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RECOGNITION AND PREVENTION OF VOICE DISORDERS AMONG PRIMARY SCHOOL TEACHERS

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SHORT INTRODUCTION

Voice is actively used in everyday life professionally by singers, actors, politicians, lawyers, and teachers (Stemple, Roy, Klaben, 2018). Teachers actively use their voice for approximately 4–5 hours per day and belong to a risk group for voice disorders. Primary school teachers use their voice particularly intensively, as they conduct 4–6 lessons per day and do not have the opportunity to take time for vocal rest. Van Houtte, Claeys, Wuyts, and Van Lierde (2010) indicate that a large proportion of teachers encounter voice disorders at least once during their professional career. The role of the speech and language therapist within the school community is becoming increasingly important, therefore, speech and language therapists could provide teachers with knowledge about vocal hygiene, voice quality, and the prevention of voice disorders.



OBJECTIVE(S) AND METHODS

This research aimed **to identify vocal characteristics of primary education teachers by analysing their voice recordings**, taken before and after Easter holiday (duration: one week), using Praat programme. Research sample was 11 primary school teachers. Two different methods were used to conduct the research.

The semi-structured interview helped to explore the individual experiences of primary school teachers, their knowledge about voice disorders and voice care, and to ask follow-up questions. The semi-structured interview consisted of 6 questions designed to reveal the respondents' knowledge of voice care (hygiene), signs of voice disorders, teachers' habits related to voice use, and classroom working conditions.



METHODS

Acoustic analysis of voice recordings was used to objectively assess the condition of teachers' voices before and after one week holiday. When recording voice samples, the participants pronounced the phoneme /**a**/ for as long as possible. When assessing voice quality and function, the sustained /a/ phoneme is selected based on physiological, acoustic, and methodological arguments that are well-established in the voice research literature (Stemple et al., 2018; Sapienza & Hoffman, 2022). Voice recordings were obtained under consistent recording conditions (identical recording environment, recording time, and constant microphone distance). Teachers' voice samples were recorded using a voice recorder on a smartphone. To ensure the most accurate results of the audio analysis, the voice recordings were made on a phone using the highest audio quality setting (*Lossless*). The analysis of the teachers' voice recordings was performed using the Praat software.



METHODS

For comparative analysis the following metrics were used: **jitter**, **shimmer**, Noise to Harmonic ratio – **NHR**, cepstral peak prominence – **CPP**. The data required for voice recordings is not taken from the entire recording. A specific part of the recording is marked where the blue line is continuous

(indicating pitch) and the yellow line does not fluctuate excessively (indicating intensity). In this example (Figure 1), the recording of the M1 subject's /a/ phoneme is shown; the red dotted line marks the location from which data on jitter, shimmer, NHR, CPP is taken, due to the stability of the aforementioned indicators.

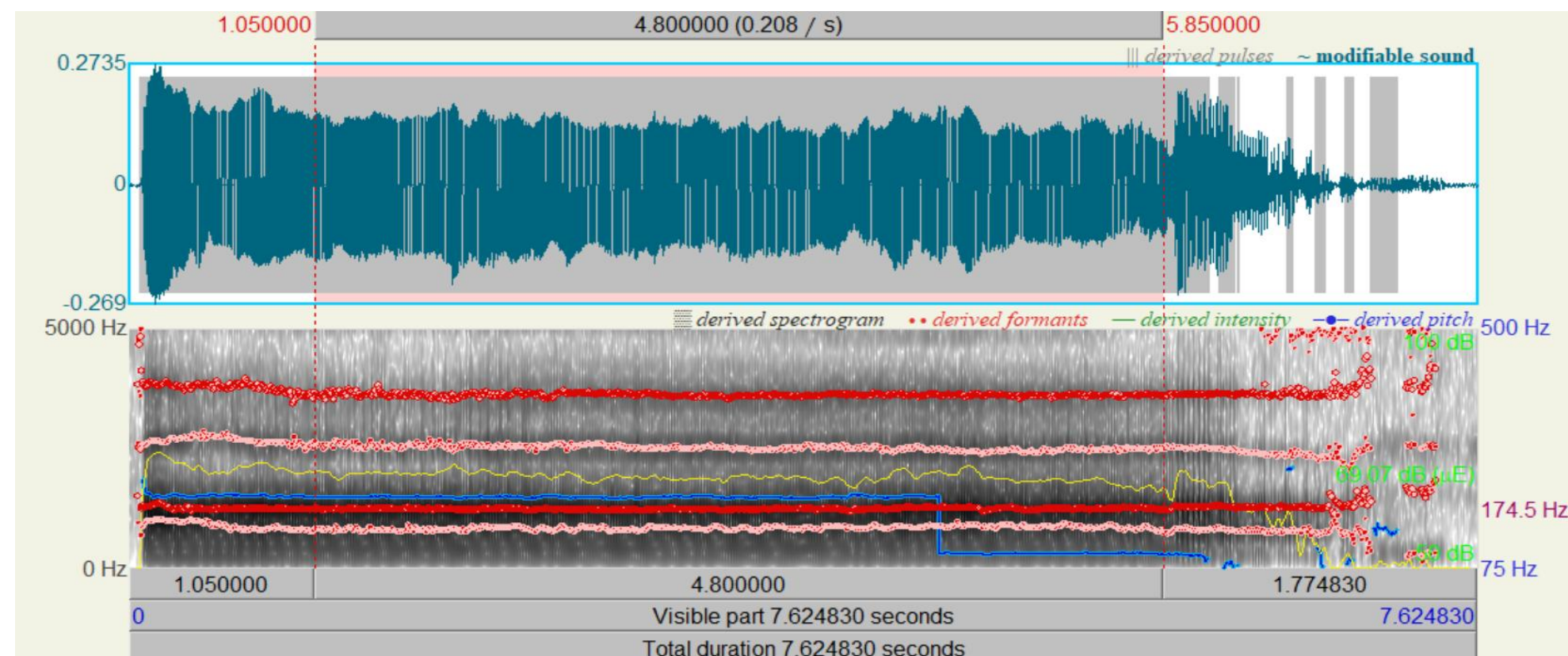


Figure 1



The interviews helped reveal that the most measures are taken only after the voice has already deteriorated, rather than as part of daily preventive care. A significant finding of the quantitative study is the directional changes in teachers' voices after the holidays. Most participants showed an increase in the HHR and the CPP, while jitter and

RESULTS

Table 1
Changes calculated by comparing the values of the record before and after the holiday

Participant	Change in jitter	Change in shimmer	Change in HNR, dB	Change in CPP, dB
M ₁	-0.430	-2.129	8.827	4.239
M ₂	0.113	-2.223	4.994	1.205
M ₃	-0.215	-0.689	2.930	-1.358
M ₄	-0.021	-1.099	0.131	-0.762
M ₅	-0.240	-5.838	5.518	1.05
M ₆	-0.260	-0.540	4.016	1.508
M ₇	-0.324	-0.909	1.412	1.304
M ₈	-0.077	-1.104	2.690	-0.721
M ₉	-0.097	-0.285	4.511	1.254
M ₁₀	0.176	-1.598	1.549	0.027
M ₁₁	-0.049	1.340	-1.096	-0.632

shimmer indices decreased in most cases. These results indicate that a reduction in vocal load during the vacation improves phonation regularity, decreases noise metrics, and restores vocal stability (Hagedorn, Alicke, Verma, 2017; Barsties, Maryn, 2017; Maryn, Weenink, 2021).



CONCLUSIONS

By combining two research methods, the results revealed two significant and interrelated aspects: (1) teachers' insufficient knowledge of voice disorders and voice hygiene (2) objectively recorded changes in voice quality associated with reduced vocal strain during rest periods. Inappropriate working conditions and noisy environments increase the strain on the voice and can lead to negative changes in voice quality and disorders (Boone, McFarlane, 2013; Martin, 2020). In order to identify signs of voice disorders as early as possible, it is important to systematically educate teachers about the causes of these disorders, proper voice load management, monitoring voice quality, and the importance of voice rest.



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