The ecology of trachoma: an epidemiological study in southern Mexico

HUGH R. TAYLOR, FRANCISCO M. VELASCO, & ALFRED SOMMER

A total of 1097 people in two communities in Chiapas, Mexico, were examined for trachoma, and information was obtained about personal and family hygiene. Trachoma was hyperendemic; approximately 25% of those under 10 years old were found to have significant inflammatory trachoma and almost 100% of those aged over 40 years had cicatricial trachoma, although the prevalence of trachoma differed significantly between the two communities. Risk factor analysis was performed by contingency table analysis and $\chi^2$ testing. The most important parameter associated with the occurrence and severity of inflammatory trachoma in children was the frequency of face washing. Children who washed their faces 7 or more times per week had significantly less trachoma than those who washed less often ($\chi^2 = 28.7; P < 0.001$). This effect was independent of age, use of clean water and soap, or use of clothes to dry the face. Children who washed infrequently and who used clothes to dry the face or clean the nose were more at risk for trachoma. No parameters of family hygiene or socioeconomic status correlated with the amount of trachoma in a family.

These data confirm and quantify for the first time the long-held belief that trachoma is associated with poor personal hygiene and suggest potentially effective and efficient intervention strategies.

Trachoma used to be a major blinding disease in Europe and North America during the last century. In this century, it gradually disappeared through a multitude of changes in living conditions, personal hygiene, health care delivery, and many other factors, or, as expressed by Reinhardts, through "material and cultural progress" (/) rather than specific chemotherapeutic intervention programmes. Trachoma is, however, a major blinding disease in many developing areas, especially in rural communities in the tropical and subtropical zones.

For many years people have tried to identify the factors responsible for the occurrence of severe blinding trachoma. In 1962 the report of a WHO Expert Committee (2) listed the following possibilities: race; climate (including temperature, rainfall, altitude, and ultraviolet light); insect vectors; population density; diet and nutrition; cultural and social customs (including household structure, religion, occupation, and water utilization); general economic levels; previous population movements; educational status; and the presence of other ocular and general diseases. Under this broad umbrella, almost every conceivable aspect of life was covered without materially advancing our understanding or fostering the development of specific intervention strategies.

Some authors have identified certain general factors associated with trachoma, such as intimate family contact (3), poor community hygiene (4), and poverty and general lack of industrial development (5, 6). Other authors have looked more critically at specific factors associated with trachoma. For example, Mann (7) identified the importance of the introduction of textiles in the absence of good personal hygiene; Assaad et al. (8) noted that crowding in sleeping quarters was important; Marshall (9) identified the introduction of piped water and the sharing of towels; and Jones drew attention to the presence of flies, which had previously been suggested by Wilson (10) and Weir (11). Hollows and coworkers (12) found clear correlations between the prevalence of trachoma and four climatic variables and six compound community hygiene variables.

Blinding trachoma is known to occur in Indian
villages in the highlands of Chiapas in southern Mexico (13). The present article describes an epidemiological study whose aim was to identify the factors (a) that differentiated individuals with and without trachoma in communities where the disease was endemic, and (b) that could serve as a basis for an effective intervention programme.

MATERIALS AND METHODS

Two communities, Naranja Seca and Chaonil, were selected from the municipality of Oxchuc, which is an area of high endemicity for trachoma. Both villages were within 40 minutes walk of the nearest road and each had a community health auxiliary working from a community health centre. They were thought to have a comparable housing density, most houses being relatively close together and of similar general appearance.

The field team went from house to house, taking a census and mapping each village. A family was defined as all the people whose meals came from the same cooking pot, and a family questionnaire was completed for each household. The questionnaire included demographic data on all persons normally living in that house, a general description of the house, and specific questions relating to water usage and sanitation. Completion of these forms required information obtained by both observation and interrogation. A second questionnaire was completed for all children aged 10 years or less. This questionnaire included questions on personal hygiene, especially relating to washing practices.

All family members had an ocular examination at a centrally located point. Each person was examined for trachoma with a 2.5x loupe and a flashlight. Trachoma was graded according to the following criteria.

**Inflammatory trachoma.** Mild—the presence of more than 5 follicles on the superior tarsal conjunctiva (equivalent to WHO follicles grade F2) (14); moderate—more than 5 follicles in the central tarsal plate (equivalent to WHO follicles grade F3); severe—papillae obscuring more than half the tarsal vessels plus follicles (equivalent to WHO papillae grade P3 and follicles grade F1 to F3). Results are presented for all inflammatory trachoma (WHO intensity categories—mild, moderate, and severe) and severe inflammatory trachoma (WHO intensity category—severe).

**Cicatricial trachoma.** Mild—the presence of definite scars in the tarsal conjunctiva (equivalent to WHO conjunctival scarring C1 and C2); moderate—sufficient scarring of the tarsal conjunctiva to cause distortion of the tarsal plate (equivalent to WHO conjunctival scarring C3); severe—trichiasis in the presence of tarsal conjunctival scarring. Results are presented for all cicatricial trachoma and severe cicatricial trachoma.

Photographs of the superior tarsal conjunctiva of the left eye were taken on all children between the age of 1 and 10 years in every fourth family. These photographs were used to verify the clinical grading in this sub-sample of children in a masked fashion. Conjunctival scrapings were collected from the superior tarsal conjunctiva of the right eye of the same children. The scrapings were stained with Giemsa stain and examined for inclusions, bacteria, and inflammatory cells.

RESULTS

The census indicated that the total population of the two communities, Naranja Seca and Chaonil, was 1289, of whom 1097 (85.1%) were examined. Trachoma was prevalent in both communities (Table 1). Inflammatory trachoma was most common in people under the age of 20 years (Fig. 1); under the age of 10 years it was more common in girls than in boys. In both sexes, mild to moderate inflammatory trachoma persisted into adult life. Severe inflammatory trachoma persisted only in adult women. Inflammatory trachoma was significantly more prevalent and more severe in Naranja Seca than in Chaonil (for children aged 10 years or less, $\chi^2$ for trend = 46.3; $P < 0.001$). The prevalence of cicatricial trachoma increased with age (Fig. 2). Although the overall prevalence of scarring was comparable in males and females, trichiasis was most common in elderly females.

Conjunctival scrapings were obtained from 171 children. Characteristic chlamydial inclusions were seen in Giemsa-stained smears from 19 (24%) of the 81 children diagnosed clinically as having trachoma.

**Personal hygiene**

A number of parameters on personal hygiene were examined for their association with inflammatory trachoma in the 469 children aged 10 years or less. Trachoma occurred significantly more frequently and was more severe in those who washed their faces infrequently and was more severe in those who washed their faces infrequently (Table 2). The relative risk for trachoma in those who washed their faces an average of less than once per day, compared with those who washed one or more times per day, was 3.1. Overall, face washing had a population attributable risk of 57%.

Because of the striking association between face
Table 1. Percentage prevalence of inflammatory and cicatricial trachoma by age and sex for Naranja Seca and Chaonil

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Inflammatory trachoma</th>
<th>Cicatricial trachoma</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Naranja Seca</td>
<td>Chaonil</td>
</tr>
<tr>
<td>Females:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-2</td>
<td>26(8)%</td>
<td>0(0)</td>
</tr>
<tr>
<td>3-4</td>
<td>77(14)</td>
<td>17(0)</td>
</tr>
<tr>
<td>5-10</td>
<td>47(6)</td>
<td>20(2)</td>
</tr>
<tr>
<td>11-14</td>
<td>50(8)</td>
<td>32(0)</td>
</tr>
<tr>
<td>15-19</td>
<td>39(6)</td>
<td>17(0)</td>
</tr>
<tr>
<td>20-39</td>
<td>25(3)</td>
<td>15(1)</td>
</tr>
<tr>
<td>40-59</td>
<td>30(3)</td>
<td>3(3)</td>
</tr>
<tr>
<td>&gt; 60</td>
<td>23(0)</td>
<td>0(0)</td>
</tr>
<tr>
<td>Males:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-2</td>
<td>35(9)%</td>
<td>3(0)</td>
</tr>
<tr>
<td>3-4</td>
<td>30(0)</td>
<td>8(0)</td>
</tr>
<tr>
<td>5-10</td>
<td>36(6)</td>
<td>6(2)</td>
</tr>
<tr>
<td>11-14</td>
<td>41(8)</td>
<td>30(3)</td>
</tr>
<tr>
<td>15-19</td>
<td>50(0)</td>
<td>31(10)</td>
</tr>
<tr>
<td>20-39</td>
<td>27(4)</td>
<td>14(2)</td>
</tr>
<tr>
<td>40-59</td>
<td>35(0)</td>
<td>3(0)</td>
</tr>
<tr>
<td>&gt; 60</td>
<td>17(0)</td>
<td>9(0)</td>
</tr>
</tbody>
</table>

* Figures in parentheses give the percentage prevalence of severe disease.
Table 2. Prevalence of trachoma in children aged 10 years or less in Naranja Seca and Chaonil, by the frequency with which their faces were washed

<table>
<thead>
<tr>
<th>Frequency of face washing (per week)</th>
<th>No. of cases without trachoma</th>
<th>No. of trachoma cases:</th>
<th>Percentage with trachoma*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Moderate</td>
<td>Severe</td>
<td></td>
</tr>
<tr>
<td>Both communities:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>11</td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>1-2</td>
<td>77</td>
<td>36</td>
<td>7</td>
</tr>
<tr>
<td>3-6</td>
<td>107</td>
<td>35</td>
<td>5</td>
</tr>
<tr>
<td>≥7</td>
<td>154</td>
<td>17</td>
<td>1</td>
</tr>
<tr>
<td>Naranja Seca:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>8</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>1-2</td>
<td>48</td>
<td>29</td>
<td>6</td>
</tr>
<tr>
<td>3-6</td>
<td>47</td>
<td>31</td>
<td>4</td>
</tr>
<tr>
<td>≥7</td>
<td>28</td>
<td>8</td>
<td>1</td>
</tr>
<tr>
<td>Chaonil:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>3</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>1-2</td>
<td>28</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>3-6</td>
<td>60</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>≥7</td>
<td>126</td>
<td>9</td>
<td>0</td>
</tr>
</tbody>
</table>

*Comparison of the prevalence of trachoma in the groups with infrequent (0-6 times per week) and more frequent (7 or more times per week) face washing.

Both communities: χ² = 28.7, P < 0.001; χ² trend = 27.8, P < 0.001.
Naranja Seca: χ² = 4.62, P = 0.099; χ² trend = 4.33, P < 0.04.
Chaonil: χ² = 3.03, P = 0.08.

washing and trachoma, the relationship between face washing and other hygiene variables was examined in children under the age of 10 years. The following variables were not associated with the frequency of face washing: age, sleeping habits, or use of previously used water. However, children who washed their faces more frequently (7 or more times per week) were also more likely to use soap and wash their bodies and clothes more often, and were less likely to use their clothes to dry the face or blow the nose. They were also more likely to live farther from their school and to live in a house with a separate kitchen, and their families were less likely to dispose of rubbish by leaving it on the ground. However, on their own, none of these variables was associated with trachoma.

There was a major difference in the frequency of face washing between the two communities. In Naranja Seca, 84% of children washed their faces less than 7 times per week compared with 44% in Chaonil (χ² = 18.0; P < 0.0001), which corresponds well with their related rates of trachoma. There was still an association between the frequency of face washing and trachoma within each community (Table 2). When stratified by community, the source of water was not correlated with either the occurrence of trachoma or with the frequency of face washing. Also, when stratified by community, there was no relationship between how long it took to get to the water source and how often children washed their faces in Chaonil; but paradoxically, in Naranja Seca, those who lived farther from their water source washed their faces more frequently (χ² = 20.6; P < 0.001).

The importance of personal hygiene parameters was examined in children who washed their faces frequently and those who did not. Children who washed infrequently and who dried their faces on their own clothes or their mother's clothes had a higher rate of trachoma than those who used a towel or let their faces dry in the air (Table 3). Similarly, children who washed infrequently and who blew their noses on their own clothes or their mother's clothes had a higher rate of trachoma than those who used a handkerchief or a separate cloth, or used the back of their hand, or blew their noses onto the ground. These
Table 3. The relationship between the frequency of face washing, the methods used to dry or clean the face and nose, and the occurrence of trachoma in children aged 10 years or less

<table>
<thead>
<tr>
<th>Method of drying the face</th>
<th>Faces washed less than 7 times per week</th>
<th>Faces washed at least 7 times per week</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Trachoma absent</td>
<td>Trachoma present</td>
</tr>
<tr>
<td>Clothes</td>
<td>114</td>
<td>71 (38)</td>
</tr>
<tr>
<td>Towel</td>
<td>39</td>
<td>11 (22)</td>
</tr>
<tr>
<td>Air</td>
<td>42</td>
<td>11 (21)</td>
</tr>
<tr>
<td>Method of nose blowing:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clothes</td>
<td>103</td>
<td>63 (38)</td>
</tr>
<tr>
<td>Handkerchief</td>
<td>46</td>
<td>13 (22)</td>
</tr>
<tr>
<td>Hand or ground</td>
<td>46</td>
<td>17 (27)</td>
</tr>
</tbody>
</table>

$\chi^2 = 8.78, P < 0.01$  
$\chi^2 = 6.08, P < 0.05$

Figures in parentheses are percentages.

Factors were not important in those who washed their faces frequently. The use of soap or clean water (water not previously used by anyone else) was not important in either group (faces washed infrequently or frequently). The variation in relative risk, by methods of nose blowing, is at most 1.5:1; but within each category of face drying or nose blowing, the relative risk associated with face washing is of a different order of magnitude entirely, namely, 3.5:1.

There was no association between the presence of trachoma and the following factors: child sleeping alone, use of soap to wash the face, use of water that had previously been used by others to wash the face, frequency of bathing (including steam baths), frequency or site of clothes washing, or frequency with which the bed linen was washed.

Family risk factors

To assess the importance of family risk factors, families were grouped by the percentage of children aged 10 years or younger who had inflammatory trachoma. In the study population, there were 214 such families, 109 in Naranja Seca and 105 in Chaonil. In 34 families, there were no children aged 10 or younger, and these were omitted from our analysis; 45 families had only one child aged 10 or younger.

Trachoma occurred more frequently and in a higher proportion of children in families from Naranja Seca than in those from Chaonil (Table 4). Further analysis of family parameters were therefore stratified by community. The following factors were examined and found not to be associated with the presence of trachoma.

Table 4. Distribution of families with at least one child aged 10 years or less by the prevalence of trachoma in the children in Naranja Seca and Chaonil

<table>
<thead>
<tr>
<th>Community</th>
<th>0%</th>
<th>1-50%</th>
<th>51-99%</th>
<th>100%</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Naranja Seca</td>
<td>36(41)</td>
<td>24(27)</td>
<td>16(18)</td>
<td>12(14)</td>
<td>88</td>
</tr>
<tr>
<td>Chaonil</td>
<td>74(80)</td>
<td>12(13)</td>
<td>2(2)</td>
<td>4(4)</td>
<td>92</td>
</tr>
<tr>
<td>Total</td>
<td>110(61)</td>
<td>36(20)</td>
<td>18(10)</td>
<td>16(9)</td>
<td>180</td>
</tr>
</tbody>
</table>

$\chi^2 = 31.9, P < 0.001$  
$\chi^2$ trend = 25.9, P < 0.001

Figures in parentheses are percentages.
frequency of inflammatory trachoma in children: size of the family; distance to the nearest house (although 75% of houses were within a 5-minute walk of the next); principal source of water for bathing, washing, or cooking; distance to the principal water source; level of education of parents; initial or final method of fecal or garbage disposal; and construction of the house, including type of walls, roof, or floor, the number of rooms, and whether there was a separate kitchen.

There was no consistent evidence for family clustering of trachoma in either community. This was true for those with severe as well as less severe inflammatory trachoma. For example, the 39 individuals with severe inflammation came from 31 different families. The risk of infection in children aged 10 years or less was examined to see whether it was influenced by the presence or absence of trachoma in the mother or a sibling. In Naranja Seca, there was a slightly increased risk of children having inflammatory trachoma if the mother had inflammatory trachoma (relative risk 1.4 for any inflammatory trachoma, 1.7 for severe trachoma). There was no such association in Chaonil. The presence of cicatricial trachoma in a mother did not influence the risk of trachoma in her children. The risk of a child having inflammatory trachoma if one of its sibs had trachoma was also assessed. In Chaonil where the overall prevalence of trachoma in children aged 10 years or less was low (10%), the rate of trachoma in siblings of affected children was appreciably higher (21%). In Naranja Seca where the prevalence in children was high (37%), no such increase was seen (rate in siblings of affected children, 39%).

**DISCUSSION**

This study confirmed that there is a high prevalence of trachoma and its sequelae in villages in the highlands of southern Mexico. It also identified a simple aspect of personal hygiene, face washing, that was strongly associated with a higher prevalence of inflammatory trachoma in young children. The study employed well-recognized epidemiological techniques of sample definition—a house-to-house census and a centrally located place of examination. Over 85% of the defined population was examined.

A simplified schema for grading of trachoma was used, which agreed with the WHO criteria (14) but was simpler to use in the field. Our method may, however, have underestimated the overall prevalence of inflammatory trachoma by excluding occasional cases that would have been classified by WHO as trivial trachoma (F1). The grading of trachoma was verified by having a second, experienced ophthalmologist review photographs from a systematic subsample of the children in a masked fashion (unpublished data); the agreement was very close. The diagnosis was further confirmed by finding chlamydial inclusions in Giemsa-stained smears in a similar percentage of clinical cases as previously reported from other endemic areas (4).

Inflammatory trachoma mostly affected the younger people, as is true in most endemic areas (12, 15-18). This is attributed to the ease of transmission of infection in this age group, resulting in frequent reinfection. Children are usually regarded as the major reservoir of chlamydial infection in an endemic area. The persistence of inflammatory trachoma in approximately one-fifth of adults suggests that transmission continued in this older group. Inflammatory trachoma has been noted in adults in some endemic areas such as Burma (19), Ethiopia (20), and Iran (17); but it is not common in others, such as Australia (12).

There was a progressive increase in the prevalence and severity of cicatricial trachoma with increasing age so that, by the age of 40 years, almost everyone had at least some trachomatous scarring. Severe cicatricial scarring with trichiasis was most common in elderly women; almost half of the women over the age of 60 years had trichiasis. This is a particularly high rate of trichiasis, although in many endemic areas women have a higher rate of severe trachoma than men (5, 18, 21, 22). The increased severity of trachoma in women has been attributed to continuing transmission between children and women who have to take care of the children and are, therefore, closely associated with them, whereas the men are usually separated from the children for most of the day.

To the casual observer, the two communities studied appear identical; they certainly had in common most of the physical characteristics specifically examined in this study. Both had the same racial, cultural, and socioeconomic characteristics although they differed significantly in the prevalence of trachoma. Those characteristics not in common that were identified by this study (e.g., use of well water as a major water source) did not correlate with the occurrence of trachoma. Detailed analysis of the community-level variables was not possible because only two communities were studied.

Interestingly, practically no flies were found in these communities in January, a time when climatic conditions would be expected to favor fly breeding (Milan Trip, personal communication). Many have stressed the important role that flies are thought to play in the transmission of trachoma (5, 17, 23), although others have considered them to be not so important (18, 22, 24). The finding of severe trachoma in Chiapas in the absence of flies indicates...
that flies are not a prerequisite for intense transmission of trachoma. This finding is in accord with that of Reinhards (22) who found fly control alone had little influence on the occurrence or severity of trachoma.

Trachoma is often attributed to crowding (4, 6, 23, 25, 26). Many authors have indicated the importance of transmission of trachoma within the family (3, 5, 10, 21, 27, 28), although others have stressed the importance of community transmission of trachoma (8). No single factor of family hygiene was associated with an increased risk of trachoma in this study. An increased risk of trachoma in large families has been reported in some areas (29) but not others (27, 30).

Taylor and coworkers (18) have pointed to a correlation between infection in a mother and infection in her children. Although we found no consistent family clustering of trachoma as such, the children in Naranja Seca did have a small increased risk of having trachoma if the mother had inflammatory trachoma. Just as no single family-level factor of hygiene was identified with an increased risk of trachoma, no indicator of family socioeconomic status or housing was associated with trachoma.

The most important and exciting association in this study was the relationship between face washing and trachoma. A clean face and clean hands have often been advocated for the reduction of trachoma, but until now no study has specifically investigated the role this sort of intervention might play. Unless someone washes the child's face, it is impossible for a child to wash its face without using its hands. Hence, we cannot distinguish between the relative importance, if any, of these two attributes. Washing of the rest of the body did not appear to be important.

Face washing has been incorporated along with other factors (personal and environmental hygiene and chemotherapy) in trachoma control programmes in Australia (31), Malta (32), and South Africa (33). In the latter two countries, trachoma became less prevalent; but in each case this was ascribed to a general improvement in living conditions. In the Ryukyu Islands, the implementation of compulsory face washing in schools occurred as piped water became freely available. This led to a paradoxical increase in the amount of trachoma, which was ascribed to the sharing of towels (9). From the first modern descriptions of trachoma, the sharing of towels or water for washing has been implicated in the transmission of infection (26, 34, 35). In the present study, neither the use of shared towels nor shared water was associated with an increased risk of infection, although the use of clothes to dry the face or to clean the nose was important among children who were infrequent face washers. It is postulated that chlamydia are transmitted on the clothes that are used to dry or clean a child's face. Infection could also be spread among members of the same family when the mother's clothes are used; this would also lead to infection of the mother.

Auto-reinfection may be important when the child's clothes are used to clean or dry its own face. The frequent isolation of chlamydia from the nasopharynx of children in a trachoma area (36) highlights the potential importance of the spread of trachoma by nasal secretions as well as the well-recognized ocular secretions (17). Attention has also been drawn to the role dirty clothes and bed linen could play in the transmission of trachoma (7, 17, 27, 37), although we found no correlation with the frequency with which these items were washed.

The sharing of sleeping space might increase the transmission of trachoma (27, 34); in some areas, at least, it has been shown to be associated with a higher prevalence of trachoma (8) but it was not found to be important in this study.

From the public health viewpoint, the identification of the importance of face washing is most fortuitous. It is probably one of the very few hygiene practices amenable to change and for which expensive intervention is not required. The change of other practices might require extensive capital outlay; continuing high, recurring costs; or fundamental cultural or social alterations. Frequent face washing does require water, but this can be a minimal amount. Trials in the United Republic of Tanzania have shown that up to 50 children can have their faces washed with a pint of water (Alan Foster, personal communication, 1984).

The present study indicates that soap, and quite possibly clean water, are not necessary and that air drying of the face is not only acceptable but ideal. Therefore, with a single motivational message and minimal amounts of water, it should be possible to significantly reduce the prevalence of inflammatory trachoma in the highland villages of Mexico. For this area, the next step must be to mount a campaign to promote face washing and determine its impact on trachoma. It is not known whether frequent face washing is equally central to trachoma control in other cultures and areas. The use of carefully designed and executed risk factor studies will be needed to guide the development of effective and efficiently targeted intervention programmes for the control and ultimate eradication of trachomatous blindness.
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RÉSUMÉ

L’ECOLOGIE DU TRACHOME: UNE ENQUETE ÉPIDÉMIOLIGIQUE DANS LE SUD DU MEXIQUE

Une enquête épidémiologique sur les facteurs de risque liés au trachome a été exécutée dans deux communautés de l’état de Chiapas, au Mexique. Le dépistage a porté sur 1097 individus et des renseignements ont été recueillis sur l’hygiène personnelle et familiale. Le trachome avait un caractère hyperendémique et environ 25% des sujets de moins de 10 ans présentaient des signes évidents de la maladie au stade inflammatoire, et près de 100% des sujets âgés de plus de 40 ans portaient des cicatrices, mais la prévalence de la maladie différait sensiblement entre les deux communautés. L’analyse des tables de contingence et le test du $\chi^2$ ont été appliqués à l’étude des facteurs de risque. Le paramètre le plus important associé à l’apparition et à la gravité de la maladie à son stade inflammatoire chez les enfants était la fréquence des lavages du visage. Le trachome était nettement moins fréquent chez les enfants qui se lavaient le visage 7 fois, ou davantage, par semaine que chez ceux qui le faisaient moins souvent ($\chi^2_{20} = 28.7$; $P < 0.001$). Cet effet était indépendant de l’âge, de l’utilisation d’eau claire et de savon, ou de l’emploi des vêtements pour s’essuyer. Le risque était plus élevé chez les enfants qui se lavaient peu souvent et qui utilisaient leurs vêtements pour s’essuyer le visage ou se nettoyant le nez. Aucun paramètre d’hygiène familiale ou de condition socio-économique ne s’est révélé corrélé avec le degré d’activité du trachome dans une famille.

Ces données confirment, sous une forme quantitative pour la première fois, la vieille croyance selon laquelle le trachome est associé à une mauvaise hygiène personnelle et elles permettent de suggérer des stratégies d’intervention susceptibles d’être à la fois efficaces et efficientes.

REFERENCES


31. **Hardy, D. et al.** The cytology of conjunctival smears from Aboriginal schoolchildren at Yalata, South Australia. *Am. j. ophthalmol.,* **63:** 1538–1540 (1967).


