

## PERBANDINGAN CIRI-CIRI AKUSTIK SUARA DI ANTARA GURU DENGAN BUKAN GURU

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Kajian ini meneliti kejadian gangguan suara dalam kalangan guru dengan mengukur ciri-ciri akustik suara (iaitu, frekuensi asas, peratusan *jitter*, peratusan *shimmer* dan nisbah *harmonic-to-noise*) antara kumpulan guru dan kumpulan bukan guru, sebagai kelompok perbandingan. Secara khususnya, tujuan kajian ini adalah untuk membandingkan perbezaan ciri-ciri akustik suara dan pola perbezaan tersebut antara kumpulan guru dan kumpulan bukan guru. Kajian ini merupakan kajian perbandingan *cross-sectional* yang melibatkan 43 orang guru dan 37 orang kakitangan bukan pengajar yang direkrut melalui convenience sampling memandangkan peserta kajian direkrut dari sekolah-sekolah rendah dan menengah terpilih di sekitar Kota Bharu, Kelantan. Peserta dibahagi kepada dua kumpulan iaitu kumpulan guru dan kumpulan bukan guru (iaitu, kumpulan perbandingan). Sampel suara diambil dari peserta-peserta setiap kumpulan. Sampel suara tersebut dianalisa secara objektif untuk mendapatkan ciri-ciri akustik suara. Setiap ciri-ciri akustik suara peserta dari kumpulan guru kemudiannya dibandingkan dengan ciri-ciri akustik yang sama dari kumpulan bukan guru untuk menyiasat kewujudan atau ketiadaan perbezaan antara peserta kedua-dua kumpulan. Tidak ada perbezaan statistik yang signifikan bagi ciri-ciri akustik suara antara kumpulan guru dan kumpulan bukan guru. Namun, semua bentuk penemuan berada pada arah yang dikehendaki iaitu, frekuensi asas dan nisbah *harmonic-to-noise* dijumpai lebih rendah pada kumpulan guru berbanding kumpulan bukan guru; manakala, peratusan *jitter* dan peratusan *shimmer* dijumpai lebih tinggi pada kumpulan guru berbanding dengan kumpulan bukan guru. Walaupun semua keputusan secara statistiknya tidak signifikan, terdapat indikasi yang menunjukkan ciri-ciri luar biasa dalam ciri-ciri akustik suara pada kumpulan guru berbanding kumpulan bukan guru, yang mencadangkan kumpulan guru memang mengalami perubahan negatif dalam suara mereka. Selain daripada kelemahan yang ada dalam metodologi yang menjurus kepada keputusan yang tidak signifikan, ada beberapa faktor lain yang mungkin menyumbang terhadap penemuan ini. Faktor-faktor yang mungkin termasuklah pengaruh suara rehat terhadap ciri-ciri akustik suara, dan perbezaan dalam respon ciri-ciri akustik dalam kaitannya terhadap penggunaan suara yang berpanjangan dalam kalangan guru.

**Kata kunci:** guru, bukan guru, Malaysia, perbandingan, suara, ciri-ciri akustik, frekuensi asas, *jitter*, *shimmer*, *harmonic-to-noise*.

## **COMPARISON OF ACOUSTIC FEATURES OF VOICE BETWEEN TEACHERS AND NON-TEACHERS**

The present study investigates the occurrence of voice disorders among teachers by measuring the acoustic features of voice (i.e., fundamental frequency, percent jitter, percent shimmer and harmonic-to-noise ratio) between teachers group and non-teachers group, as the comparison group. Specifically, the objective of the present study is to compare the differences of acoustic features of voice and their patterns of differences between teachers group and non-teachers group. This is a comparative cross-sectional study that involves 43 teachers and 37 non-teaching staffs who were recruited through convenience sampling as the participants from the selected primary and secondary schools in Kota Bharu, Kelantan. The participants were divided into two groups i.e., teachers group and non-teachers group (i.e., comparison group). The voice samples were collected from the participants in each group. These voice samples were objectively analyzed to obtain several acoustic features of voice. Each acoustic feature from the teachers group was then compared to the same acoustic feature from the non-teachers group to investigate whether there were differences between the two groups. There were no statistically significant differences in any acoustic features of voice between teachers group and non-teachers group. However, all the trends of the findings were in the desired direction i.e., fundamental frequency and harmonic-to-noise ratio were found to be lower in the teachers group compared to non-teachers group, whereas, percent jitter and percent shimmer were found to be higher in the teachers group compared to non-teachers group. Although all of the results were not statistically significant, there was indication of atypical characteristics in acoustic features of voice in teachers group compared to non-teachers group that suggested teachers were indeed experiencing negative changes in their voice. Apart from possible weaknesses in methodology that produced these non-significant results, there were several other possible factors contributing to these findings. These possible factors include effect of voice rest to the acoustic features of voice and discrepancies in the response of acoustic features in relation to prolonged voice use among teachers.

**Key words:** teachers, non-teachers, Malaysia, comparison, voice, acoustic features, fundamental frequency, jitter, shimmer, harmonic-to-noise.

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