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The Prevalence of Demodex Folliculorum on Eyelashes of Symptomatic and Asymptomatic Normal Patients

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INTRODUCTION

Demodex Folliculorum (DF) is the most common ectoparasite found in human skin and eyelashes ¹⁻⁴. They are ordinarily found on the face; cheeks, nose, chin and eyelashes ¹⁻⁴. Ocular symptoms of DF infestation include itching, dryness, surface irritation, burning, foreign body sensation, photophobia and reduced vision ^{1,5,6}.

The human body plays host to two types of Demodex, DF and Demodex Brevis (DB). DF is approximately 0.4 mm in length and resides in the hair follicles. DB is slightly smaller (approximately 0.2 mm) and is generally found in the sebaceous glands ⁴. Adult DF and DB have a head with four pairs of legs attached, and a long body-tail ^{2,4} (Figure 1). Their main food source comprises of sebum and epidermal cells ²⁻⁴. DF mites are most active at night, when male DF travel across the skin in search of a mate, moving~16mm/hr. Female DF lay eggs in the base of the eyelash and sebaceous glands. The lifecycle of DF is approximately 14-18 days ².

The incidence of DF increases with age and skin conditions such as acne rosacea ^{1,2,7}. DF has been observed in 25% of patients at age 20, 84% of patients at age 60 and 100% of patients over the age of 70^{9,10}.

Figure 1: Detail of Demodex Folliculorum, multiple mites found on one eyelash

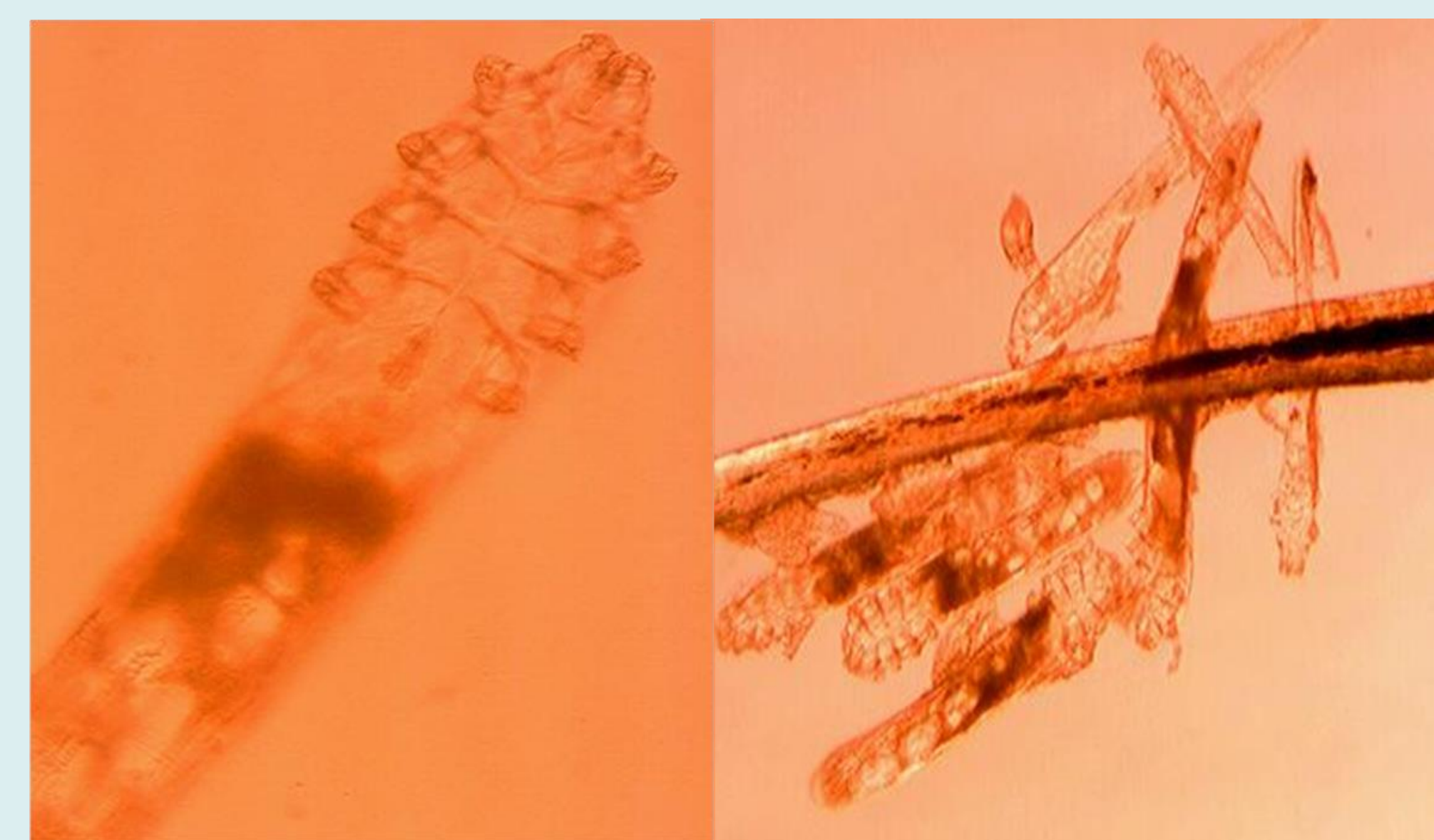


Figure 2: Cylindrical dandruff visible as cuffs at the base of the eyelashes.

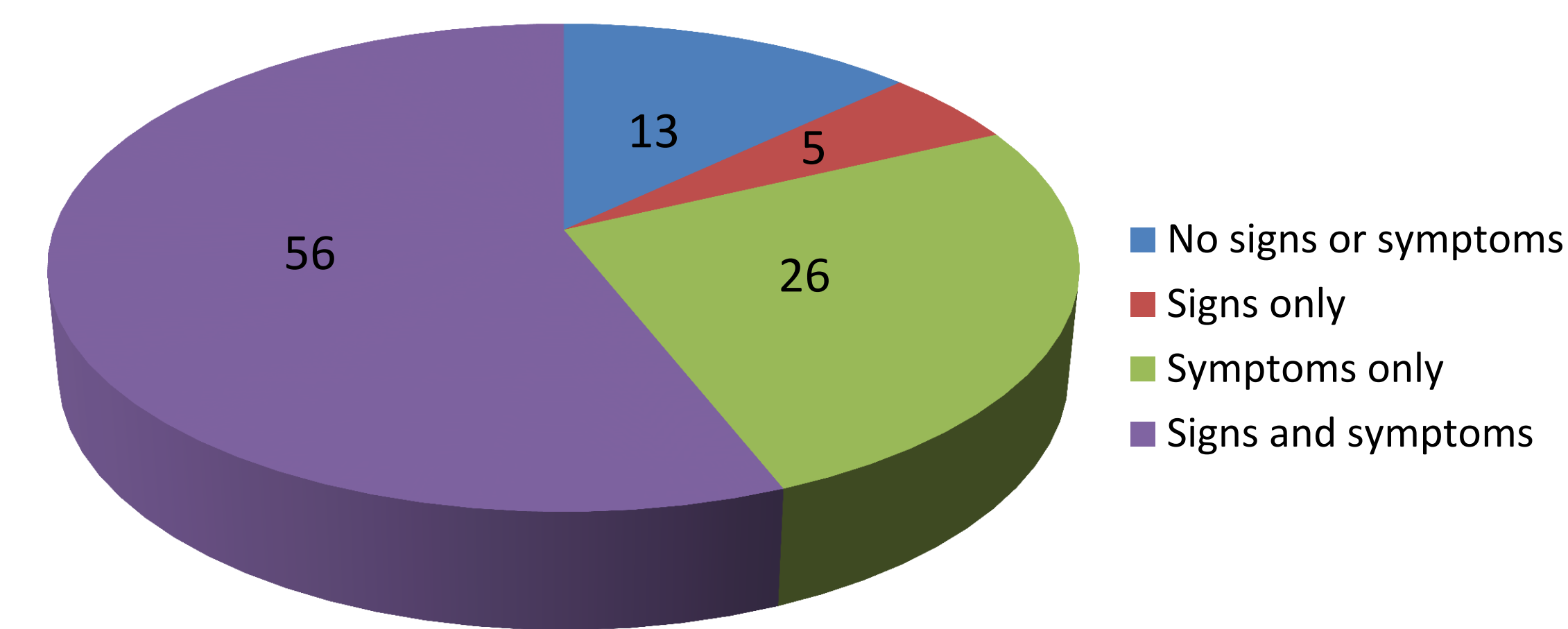


OBJECTIVE

To examine the prevalence of DF on the eyelashes of symptomatic and asymptomatic patients in a normal clinical setting.

METHODS

Students and patients of the National Optometry Centre (n = 100 eyes), aged 19 – 78 years were assessed and sub-divided into 4 groups; Group (1) No signs or symptoms (n = 13), Group (2) signs only, no symptoms (n = 5), Group (3) symptoms only, no signs (n = 26) and Group (4) signs and symptoms (n = 56).



Each subject completed a novel DF questionnaire on ocular symptoms and lifestyle. Habitual distance visual acuity was assessed and a slit lamp examination was conducted. 8 lashes – 2 from each eyelid were manipulated and epilated for microscopic examination. Adult DF count was recorded using the modified Coston method ⁴.

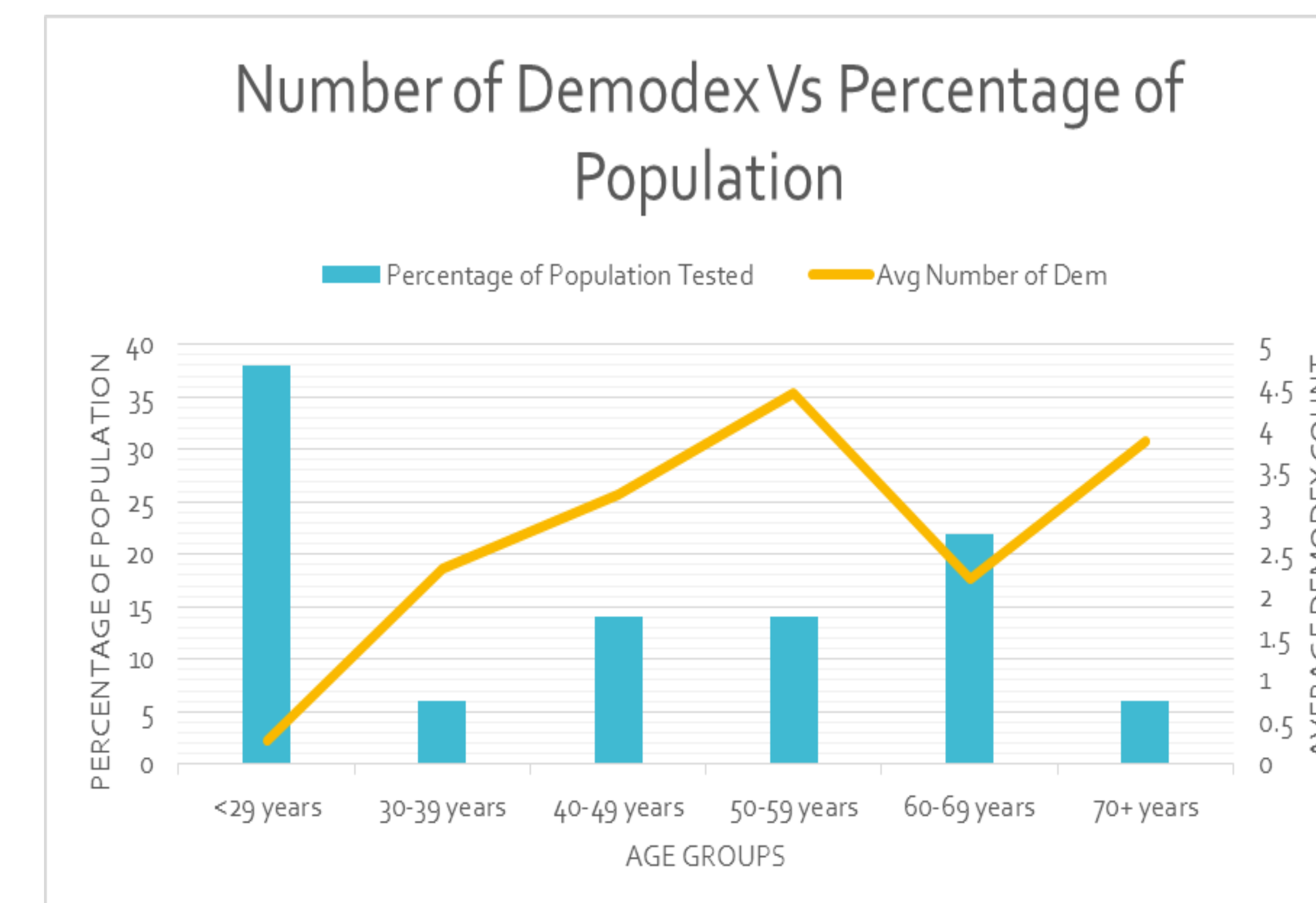
Table 1

Total number of Demodex Folliculorum counted		
Variable	ANOVA P-value	Kruskal-Wallis P-Value
Age	0.000	0.000
Frequency of bed linen cleaning	0.032	0.001
Presence of cylindrical dandruff	0.000	0.002
Discoloured / mis-directed eyelashes	0.003	0.000
Staphylococcal blepharitis	0.005	0.003
Seborrheic blepharitis	0.008	0.001
Meibomian gland dysfunction	0.024	0.001

RESULTS

- A one-way ANOVA was used to analyse the prevalence of DF (significance level: $p \leq 0.05$).
- The DF count significantly increased with age ($p = 0.000$), increased frequency of cleaning pillow case ($p = 0.011$) and in the presence of cylindrical dandruff (CD) ($p = 0.000$), discoloured/misdirected lashes ($p = 0.003$) blepharitis ($p = 0.005$) and meibomian gland dysfunction (MGD) ($p = 0.024$). There was no significant link ($p > 0.05$) between DF count and gender, make-up, skin conditions, allergies, method of drying bed linen, method and frequency of lid hygiene routine.
- The presence of DF was significantly less among make-up ($p = 0.008$) and contact lens wearers ($p = 0.000$). The lowest numbers were seen among two-weekly and monthly wearers ($p = 0.000$).
- The non-parametric test Kruskal-Wallis was also applied and similar results were found. (See Table 1 for significant results with regards to quantity of DF).
- A one-way ANOVA was used to analyse the age and lifestyle of patients who were more symptomatic (significance level $p \leq 0.05$). Patients were more symptomatic with increasing age ($p = 0.000$) and allergies ($p = 0.010$). Patients who wore contact lenses were significantly less symptomatic ($p = 0.009$).
- One-way ANOVA analysis showed the most significant associated ocular discomfort symptoms were gritty/irritated eyes ($p = 0.049$), itchy eyes ($p = 0.019$), burning eyes ($p = 0.042$) and lashes stuck together in the morning ($p = 0.000$). The highest presence of DF was seen among subjects who reported symptoms most noticeable during the afternoon and night ($p = 0.013$).
- The prevalence of Demodex is relatively high, and is more common with increasing age. Some studies suggest 100% of patients over the age of 70 have Demodex ¹¹. The prevalence of DF found with age in this study are shown in Figure 3. Overall prevalence found was 61%.

Figure 3: Shows the distribution of Demodex counted across the different categories and the ages of the subjects in each category.



CONCLUSION

DF was found on 61% of eyes tested in the study. Of these 8% of eyes were asymptomatic. 39% of eyes were found to have no DF, yet 66.6% of these patients were symptomatic. Not all patients with symptoms will have DF, and DF can still be found in asymptomatic individuals, but most patients with DF will have symptoms or signs seen on Slit lamp evaluation.

There are significant relationships between the presence of and number of DF with age, contact lens wear and frequency of cleaning pillow cases but the latter results are significantly influenced by the age of the subjects. The average age of subjects cleaning bed linen = once a month is 24 years in comparison to 45 years for those washing bed linen > once a month, and 59 years >once a week ($p = 0.003$). The higher age group were associated with more frequent bed linen washing and this may skew the result. The large sample size of younger patients in this study is a limitation, a larger sample size would be preferable with age-matched subjects.

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