

Voice Problems in a Small Swedish Town: A Retrospective Study of the Prevalence and a Follow-up*

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Summary: The prevalence of voice problems among patients consulting the primary health care unit of a small Swedish town during 1984 was investigated. A study of the records of 11,606 patients indicated that 102 of them consulted their doctor mainly because of voice problems. The period prevalence of voice problems in the population of 20,049 people was 0.5%. A follow-up examination ~1 year later indicated that 44% of these patients still had voice problems. Among the patients with a voice disorder diagnosis made by means of indirect laryngoscopy in 1984, 72% still had a voice disorder diagnosis at the follow-up. It is pointed out that the doctor who is seeing a patient with voice problems should make a thorough examination including indirect laryngoscopy. It is also important to discuss the patient's smoking habits and professional vocal strain to prevent recurrence. **Key Words:** Voice problems—Prevalence—Primary health care—Follow-up.

In a screening procedure to detect undiagnosed voice disorders, there must always be a definition of the normal voice. The results depend a great deal on this definition. At present there are no Swedish studies of the prevalence of voice problems in the general population. Figures of this prevalence found in the literature are all from health screening procedures in the general population.

Early estimates of the prevalence of voice disorders among school children showed varying results: from 0.2% (1) to 27% (2) and 41.6% (3).

In a review by Wilson (4), a number of screening studies of voice problems in school children were

presented. The results of most of these studies show that ~6–9% have voice problems; e.g., Baynes (5) found that 7.1% of the 1,012 first-, third-, and sixth-grade children had chronic hoarse voices. Senturia and Wilson (6) reported that 6% of 32,500 school children in the St. Louis, MO, area (U.S.A.), aged 5–18 years, had voice deviations.

Laguate (7) screened 428 adults going through a series of tests in a multiphasic health screening unit. The subjects ranged in age from 18 to 82 years. Among these, 6.7% were referred for laryngeal evaluation because of an abnormal voice.

The aims of the study were as follows: (a) To study the period prevalence of voice problems in a Swedish town. A voice problem is here defined as a voice symptom for which the patient consults a doctor. Only patients who had consulted the doctor mainly because of voice problems were included. (This excluded, e.g., a common cold associated with hoarseness). (b) To reexamine as many of these patients as possible. How many patients still had voice problems? Which factors were responsible for maintaining the problems?

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* *Editor's note:* This article provides interesting data on the prevalence of voice disorders. The data collected in the small town compare favorably with similar data from Huddinge Hospital, one of the largest in Sweden. Consequently, this work is being published despite the lack of sophistication in instrumentation, with the hope that the author or other investigators will carry out further studies using objective voice measures and video documentation, rather than mirror laryngoscopy alone.

PROCEDURE

The study was carried out in a Swedish town, Tierp. This is a small town of some 20,000 inhabitants, situated ~60 km from each of the cities of Uppsala and Gävle. There is some industry in Tierp, but also many farms in the neighborhood. There is a health care unit in the town, where general practitioners work. Because of the distance to other medical centers (Uppsala, Gävle), one can assume that practically all patients with voice problems primarily consult this unit. Most of the patients with voice problems are examined by a general practitioner, but some of them are also examined by a consultant ear, nose, and throat (E.N.T.) specialist from Uppsala.

As part of a project in cooperation with the Institute of Social Medicine in Uppsala, every patient in Tierp is given a specific diagnosis, which is coded and computerized in Uppsala. By searching through possible diagnoses, one can find all the patients with voice disorders who consulted a doctor during a given year. In this investigation, patients seen because of voice problems during 1984 were studied.

The first part of the study was to collect information from the medical records of the patients. The second part was to contact these patients and ask them about their present voice problems. All were offered a second examination, which was performed at the health care unit by the author. The previous case history was supplemented and a complete E.N.T. examination was performed, including indirect laryngoscopy. Also, the voice was evaluated perceptually. Each patient was given a new diagnosis. In certain cases, the history of the patient was supplemented with information from examinations and treatment given at the Departments of phoniatrics and E.N.T. in Uppsala.

The follow-up examinations were carried out from October 1985 to April 1986.

RESULTS

Data from medical records

Studies of the patient records from 1984 revealed 102 patients who met the criteria for inclusion in the study. The total population of Tierp at the time was 20,049 people (10,195 men and 9,854 women) (8). Thus, the period prevalence of voice problems in Tierp during 1984 was 0.5%. During this year, a

total of 11,606 patients consulted the health care unit. Among the 102 patients, there were 48 men and 54 women; 0.47% of the men and 0.55% of the women had voice problems. The age distribution of the patients included in the study is presented in Table 1. The age range of the patients was from 2 to 82 years of age. The average age was 43.6 years for the males and 39.3 years for the females. The prevalence of voice problems for the groups in Table 1 did not differ significantly from the prevalence for all the patients.

Diagnoses

The most common diagnosis in the medical records was acute laryngitis (34 patients). Other diagnoses were chronic laryngitis (six), chronic vocal fold edema (Reinke's edema) (four), bowed vocal folds (three), phonasthenia (a diagnostic label used for patients with vocal fatigue in spite of normal laryngoscopic findings) (four), vocal nodules (two), and vocal fold polyps (two). There were also 38 patients who were diagnosed as cases of acute laryngitis although laryngoscopy had not been carried out. In total the larynx had been examined in 61 patients and was not examined in 41 patients (40%).

Smoking

Information about smoking habits was found in the medical records of 37 patients (36%). Twenty of these were nonsmokers. In the rest of the cases, no such information was found.

Occupational voice strain

In 30% of the records, occupational voice strain was mentioned. Information about other diseases was found in 44 medical records (33%). In 12 of these, the patients had tension problems in the neck-shoulder region or headache.

Treatment

The overall majority, 75% (77/102), were treated with antibiotics, cough medicine, or other medications. Thirteen patients were prescribed voice rest,

TABLE 1. Age distribution of patients included in the study

Age (yrs)	No. of patients
0-15	14
16-64	70
>64	18
Total	102

two patients were advised to stop smoking, and eight patients were referred to the E.N.T. or the Phoniatic Departments in Uppsala. Only six patients were offered voice therapy and four of them accepted. There were also some patients who had a follow-up at the primary health care unit in Tierp. This makes a total of 20% (20/102) of the patients who had further treatment or follow-up.

DATA FROM FOLLOW-UP STUDY OF 102 PATIENTS

For follow-up, patients were contacted by letter or by telephone. In this way 98 patients (96%) were reached. Of these, 71 (70%) came to the second examination. The diagnoses made at the follow-up examination are given in Table 2.

At the follow-up, 53 patients (52%) had no voice complaints, 45 (44%) had some voice complaints and a voice disorder, and the remaining 4 patients (4%) could not be reached for a follow-up.

The occurrence of the various voice disorders compared with the same disorders for patients consulting the Phoniatic Department in Huddinge during the 5-year period from 1979 through 1983 is presented in Table 3 and shows a surprising simi-

TABLE 3. Comparison with occurrence of the various voice disorders in Tierp and Huddinge University Hospitals

Diagnosis	Occurrence (%)	
	Tierp	Huddinge
Laryngitis (acute and chronic)	15.5	14.6
Chronic vocal fold edema (Reinke's edema)	6.7	5
Contact granuloma	8.9	1
Vocal nodules	17.8	14
Vocal fold polyps	6.7	4
Phonasthenia (vocal fatigue)	35.5	36
Bowed vocal folds	6.7	3
Psychogenic dysphonia	2.2	2.2

larity. The patients were asked about their smoking habits at the follow-up. Eighty-one patients (83%) were nonsmokers. There were eight patients smoking >15 cigarettes per day; three of them had chronic vocal fold edema (Reinke's edema), two had chronic laryngitis (with reddened and swollen mucous membrane), one had contact granuloma, one had phonasthenia, and one had normal vocal folds.

Among the 45 patients with voice disorders at the follow-up, 28 (62%) reported having an occupation that involved voice strain, for example, clergy, pre-school teachers, workers in very noisy environments, and telephone operators in busy offices.

TABLE 2. Diagnoses made at follow-up examination

Diagnosis		No. of patients
Organic voice disorders (10 patients)	Acute laryngitis	1
	Chronic laryngitis (3 of these patients also had vocal fold polyps)	6
	Chronic vocal fold edema (Reinke's edema)	3
Functional-organic disorders (15 patients)	Vocal nodules	8
	Vocal fold polyp	3
	Contact granuloma (1 of these patients also had bowed vocal folds)	4
Functional voice disorders (20 patients)	Phonasthenia (vocal fatigue)	16
	Psychogenic dysphonia	1
	Bowed vocal folds	3
Subtotal		45
No voice disorder (53 patients)	No voice complaints and a normal examination	26
	No voice complaints, did not come to second examination	27
Total		98

Voice disorder characteristics at follow-up

There were six patients with chronic laryngitis and three patients with chronic vocal fold edema (Reinke's edema). All of them were smokers except three who had recently given up smoking. All except one of the patients with chronic laryngitis were men, and all three of the patients with chronic vocal fold edema were women. None of the patients with Reinke's edema had had any specific treatment other than antibiotics.

Of eight patients with vocal nodules, seven were females and six reported voice strain in their occupation. In 1984, four of these patients were given the diagnosis of acute laryngitis even though no examination of the larynx had been done; none of these patients had had any voice therapy. We found four patients with contact granulomas, all men, and none had had any voice therapy.

There were 16 patients who were given the diagnosis of phonasthenia (vocal fatigue). Twelve of these patients (75%) had voice strain in their occupation. In 1984, 12 of the patients were treated for

acute laryngitis without any follow-up. Only 3 of the 16 patients had had voice therapy.

FOLLOW-UP OF VARIOUS DIAGNOSES

We compared the diagnoses made by means of indirect laryngoscopy in 1984 with the diagnoses for the same patients made at the follow-up in 1985. The results are presented in Table 4. Only 28% (13) of those who had a voice disorder diagnosis in 1984 were normal at the follow-up. Thus, 72% still had a voice disorder diagnosis then. This figure is based on 46 patients only, but, on the other hand, it comprises patients who had a complete examination including indirect laryngoscopy both in 1984 and at the follow-up. There were 28 patients with acute laryngitis diagnosed by means of indirect laryngoscopy in 1984. At the follow-up, 57% (16) of these still had voice problems. As can be seen in Table 4, practically none of the patients with other voice disorders in 1984 were normal at the follow-up.

DISCUSSION

When studying voice disorders, one must remember that the voice function is part of the be-

havior of the person. What is a normal voice for one person can be abnormal for another, depending on the personality, occupational demands on the voice, etc. Since many voice disorders are not progressive, a person may adapt to his or her disorder and therefore not consult a doctor about it. Many voice disorders that could be treated remain undiagnosed for this reason (9). In this study, we included only patients who had consulted a doctor mainly because of their voice problem, and it was in no way a screening procedure. This is one explanation for why the result of this study—a prevalence of 0.5% for voice disorders—is ~10 times lower than the figures in the screening studies described in the introduction. Those studies included all patients with voice problems passing a general health screening procedure. The prevalence might also be higher in a city area, where people to a higher degree have voice strain in their occupation.

Studies of the medical records revealed that as many as 40% of the cases did not receive inspection of the larynx at their first exam. The diagnosis of acute laryngitis had been made in 38% of the patients without inspection of the larynx. Thus, with such a procedure many conditions remain undiagnosed. Information about smoking habits was noted in only 36% of the patients' records, and information about voice strain in the occupation was noted in 30%. All such information is important for the treatment and follow-up of patients with voice problems.

Only 20% of the patients had any follow-up or referral for treatment other than antibiotics. Referral to E.N.T. or Phoniatric Departments was made in only 8% of the cases. Very few patients had received voice therapy. One explanation for this is that in 1984 there was no logopedist in Tierp, so patients had to travel 60 km to Uppsala or Gävle to obtain voice therapy (to be effective and prevent recurrence this usually requires 15–20 sessions with the logopedist). (Logopedist corresponds to a speech and language pathologist in the United States and to a speech therapist in Great Britain.)

In the second part of the study, 96% of the patients were contacted for the follow-up examination. At the follow-up, as many as 44% of the patients still had voice complaints.

The distribution of the various voice disorders in Tierp was similar to that of the Huddinge Phoniatric Department (Table 2). One exception was the diagnosis of contact granuloma. In Tierp, this diagnosis was made in 9% as compared with 1% in

TABLE 4. *Diagnoses made by means of indirect laryngoscopy*

1984	n	At follow-up	n
Bowed vocal folds	2	Bowed vocal folds	2
Acute laryngitis	28	Vocal fold polyp	1
		Vocal nodules	1
		Chronic vocal fold edema	1
		Contact granuloma	3 ^a
		Chronic laryngitis	2 ^b
		Psychogenic dysphonia	1
		Phonasthenia (vocal fatigue)	7
		Normal	12
Vocal fold polyp	2	Vocal fold polyp	1
		Normal	1
Chronic laryngitis	6	Acute laryngitis	1
		Vocal fold polyp	1
		Chronic laryngitis	4 ^c
Vocal nodules	2	Vocal nodules	2
Chronic vocal fold edema	1	Chronic vocal fold edema	1
Phonasthenia	5	Bowed vocal folds	1
		Phonasthenia	2
		Vocal nodules	1
		Chronic vocal fold edema	1
Total: 46 patients			

^a One patient also had bowed vocal folds.

^b One patient also had contact granuloma.

^c One patient also had vocal nodules.

Huddinge. Generally patients with contact granuloma have small problems with their voice, which is often characterized by vocal fry. One suspects that patients with contact granuloma often get used to their voice and therefore do not consider consulting a doctor. In this study the diagnosis was made at the follow-up. The occurrence of contact granuloma in the population is perhaps higher than we know today.

The most common voice disorder at this follow-up was phonasthenia (35% in Tierp compared with 36% of the patients with voice disorder in Huddinge). In this condition the amount of voice strain in the occupation seems very important. (In this study 75% of the patients had voice strain in their occupation.) Most of the patients with this diagnosis were treated for acute laryngitis in 1984 but continued to have voice problems.

The patients with vocal nodules were in many ways similar to the phonasthenic patients in this study. In half of the cases, they were treated for acute laryngitis with no follow-up. Some had a correct diagnosis but were not offered voice therapy. Also, here a majority had a voice-straining occupation, and all but one were female.

The patient's smoking habits are obviously very important for the development of chronic vocal fold edema (women) and chronic laryngitis (men). Almost all patients in these groups were smokers or had recently given up smoking.

At the follow-up we found eight patients who smoked ≥ 15 cigarettes a day. Seven of these had voice disorders, all but one with pathological changes of the vocal folds.

CONCLUSIONS

The prevalence of patients consulting the doctor mainly because of voice problems during 1984 in Tierp was 0.5%. At the follow-up examination ~1 year later, 44% of the patients still had voice problems. Important factors that seem to contribute to this were smoking habits and the amount of voice strain in the occupation. Only 20% of these patients had any follow-up examination or treat-

ment to prevent recurrence. The distribution of the various voice disorders at the follow-up was very similar to the same disorders in the selected material at the Huddinge Phoniatic Department. We found that 72% of the patients originally diagnosed by indirect laryngoscopy in 1984 who came to follow-up still had a voice disorder diagnosis.

It seems essential that the general practitioner who has a patient with voice problems make a thorough examination including an indirect laryngoscopy. The above-mentioned factors should be considered to prevent recurrence. It seems also important that phoniatic-logopedic examinations and treatments be made more accessible to primary health care.

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REFERENCES

1. ASHA Committee on the Midcentury White House Conference. Speech disorders and speech correction. *J Speech Hear Disord* 1952;17(2):129-37.
2. Weinberg K. Studien Über das Stimmorgan bei Volksschulkindern. *Arch Laryngol* 1916;30:175-99.
3. Flatau T, Gutzmann H. Die Singstimme des Schulkindes. *Arch Laryngol* 1908;20:327-48.
4. Wilson K. *Voice problems of children*. 2nd ed. Baltimore: Williams & Wilkins, 1979:6-8.
5. Baynes RA. An incidence study of chronic hoarseness in children. *J Speech Hear Disord* 1966;31:172-6.
6. Senturia BH, Wilson FB. Otorhinolaryngologic findings in children with voice deviations. *Ann Otol Rhinol Laryngol* 1968;77:1026-41.
7. Laguaite JK. Adult voice screening. *J Speech Hear Disord* 1972;37:147-51.
8. Smedby B, Korpela M. *Report on diagnoses made by physicians at the primary health care unit in Tierp 1984*, Working paper 1985-06-28. Uppsala: Unit for Primary Health Care Research, Department of Social Medicine, Uppsala University Hospital Sweden, 1985.
9. Sonninen A. Phoniatic viewpoints on hoarseness. *Acta Otolaryngol [Suppl]* 1970;263:68-81.