Voice Disorders in Teacher Students—A Prospective Study and a Randomized Controlled Trial

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Summary: Objectives. Teachers are at risk of developing voice disorders, but longitudinal studies on voice problems among teachers are lacking. The aim of this randomized trial was to investigate long-term effects of voice education for teacher students with mild voice problems. In addition, vocal health was examined prospectively in a group of students without voice problems.

Methods. First-semester students answered three questionnaires: one about background factors, one about voice symptoms (Screen6), and the Voice Handicap Index. Students with voice problems according to the questionnaire results were randomized to a voice training group or a control group. At follow-up in the sixth semester, all students answered Screen6 again together with four questions about factors that could have affected vocal health during their teacher education. The training group and the control group also answered the Voice Handicap Index a second time.

Results. At follow-up, 400 students remained in the study: 27 in the training group, 54 in the control group, and 319 without voice problems at baseline. Voice problems had decreased somewhat more in the training group than in the control group, but the difference was not statistically significant ($P = 0.1$). However, subgroup analyses showed significantly larger improvement among the students in the group with complete participation in the training program compared with the group with incomplete participation. Of the 319 students without voice problems at baseline, 14% had developed voice problems.

Conclusions. Voice problems often develop in teacher students. Despite extensive dropout, our results support the hypothesis that voice education for teacher students has a preventive effect.

Key Words: Teacher students–Voice problems–Long-term voice training–Screening instrument–Voice Handicap Index.

INTRODUCTION

Teaching is a professional activity with high demands on communicative capability and voice function. Most teachers are dependent on a voice that functions well for many hours every day throughout their career. At the same time, the teacher's voice must be clear and comfortable to listen to in order to make learning easy for the pupils.

Teachers are exposed to many environmental factors in the workplace that might affect their voice and eventually lead to voice problems. The most obvious risk factor is speaking against high background noise, in poor room acoustics, and in rooms with overly dry air. Furthermore, feelings of stress or distress may influence the voice in a negative way. The importance of voice rest for teachers with heavy vocal load has also been stressed, but often teachers are short of time for vocal recovery during the workday.[1–6] Voice problems also undermine the teachers' interaction with their pupils and affect learning.[7–9]

Teachers are overrepresented among patients with voice disorders.[10–12] Common symptoms are vocal fatigue, hoarseness, and pain or lump sensation in the throat without having a cold. The prevalence of voice problems among teachers varies from 5% to 80% depending on the type of teachers studied (eg elementary school teachers, high school teachers, music teachers, science teachers), the phrasing of the questions, and the response rate.[13–15] Lyberg Åhlander et al[16] reported a prevalence of 13% among teachers in 23 randomly selected schools in Sweden, and a study in Finland found that the prevalence of voice problems among teachers increased from 5% to 20% over a period of 12 years.[17] In a study by Roy et al,[18] 1243 teachers and 1288 nonteachers from Iowa and Utah were randomly selected for a telephone interview regarding voice problems. The prevalence of current voice problems was higher among the teachers than among the nonteachers (11.0% vs. 6.2%); the lifetime prevalence of voice disorders was higher among the teachers (57.7% vs. 28.8%); and more teachers than nonteachers had consulted a health care professional because of a voice disorder (14.3% vs. 5.5%). Similar results were presented by Behlau et al[19] in a study of 1651 teachers and 1614 nonteachers in Brazil. A higher prevalence of current voice disorders was found among teachers compared with nonteachers (11.6% vs. 7.5%), and 12.1% of the teachers reported that they had been absent from work because of voice problems on five or more days in the past year, in comparison with 2.4% among the nonteachers.

One potential risk factor for developing voice problems among teachers is insufficient education in voice ergonomics and lack of voice training, as highlighted by Fritzell,[11] Vilkman,[20] and others. One definition of voice ergonomics is "awareness of work-related risk factors for voice disorders and knowledge about how to improve voice production and speech intelligibility in different working environments with the goal to prevent occupational voice disorders."[21] Research during recent decades has shown the importance of preventative voice education for teachers.[22–26]

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In a study by Bovo et al,[27] a group of 21 female teachers received preventative voice treatment and guidance over 3 months, and the results from voice assessments were compared with those in a control group of teachers without treatment. The participants answered questionnaires on vocal self-evaluation, and their voices were recorded for acoustic and auditory perceptual voice analyses. All participants were also examined by videolaryngoscopy. There was an evident improvement in the treated group directly after the intervention, with results from questionnaires such as the Voice Handicap Index (VHI) showing a significant decrease in voice symptoms at 3 months post baseline. However, it is crucial to also study the effects of preventative voice care on a long-term basis; so far, no long-term study has been conducted.

Preventative voice education for teachers and teacher students in university programs is still rare in Sweden.[28,29] Of 25 university programs for teacher students in Sweden, only nine provide compulsory voice education, though a few also teach voice ergonomics. International studies show that teacher students with weaknesses in voice function are at risk of developing a voice disorder during their teaching career.[30,31] A study by Simberg et al[32] showed that 20% of 226 teacher students in Finland had voice disorders. Similar results were found by Ohlsson et al,[33] showing voice problems in 17% of 1250 Swedish teacher students in their first semester (mean age 23 years). Individual risk factors for the students with voice problems included previous vocal and speech problems in childhood or adulthood, frequent throat infections, airborne allergy, smoking, hearing problems, voice-demanding work, and voice-demanding hobbies. Voice problems were more common among women. In another study comparing different student groups, Simberg et al[34] found that voice disorders were more common among teacher students than among other student groups. The results indicate that special attention should be paid to the voice care of teacher students.

Prevention can be planned and implemented on three levels, according to the time of intervention: primary, secondary, or tertiary.[35] Primary prevention is implemented before the problem has even occurred, whereas secondary prevention signifies identification of the problem and early intervention. Tertiary prevention aims at remediating the problem, that is, to minimize the impairment, disability, and handicap of a condition. This article reports on a prospective and randomized controlled trial for secondary prevention in students with voice problems, and a prospective study of students without voice problems.

The aims of this work were (1) to investigate the long-term effects of a program for voice education, and (2) to study possible changes in vocal health over time in students without voice problems at baseline.

METHODS

Design and participants

The randomized controlled study was carried out at the teacher programs of two universities in southern Sweden, University of Gothenburg and Linnaeus University, between 2009 and 2013. The design of the 3-year longitudinal study is shown in Figure 1.

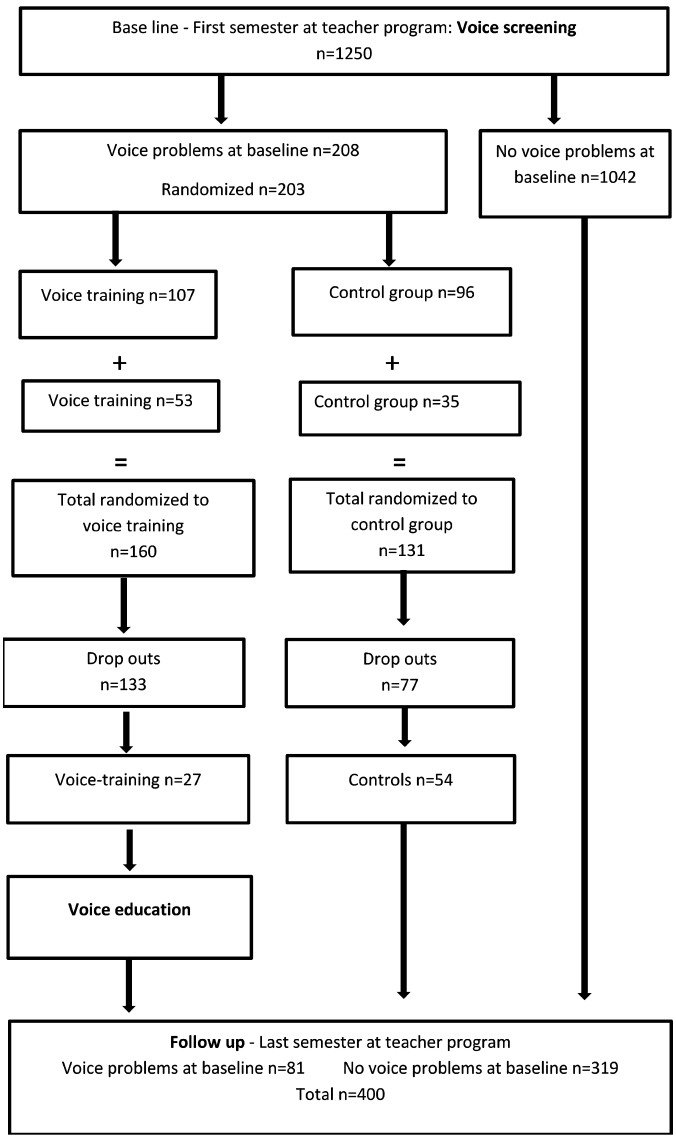

FIGURE 1. Study design.

A letter providing information about the study was sent to the new teacher students before the start of their first semester, together with the general welcome letter from the departments of education. Later, at the general introduction for the new students, further information about the study was presented by the project leader and the students were invited to participate. Of the 1250 students who agreed to participate in the autumn 2009/spring 2010 semester (76% out of the 1636 that were approached), 208 had voice problems according to their answers to the questionnaires, as described below.[33] Five of these left the teacher program before randomization, leaving 203 students for randomization (Figure 1); 107 were randomized to voice training and 96 to the control group. Because of early dropouts, voice screening was performed again with new first-semester teacher students in the autumn 2010/spring 2011 semester; this provided 88 additional students, of whom 53 were randomized to voice training and 35 to the control group. Thus, in total, 160 students were randomized to voice training and 131 to the control group. The reason for oversampling students for the intervention