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Pathologic Laryngoscopic Findings, Number of Years in Teaching and Related Factors among Secondary Public-School Teachers in Bacolod City, Negros Occidental

ABSTRACT

Objective: To determine the presence or absence of gross laryngeal or vocal cord pathology during endoscopic examination and determine if there is a relationship between these findings, the number of years in teaching and the presence of other risk factors among teachers in a public secondary school in Bacolod City.

Methods:

Design: Cross-Sectional Study
Setting: Secondary Public School in Bacolod City, Philippines
Participants: A total of 50 school teachers participated in the study conducted from July 2016 to May 2017. They completed a questionnaire on demographic data, professional profile and lifestyle profile and underwent laryngoscopic examination.

Results: The most common pathologic laryngoscopic findings were vocal fold nodule (12%), swollen arytenoids (10%), paretic vocal cords (6%) and epiglottic mass (6%). There was no significant relationship between laryngoscopic findings and number of years teaching ($X2 = 0.103$, $df = 1$, $p = .748$. However, there was a significant relationship between laryngoscopic findings, smoking ($X2 = 6.419$, $df = 1$, $p = .011$) and daily water intake ($X2 = 10.208$, $df = 2$, $p = .006$).

Conclusions: Results of this study suggest that in terms of voice care, public school teachers may benefit from avoidance of smoking and increased water intake.

Keywords: *teachers, vocal cord, hoarseness, voice, laryngoscopy, videostroboscopy*

Hoarseness is a term used to describe voice changes and is one of the most common symptoms seen in otolaryngologic practice, ranking among the top ten most seen conditions in the Corazon Montelibano Memorial Regional Hospital otorhinolaryngology out-patient department. It may be the earliest manifestation of a large variety of conditions (benign or malignant) directly or indirectly affecting the larynx.[1-3] Such conditions that may be seen on laryngoscopy include vocal fold edema, polyps, nodules and glottic masses.[4-5]

Many factors are involved in the development of hoarseness.[4, 6-9] These factors include occupational risk factors, demographic factors such as gender and socioeconomic status and lifestyle factors such as smoking and a history of poor respiratory health.[3,4,10,11] Teachers are especially prone to hoarseness, and the risk factors that increase the likelihood of voice changes

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among teachers include the number of working hours, number of years of experience, interval between classes, usage of microphone or not, and teaching against background noise.[7,8,12,13] To the best of our knowledge based on a search of PubMed, HERDIN and Google scholar using the keywords "*teachers,*" "*vocal cord,*" "*hoarseness,*" "*voice,*" "*laryngoscopy,*" and "*videostroboscopy*" there have been no studies evaluating hoarseness, its risk factors and pathological causes among teachers in the province of Negros.

Thus, it is the aim of this study to determine the presence or absence of gross laryngeal or vocal cord pathology during endoscopic examination and determine if there is a relationship between these findings, the number of years in teaching and the presence of risk factors among teachers in a public secondary school in Bacolod City.

METHODS

With approval by the Research Ethics Review Committee of Corazon Locsin Montelibano Memorial Regional Hospital, this cross-sectional study purposively sampled 55 teachers from a single secondary public school in Bacolod City for participation from 1 July 2016 to 31 May 2017.

Considered for inclusion were all fulltime secondary teachers regardless of teaching experience who gave written informed consent. Excluded were those diagnosed with pulmonary tuberculosis, those diagnosed with a thyroid disorder and those who had undergone surgery of the larynx, thyroid and neck.

Recruitment of participants was done through a group meeting. A lecture on voice misuse was conducted by the primary researcher at the start of recruitment. This 30-minute lecture concluded with a short discourse on the type of research to be conducted, the procedure to be performed, the possible side effects and discomfort of the procedure and particulars about result outcomes. The decision to participate in this study was voluntary and participants were allowed to drop out of the study anytime.

A questionnaire was then distributed to the participants after the 30-minute lecture. It was formulated based on the profile of participants and risk factors that the study wished to measure (e.g. personal profile, professional profile, lifestyle profile, and medical history) and pre-screened by three ORL-HNS consultants.

Participants underwent history taking and a physical examination was conducted by the primary investigator including recorded laryngoscopy using a 70 degree rigid laryngoscope (Shenda, China) attached to a locally-fabricated video camera system (Muracam Endoscopic Camera System, Quezon City, Philippines). Topical anesthesia (Lidocaine 10% 10mg/dose spray, AstraZeneca AB, Sweden) was administered prior to each procedure.

All procedures were performed in the school clinic. The primary investigator reviewed the recorded videos independently of participant profiles and made notes of observations specifically pathologic findings using MS Excel version 15.0.5031.1000 (Microsoft Corporation, Redmond, WA, USA). These recorded videos were then reviewed and evaluated by the co-investigator who was blinded to the participants and their responses to questionnaires. The diagnoses were compared with initial diagnoses listed on the Excel file. Pathologic findings had to be congruent for data to be analyzed.

Data were analyzed using frequency distribution for categorical variables and measures of central tendency and dispersion for continuous variables. The outcome prevalence was estimated based on the independent variables by testing differences between proportions using Pearson chi-square test for independence. The software used was the IBM SPSS v.20 (IBM Corporation, Armonk, NY, USA) with the level of significance set at 0.05.

RESULTS

Of the 55 teachers originally screened for the study, two did not consent for laryngoscopic examination, two backed out from the study and one did not meet inclusion criteria. A total of 50 participants completed this study.

Of the 50 participants, 39 (78%) were female and 11 (22%) were male. Twenty-three (46%) were aged 41-50 years, 12 (24%) were 31-40 years old, 9 (18%) were 21-30 years old, 5 (10%) were 51-60 years old and 1 (2%) was 61-70 years old.

Twenty-eight (56%) had worked as teachers for more than 10 years, 14 (28%) had only been teaching for 1-5 years and the remaining 8 (16%) had been teaching for 6-10 years. *(Figure 1)* During the time of interview, 41 (82%) handled 4-6 classes per day, only 5 (10%) handled more than 6 classes per day and the remaining 4 (8%) handled 1-3 classes a day, each spending 1-2 hours per class per day. *(Figure 2)*

Lifestyle profiles of the participants covered their extracurricular, smoking and drinking activities. Extracurricular activities entailed the use of voice other than teaching including singing, speaking (radio broadcasting) and coaching. Only 13 (26%) were involved in any of the three extracurricular activities. The frequency of these activities among the 13 participants involved were: 1 participated in the public speaking on a monthly basis, 10 participated in singing and coaching on a weekly basis and only 2 participated on coaching on a daily basis. *(Table 1)*

Other lifestyle practices investigated were drinking (alcoholic beverages), smoking and amount of daily water intake. Only 14 (28%) of the participants drank alcoholic beverages occasionally while the remaining 36 (72%) were non-drinkers. Majority were non-smokers while only 5 (10%) smoked cigarettes, around 15-20 packed years each. For water intake, 28 (56%) drank 5-10 glasses daily, 11 (22%) drank 1-4 glasses daily and 11 (22%) drank more than 10 glasses daily.

For symptoms reported by the participants: hoarseness was not experienced by 12 (24%) participants, 24 (48%) reported experiencing it occasionally, 7 (14%) on a monthly basis, 4 (8%) on a weekly basis and 3 (6%) on a daily basis. Loss of voice was reportedly experienced

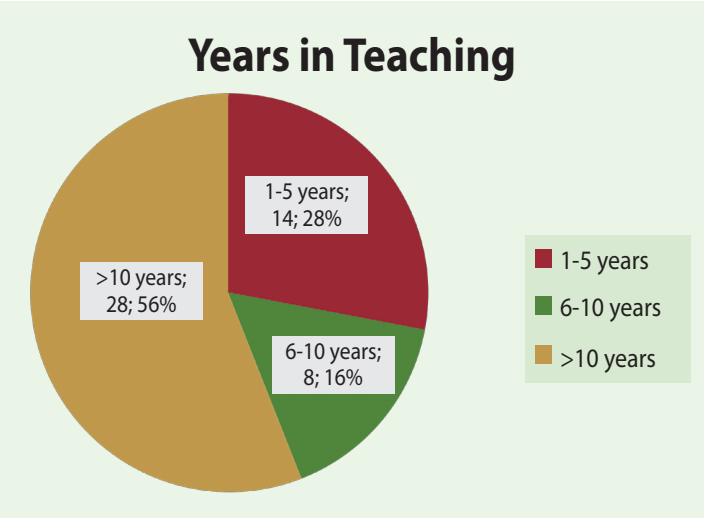

Figure 1. Pie chart shows distribution of participants (n) according to years of teaching experience and percentage (%) of total participants

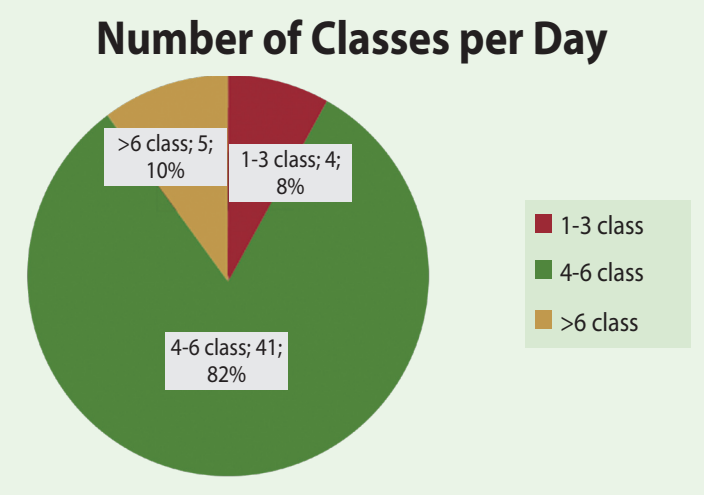

Figure 2. Pie chart shows the distribution of participants (n) and percentage (%) of total in terms of classes handled per day

Table 1. Distribution (n) and percentage (%) of participants according to extracurricular activities that entail the use of voice other than teaching broken down by frequency (daily, weekly, monthly)

Extracurricular Activities						
Activity	n	%	Frequency			Total
			Monthly	Weekly	Daily	
None	37	74	-	-	-	-
Singing	9	18	0	9	0	9
Speaking	1	2	1	0	0	1
Coaching	3	6	0	1	2	3
TOTAL	50	100	1	10	10	13

by 5 (10%) of participants occasionally and 1 (2%) on a monthly basis and the majority 43 (86%) did not experience it. Dysphagia was not experienced by a majority of the participants (60%), while 16 (32%) had it occasionally. And lastly, foreign body-sensation was reportedly experienced occasionally by 27 (54%) of the participants, 5 (10%) on a monthly basis, 2 (4%) on a weekly basis and 4 (8%) on a daily basis by the participants.

Of the 50 participants, 16 (32%) were asthmatic, 19 (38%) suffered from allergic rhinitis, 19 (38%) had nasal drip, only 24 (48%) suffered from colds, 12 (24%) reported having had sinusitis and only 1 (2%) had a history of laryngitis.

Pathologic laryngoscopic findings were congruent for both investigators and showed that 3 (6%) manifested paretic vocal cords, 6 (12%) had vocal cord nodules, 5 (10%) presented with swollen arytenoids and 3 (6%) were noted to have an epiglottic mass.

There was no significant relationship found between pathologic laryngoscopic findings and age, sex, civil status, year level taught, number of classes per day, number of hours per class, extracurricular activities or alcohol intake. No significant relationship was found between pathologic laryngoscopic findings and number of years in teaching ($X2 = 0.103$, $df = 1$, $p = .748$). However, a significant relationship was noted between pathologic laryngoscopic findings and smoking ($X2 = 6.419$, $df = 1$, $p = .011$) and with water intake ($X2 = 10.208$, $df = 2$, $p = .006$).

DISCUSSION

The most common pathologic laryngoscopic findings among the public secondary school teachers surveyed in Bacolod City were vocal fold nodule, swollen arytenoids, paretic vocal cords and epiglottic mass. There was no significant relationship between laryngoscopic findings and number of years teaching but there was a significant relationship between laryngoscopic findings with smoking and with water intake.

The most common symptoms reported in this study were foreign body sensation, hoarseness, dysphagia and loss of voice. These are similar to the findings of Sophie Yick-yu Lee *et al*, where the common symptom experienced by 498 teachers in their study was hoarseness followed by throat pain and dry throat.[8] Although the study population was different, these findings are also consistent with those of a local study by Carrillo *et al*. showing that the most common chief complaint among patients who underwent videostroboscopy examination was hoarseness (77.6%), followed by globus sensation (5.9%), dysphonia (4.8%) and dysphagia (4.6%), while the most common pathology was vocal fold nodules (17.4%), followed by laryngoesophageal reflux (16.6%), vocal cord paralysis or paresis (12.9%), vocal cord cyst (10.4%), vocal cord polyps (8.1%) and presumptive cancer (6.1%).[14] This is in contrast to a study by Yogesh *et al*. of 110 teachers with 70 symptomatic subjects, where 34.2% had vocal cord edema, 28.57% had incomplete glottis closure, 12% had vocal nodule, 1.42% had vocal polyps, 1.42%

had sulcus vocalis, and 1.42% had contact ulcer.[12] Another study done by Souza *et al*. reported an 18.9% prevalence of vocal cord pathologies.[15]

A significant relationship was noted between smoking and laryngoscopic findings in this study. This suggests a high probability that a person would have a laryngoscopic pathology if that person smoked. Inhaled smoke is irritating to the mucosa and may induced esophageal reflux which reduces vibratory efficiency of the vocal folds.[16] Smoking was also recognized as one of the risk factors in acquiring voice disorders in a study done by Akindobe R *et al*.[17] although a study by Sophie Yick-yu Lee *et al*. did not identify smoking as a risk factor.[8]

A significant relationship was also noted between water intake and laryngoscopic findings. This suggests that with each increase of water intake, there is a probable decrease in the chances of acquiring pathologic manifestations in the larynx. Constant speaking causes significant, insensible loss of fluids via the respiratory system.[4,7] Dehydration affects the mucosal lining causing it to lose its integrity, thus making it prone to developed pathologies.[16]

The present study has several limitations. First, there was no control group, and the cross-sectional design captured participants at one point in time (and not all confounding variables may have been accounted for). A case-control or cohort study may yield better data to better investigate the causes of disease as well as establish links between risk factors and health outcomes. Second, the study population was very small. Should there be a replication of this research study, we recommend a pre-survey of the targeted population in order to gain a more accurate picture of their characteristics and to help ensure that sub groups within that population are properly represented. Third, our questionnaire should have been properly pre-tested and validated. This may explain why the frequency of laryngitis was only 2% (1 person), given the very large number of participants having history of hoarseness and loss of voice. Perhaps, by doing this, data from this study may be replicated, expanded, verified or improved on.

From the outset, the significance of this study has been tethered to the vocal well-being of public school teachers because of their need to be able to continue to speak effectively in class. Significant results were discovered in this study regarding factors that may lead to unfavorable conditions that may threaten the future use of their voices. But apparently, years of service do not relate to pathological findings. According to the results of the study, specific points to be taken up should be: 1) cessation of smoking, 2) emphasis on the need to increase water intake to properly maintain adequate hydration, 3) support and/or therapy to help those who find it difficult to take on lifestyle changes, 4) facilitate consultation and/or treatment regimens for those in whom it is indicated, and 5) collaborate with the teachers for them to negotiate with the school administration to provide necessary training/ seminars and/or equipment to improve their teaching and classroom management techniques.

In conclusion, our results suggest that public school teachers may benefit from avoidance of smoking and increased water intake in terms of voice care, factors contributing to acquiring pathologic manifestations in the larynx. Problems in voice production and the ability to communicate may affect teaching quality, teaching performance and job satisfaction. It is therefore necessary to share this particular information with them through follow-up health teachings and collaborative efforts designed to minimize the chances of permanent damage to their larynges. Information on voice and laryngeal status of this population can aid in guidance on proper vocal hygiene.

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