Normative Acoustic Characteristics of Voice in Healthy Elderly Algerian Arabic Speakers: Preliminary Data for Clinical Reference

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Abstract:

The establishment of language-specific acoustic norms is essential for accurate voice assessment, particularly in under-studied linguistic populations such as Algerian Arabic.

This preliminary study aimed to establish normative acoustic values for 23 voice parameters in healthy elderly Algerian Arabic-speaking adults and to examine gender differences in these measures.

Fifty healthy participants (25 males, 25 females) aged 50–85 years with no history of voice disorders were recruited. Voice recordings of a sustained vowel /a/ and continuous speech were analyzed using VOXplot and Praat software. Acoustic parameters included fundamental frequency (F0), perturbation measures (jitter, shimmer), harmonic measures (HNR, CPPS), spectral measures (slope, tilt), and maximum phonation time (MPT). Descriptive statistics were calculated, and gender differences were examined using independent-samples t-tests with Cohen's d effect sizes.

Significant gender differences were observed for F0 (males: 130.45 Hz, females: 204.78 Hz; $p < 0.001$, $d = -3.83$), jitter local (males: 1.12%, females: 0.84%; $p < 0.001$, $d = 1.27$), HNR (males: 19.86 dB, females: 22.98 dB; $p < 0.001$, $d = -1.22$), and HNR-D (males: 24.29 dB, females: 33.78 dB; $p < 0.001$, $d = -3.67$). Perturbation measures were generally higher in males, while harmonic measures were higher in females. Voice breaks were rare, and MPT did not differ significantly between genders.

This study provides the first normative acoustic dataset for healthy elderly Algerian Arabic-speaking adults, offering essential reference values for clinical voice evaluation and future research on voice disorders such as Parkinson's disease.

Keywords:

Algerian Arabic, acoustic analysis, normative data, voice quality, gender differences.