

Prevalence of recurrent herpes labialis and aphthous ulcers among young adults on six continents

JUAN A. EMBIL,* MD, PH D, FRCP[C]; RUSSELL G. STEPHENS,† DDS, M SC; F. RUSSELL MANUEL,‡ MD, M SC

Summary: The prevalence of recurrent herpes labialis (RHL) and recurrent aphthous ulcers (RAU) in young adults — 635 armed-forces recruits and 9897 health-profession students — in 48 institutions in 21 countries was determined by a questionnaire survey. Two or more occurrences (lifetime prevalence) of RHL were reported by 33.2% of men and 28.0% of women; the corresponding figures for RAU were 38.7% and 49.7%. North American respondents, mainly from Canada, had a significantly higher prevalence of both lesions. There were some differences in relation to profession. Approximately 15% of all the people surveyed had had herpes labialis and 25% had had aphthous ulcers at least once during the previous year. Persons with a history of recurrence of one lesion were more likely to have a history of recurrence of the other.

Résumé: Prédominance de l'herpès labial et des ulcères aphteux récidivants parmi de jeunes adultes dans six continents

La prédominance de l'herpès labial récidivant (HLR) et des ulcères aphteux récidivants (UAR) chez de jeunes adultes — 635 recrues militaires et 9897 étudiants dans le domaine de la santé — à 48 institutions dans 21 pays a été déterminée par une étude employant des questionnaires. Au moins deux épisodes (prédominance à vie) de HLR ont été signalés par 33.2% des hommes et 28.0% des femmes; les chiffres correspondants pour les UAR ont été de 38.7% et de 49.7%. Ces deux lésions étaient nettement plus fréquentes chez les sujets d'Amérique du Nord (surtout du Canada). On notait certaines différences selon la profession. Près de 15% de l'ensemble des gens interrogés avaient déjà eu un herpès labial et 25% avaient souffert d'un ulcère aphteux au moins une fois durant l'année précédente. Les personnes avec une histoire de récurrence d'une des lésions étaient plus prédisposées à avoir une histoire de récurrence de l'autre lésion.

Recurrent herpes labialis (RHL) and recurrent aphthous ulcers (RAU) are painful oral lesions whose frequent recurrence is distressing and debilitating to the patient and frustrating for physicians and dentists.^{1,2} There is no proven effective treatment for either. The cause of herpes labialis ("cold sore" or "fever blister") is *Herpesvirus hominis*, but the cause of aphthous ulcer ("canker sore") remains a mystery.^{3,4}

There is evidence to support the clinical impression that these lesions are common. In Great Britain Sircus, Church and Kelleher⁵ reported a lifetime prevalence of RAU of 20.1% in 1587 hospital outpatients. In a professional-school population of 1800 in the United States Ship and colleagues⁶ recorded RAU in 57.3% of women and 54.2% of men; the prevalence of RHL for the two sexes averaged 38.2%. More recent prevalence figures are 66.2% for RAU and 31.5% for RHL in a student population, and 13.2% and 44.6%, respectively, in a group of older patients.⁷

The aim of this study was to determine by questionnaire whether there were significant variations in the prevalence of RHL and RAU in different countries that might be worth exploring further. Ideally such a study would be done by one individual travelling to each of the countries and personally explaining the aims and use of the questionnaire to each group of respondents. Because this was impossible we conducted a questionnaire survey by mail. Students of the health professions were chosen because this group was likely to be accessible and also relatively homogeneous with respect to age, health knowledge and possibly socioeconomic status.

This report presents only the overall results of the study, with emphasis on the continental differences. A detailed analysis of the Canadian data is being prepared.

Materials and methods

Letters requesting cooperation in conducting the study were sent to the deans or directors of 253 institutions (schools of medicine, dentistry, nursing and dental hygiene) in 30 countries on six continents. Interested respondents were then sent a sample questionnaire in the appropriate language, together with a request for advice on local medical terminology and corresponding colloquialisms. An outline of objectives, the list of student groups to be surveyed, and the method for returning the data were sent to in-

From the faculties of medicine and dentistry, Dalhousie University, Halifax, NS

*Associate professor of microbiology and assistant professor of pediatrics, faculty of medicine, Dalhousie University

†Presently professor of oral medicine, faculty of dentistry, University of Western Ontario, London, Ont.

‡Associate professor of preventive medicine, faculty of medicine

Reprint requests to: Dr. J.A. Embil, Infectious diseases research unit, Izaak Walton Killam Hospital for Children, 5850 University Ave., Halifax, NS B3J 3G6

dividuals supervising the distribution of the questionnaire. Colour slides of RHL and RAU were used by some supervisors to assist students.

Questionnaires were distributed to medicine, dentistry, nursing and dental hygiene students and, for comparison, to 635 recently recruited members of the Canadian Armed Forces. The following information was requested: age, sex, marital status, current year of study and replies to eight questions on RHL and eight on RAU. We used the World

Health Organization's "Oral Health Surveys"¹⁸ as a guide in data collecting and reporting.

Results

We received 10 532 completed questionnaires from 48 institutions in 21 countries (Table I); the respondents were from the age groups believed to have the highest prevalence of RHL and RAU (Table II).⁶ Because of inconsistency or incompleteness we discarded the RHL portion of 343 questionnaires and the RAU portion of 296. Furthermore, some respondents (< 5% on any one point) failed to indicate one or more general characteristics such as age or sex.

Only people who reported two or more occurrences of either lesion were counted as having a "positive history" of recurrence, or "lifetime prevalence"; those who had had less, did not reply, or said they did not know were considered to have "negative histories". The lifetime prevalence rates for RHL and RAU for the male respondents were 33.2 and 38.7% and for the females, 28.0 and 49.7% (Table III). The Canadian respondents and those from one United States university reported the highest rates for both lesions in both sexes, and the South American respondents reported the lowest rates. With one exception all Canadian prevalence rates were significantly higher ($P < 0.01$; two-tail test of the difference between proportions) than those of the continent with the nearest rates; the 3.3% difference between the prevalence of RAU in Asian and North American men was not significant ($P = 0.14$).

To determine whether there were any sex-related differences in prevalence we considered only the 20 institutions from which at least 25 persons of each sex had responded

Table I—Geographic origin of respondents

	No. of university faculties or institutions	No. of respondents
Africa		
Ghana	1	77
South Africa	3	323
Asia		
Hong Kong	1	112
India	1	200
Japan	3	256
Philippines	1	175
Thailand	1	193
Australasia		
Australia	2	222
New Zealand	1	329
Europe		
Belgium	1	20
Denmark	1	381
Finland	1	73
Greece	1	297
Sweden	2	24
United Kingdom	12	1 042
North America		
Canada	10	4 639
United States	1	154
South America		
Argentina	1	624
Colombia	1	85
Puerto Rico	1	117
Venezuela	2	1 189
Total	48	10 532

Table II—Age distribution of respondents

Age (yr)	Males (%)	Females (%)
15 — 19	15.6	23.3
20 — 24	70.0	64.0
25 — 29	12.0	7.3
30 +	2.4	5.4

Table III—Lifetime prevalence* of recurrent herpes labialis (RHL) and recurrent aphthous ulcers (RAU), by sex and continent of respondents

Continent	RHL				RAU			
	Male		Female		Male		Female	
	Total no. of respondents	% positive	Total no. of respondents	% positive	Total no. of respondents	% positive	Total no. of respondents	% positive
Africa	331	31.1	73	26.0	328	31.1	73	30.1
Asia	508	18.5	442	16.5	511	43.1	436	47.5
Australasia	417	34.3	135	26.7	429	33.8	139	32.4
Europe	1380	31.1	705	30.8	1382	36.0	711	36.7
North America	2490	42.1	1665	37.4	2516	46.4	1668	69.4
South America	792	17.8	921	14.4	791	22.1	926	30.3
Total†	5918	33.2	3941	28.0	5957	38.7	3953	49.7

*Two or more occurrences of the lesion constituted a positive history or "lifetime prevalence".

†When sex was not indicated or replies to either the RHL or RAU questions were inconsistent, the questionnaire (or portion of) was discarded; hence, the total number of respondents varies.

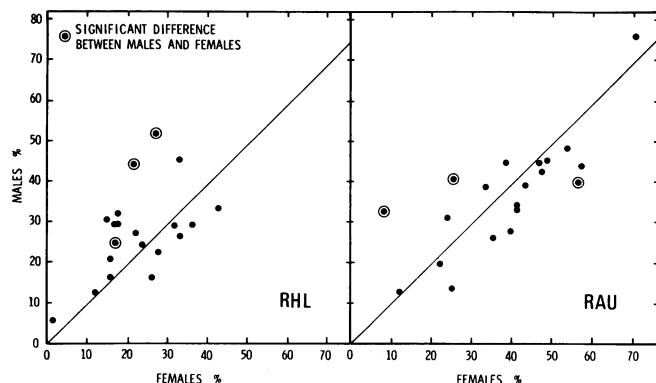


FIG. 1—Comparison of prevalence of recurrent herpes labialis (RHL) and recurrent aphthous ulcers (RAU) in male and female medical and dental students from 20 schools in 13 countries.

(Fig. 1). In three of the institutions there was a significant difference in prevalence between men and women for RHL ($P < 5\%$; significance of the difference between proportions). There were significant sex-related differences for RAU in three other institutions, but not all in the same direction. Overall, there were no significant differences in the lifetime prevalence rates for either infection: the probability of a difference as great as that observed between the 20 pairs of prevalence rates for both RHL and RAU was greater than 10% by Wilcoxon's signed-ranks test.

The apparent profession-related differences (Table IV), which may be partly explained by continental differences, are being further explored.

In determining the RHL-RAU relationship (Table V) separate chi-square tests for men and women indicated that both a positive and a negative history of both RHL and RAU occurred more frequently than would be expected if these conditions were independent of one another ($P < 0.002$).

Frequent recurrence of the infection (more than 10 lesions) was reported by about one fifth of those who had had RHL and one third of those who had had RAU (Table VI).

To facilitate comparison with other published work on RHL and RAU all the preceding results have been presented as lifetime prevalence rates. As to incidence, in the previous year 15.4% of the men and 14.0% of the women had had herpes labialis at least once; the corresponding figures for at least one aphthous ulcer were 22.5 and 29.2%.

Discussion

A major drawback to an international questionnaire is the possible misinterpretation by various cultural or language groups. It was not possible to assess the importance of this factor, but recurrent herpetic lesions on the lips are sufficiently distinct clinical entities that one can likely rely on students of the health professions to provide reasonably accurate data. The data on RAU may be less reliable because other mouth lesions may be confused with these ulcers. We believe our data indicate real differences in the prevalence of RHL and RAU between countries and warrant further investigation.

Ship and colleagues⁶ reported a positive history of RHL in 38.2% of 1788 health sciences students in the United States but no significant sex differences. In our similar study of Canadian students we found positive histories of RHL in 42.1% of 2490 men and 37.4% of 1665 women; this supports the observations of Ship and colleagues that these lesions are very common, that RHL is most prevalent in North America and that there is no significant sex difference for the infection. We believe that there is no contradiction between this last conclusion and the evidence in

Table IV, because this table gives unequal weights to the sex differences in the various schools and is less reliable than our analysis. Our statistics for RHL in students of the health professions probably are underestimates of the prevalence in the general population in these countries because it has been demonstrated in some serologic studies⁹⁻¹¹ that *H. hominis* antibodies are more commonly found in people of the lower socioeconomic groups.

Our results support the observation of Ship and colleagues⁶ that RAU is more common in North America than in the United Kingdom or continental Europe. However, comparison of health-profession students in North America with hospital and general-practice patients in the United Kingdom must take into account variation in age, profession and socioeconomic status. In our study of students of similar age and professional interests but of

Table V—Relationship of RHL and RAU histories

Clinical status	4961 men*		3436 women*	
	% observed	% expected	% observed	% expected
RHL+, RAU+	18.0	15.3	18.3	15.9
RHL-, RAU-	39.2	36.6	35.1	32.7
RHL+, RAU-	17.3	19.9	11.4	13.8
RHL-, RAU+	25.5	28.2	35.2	37.6

*Respondents who said they did not know or gave no reply for either condition have been excluded, as have those with fewer than two occurrences of either lesion.

Table VI—Frequency of recurrence of herpes labialis and aphthous ulcers in respondents with a positive history

Lesion	% of respondents with indicated no. of recurrences				Total with positive history
	Not stated	1-4	5-10	> 10	
Herpes labialis	12.6	46.5	19.7	21.1	3167
Aphthous ulcer	9.8	33.3	26.6	30.3	4392

Table VII—Comparison of lifetime prevalence of RAU in three studies

Sex	% with positive history			
	North America ⁷	North America*	United Kingdom†	Europe‡
Male	52.4	46.4	16.3	36.0
Female	57.3	69.4	21.7	36.7

*Mainly Canada; present study.

†Calculated from Table I in the report by Sircus, Church and Kelleher,⁵ excluding children under 10 years of age.

‡Mainly United Kingdom; present study.

Table IV—Profession and sex of respondents with RHL and RAU

Student group	RHL				RAU			
	Male		Female		Male		Female	
	Total no. of respondents	% positive	Total no. of respondents	% positive	Total no. of respondents	% positive	Total no. of respondents	% positive
Medicine	3594	28.9	1338	20.9	3716	36.0	1340	32.4
Dentistry	1580	39.0	727	21.9	1581	47.6	728	47.5
Nursing*	13	46.2	1471	36.4	17	58.8	1480	66.5
Dental hygiene†			253	34.8			252	66.3
Total§	5187	32.0	3789	28.0	5314	39.7	3800	50.8

*Geographic origin of respondents: North America (Canada), 70.9%; South America, 3.0%; Europe, 8.7%; Asia, 7.2%; Africa, 0.2%; Australia and New Zealand, 1.6%; not stated, 0.6%.

†Canada only.

§Totals do not include Armed Forces recruits and, because of exclusions as in Table III, differ for RHL and RAU.

different nationalities, North American/European differences are again evident (Table VII).

Our study also indicated that persons with a history of recurrence of one lesion were more likely to have a history of recurrence of the other. This association between RHL and RAU may indicate that the causes are related but could also indicate that persons who have had one lesion are more likely to recall having had the other.

We think that future studies of RHL and RAU should determine true incidence rates and examine the incidence in various age groups. Such rates are likely to be more accurate than lifetime prevalence rates, which depend on long-term memory and increase with age.

We suggest that further studies of the incidence of RHL be done in other countries and that the findings be related to the incidence of different types of cancer in these countries. RHL is a definite clinical condition of known cause, readily investigated by use of a simple questionnaire. Our survey revealed worldwide interest in this infection and showed that health professionals in the various countries will cooperate to provide data for comparative studies.

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And who can tell?

*And who can tell of my love?
Like the broad strong nose of a brown beaver
Silently nosing up the quiet creek,
The ripples are seen before the wet fur,
And not till a warning slap of wide tail
Warns the less sensitive of the presence
Does it become blatant,
Only to dive below the surface
Resentful at intrusion,
To follow a powerful, invisible course,
Reappearing with the shock of the insidious
At some unexpected backwater upstream.*

*Not for your behest are the paint and nailed notices,
"Thou shalt not" . . . Not what?
Not breathe, not swim, not dive,
Slide down a mud bank
For the fun of the feel
And the glorious splash below?*

*Swim on, gentle beaver, my love;
In time, men will realize
That your drive to exist in harmony
Is the current
That guides the stream of life,
Changing its course by your actions,
And rejoicing in your powerful grace,
My quiet love.*

PATRICIA J. HARPER, MB, BS
12711 - 39th Ave.
Edmonton, Alta.