106 perennial rhinitic cases (and 2115 noncases) and 230 seasonal rhinitic cases (and 1991 noncases) that fully completed the questionnaires.

Table 1 shows adjusted and unadjusted odds ratios which were derived from tabulations of the characteristics of the cases and controls: first, for all subjects; second, restricted to subjects who denied changing their pillow type; and third, adjusted to assume the extreme scenario that all synthetic pillow users who did change their pillow type previously used a feather pillow rather than a different type of synthetic

Table 1. Prevalence of perennial and seasonal rhinitis with different pillow usage and results for analyses of nonfeather vs feather pillows in the sample.

Percentage who changed pillow type	Changed pillow?	Perennial† rhinitis 38%	Seasonal‡ rhinitis 35%
<i>Current pillow</i>			
Feather	Yes	17.4% (4/23)	27.7% (5/23)
Feather	No	1.9% (14/732)	6.4% (47/732)
Non-feather	Yes	11.2% (37/330)	25.2% (83/330)
Non-feather	No	4.5% (51/1136)	8.4% (95/1136)
		OR (95% CI)	OR (95% CI)
<i>Analysis</i>			
Unrestricted* (n = 2221)		2.61; (1.56–4.38)	1.87 (1.35–2.58)
Restricted to no changes** (n = 1868)		2.41; (1.32–4.39)	1.33 (0.93–1.91)
Adjusted assuming all former use was the other type of pillow (n = 2221)		0.99; (0.67–1.46)	0.68 (0.51–0.89)

*Current use analysis including all subjects who changed their pillow type. **Current use restricted to no feather pillow change. †Three or more symptoms all year round. ‡Three or more symptoms for part of the year. OR, odds ratio; CI, confidence interval.

Table 2. Association of perennial and seasonal rhinitis with past and present pet ownership among 2025 subjects not avoiding pets due to allergy and results of analyses represented by mutually adjusted* odds ratios.

		Type of rhinitis symptom			
		Perennial† (<i>n</i> = 106)		Seasonal‡ (<i>n</i> = 230)	
	Exposure?	Proportion	OR*, 95% CI	Proportion	OR*, 95% CI
Cat now	Yes	24/550	0.94 (0.55–1.62)	66/550	1.34 (0.93–1.93)
	No	60/1475		118/1475	
Dog now	Yes	20/428	0.94 (0.54–1.86)	51/428	1.47 (1.01–2.14)
	No	64/1597		133/1597	
Cat at age 10 years	Yes	32/745	1.09 (0.66–1.81)	70/745	1.07 (0.75–1.53)
	No	52/1280		114/1280	
Dog at age 10 years	Yes	38/795	1.30 (0.81–2.10)	71/795	0.82 (0.59–1.16)
	No	46/1230		113/1230	

*Adjusted for age in 10 year groups, sex and other factors shown in the Table. †Three or more symptoms all year round. ‡Three or more symptoms for part of the year. OR, odds ratio; CI, confidence interval.

pillow. Using unrestricted analysis, the associations of synthetic pillows and both types of rhinitis is very strong [odds ratios (OR) 2.61 for perennial rhinitis, 1.87 for seasonal rhinitis]. Restricting the analysis to those who did not change their pillow type shows a slightly weaker, but still a strong association (OR 2.41 for perennial rhinitis, 1.33 for seasonal rhinitis). Approximately one-third of the cases using synthetic pillows had changed their pillow type. However, it is not known which pillow type was previously used (for example, there are different types of synthetic pillow). Adjusting the data to the extreme and unlikely scenario where all changes of pillow type were from feather to synthetic changes the direction of the association of synthetic pillows to seasonal rhinitis but only just negates the association of perennial rhinitis.

Table 2 presents adjusted and unadjusted OR derived from tabulations of the characteristics of the cases and controls for associations of perennial and seasonal rhinitis with past and present pet ownership. The data was restricted to the 2025 (90%) subjects not avoiding pets due to allergy and results of analyses are represented by mutually adjusted odds ratios. A weak association of current dog ownership is demonstrated for seasonal rhinitis [OR 1.47; 95% confidence interval (CI) 1.01–2.14]. No associations were seen for dog ownership in childhood or cat ownership at any time with either type of rhinitis.

Adjustments for age and sex were made and appeared to have very little effect on the measures of association.

Discussion

This cross-sectional study of a large sample achieved an exceptionally high return rate of the questionnaires.

However, relatives and friends of hospital outpatients attenders are not necessarily representative of the general population. By excluding relatives and friends of respiratory medicine and otolaryngology clinic attenders, the authors see no reason for this not to be a generalizable population. Furthermore, the prevalences of perennial and seasonal rhinitis and pet avoidance compare well with other studies [6,7,8]. Even if this study were not considered to be representative of a true cross-section, the associations found with respect to rhinitis still have important validity.

Pillow type

Unrestricted analysis of rhinitis in relation to pillow type shows a very strong association of both seasonal and perennial rhinitis with synthetic pillows. However, this result could be biased if subjects with rhinitis tended to avoid feather pillows in order to control their disease. More than one-third of rhinitic cases reported changing pillow type because of allergy. We therefore restricted the data to those who did not change their pillow type and have still demonstrated a strong link between synthetic pillow use and perennial and seasonal rhinitis. No information was collected about types of pillow previously used. A 'former use' analysis, which adjusted to the extreme and very unlikely case where all the changes that were made were from feather to synthetic pillows, changes the direction of the associations of synthetic pillows with seasonal rhinitis but only just negates the associations with perennial rhinitis. Thus even on the most extreme assumption, our data show no positive association between feather pillows and perennial rhinitis. This finding contradicts the commonly held

view that early exposure to feather pillows causes allergic conditions of the nose later in life [11]. Indeed, our findings suggest it is more likely that nonfeather pillows increase the risk of rhinitis. One explanation is that synthetic pillows may harbour more house dust mite antigen than feather pillows (as suggested by a recent study [9]), thereby posing a risk of mite-sensitive perennial rhinitis.

Furred pets

Our results suggest an association of symptoms of seasonal rhinitis and present dog ownership. However, the association is weak and because early dog ownership appears protective, the significant association with current dog ownership may represent a chance finding. However, it could be argued that seasonal symptoms may arise from outdoor allergen exposure as a result of increased time spent outdoors because of dog ownership.

Despite the theories of allergy development linking early exposure to such allergens to development of allergic disease [10,11], we have demonstrated no firm associations of childhood ownership of cats and/or dogs and symptoms of rhinitis. This contrasts with a study of childhood asthma which found that furred pet exposure at any time is an independent risk factor for the more severe forms of wheeze in adolescence [12]. These apparent differences in aetiology of rhinitis and asthma may arise as a result of the aerodynamic properties of the allergen-bearing particles. Large allergen-bearing particles such as the house dust mite allergen become airborne only with disturbance and tend to impact in the upper airway. The much smaller allergen-bearing particle of cat dander, which becomes airborne with minimal disturbance, would be expected to reach the lower respiratory tract and therefore be more closely associated with asthma than rhinitis [13].

This is the first study to investigate associations of pillow type and furred pet ownership with rhinitis. Our findings suggest that avoidance of feather pillows is unlikely to be of benefit to adults with perennial rhinitis and raise the possibility that synthetic pillow use may actually increase the likelihood of developing perennial rhinitis. Similar conclusions have been drawn with respect to use of non-feather pillows by children with asthma [12].

Although individuals with established furred animal sensitivity might be expected to have exacerbations of

perennial rhinitic symptoms in the presence of the allergen, our findings indicate that ownership of furred pets at any time of life is unlikely to substantially increase the chance of development of perennial rhinitis.

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