VOICE PATHOLOGY SCREENING TROUGH THE SMARTPHONE

Virgilijus Uloza, Nora Ulozaitė-Stanienė, Tadas Petrauskas

Department Otorhinolaryngology,
Lithuanian University of Health Sciences Kaunas, Lithuania

Introduction. Currently, the concept of 'mobile health' is rapidly evolving. The easy availability of health care-related apps to patients and healthcare providers stimulates their potential use in clinical practice.

Research objective. To elaborate the application suitable for mobile communication devices for estimation of Acoustic Voice Quality Index (AVQI) and evaluate its applicability in the clinical setting.

Materials and Methods. The elaborated AVQI automatization and background noise monitoring functions were implemented into a mobile *VoiceScreen* application running iOS operating system. Consequently, the *VoiceScreen* application allows voice recording, automatically extracting acoustic voice features and displaying the AVQ. The purpose of this application is to differentiate between pathological and normal voice and to generate a recommendation to the user. A study group of 103 adult individuals with normal voices (n= 30) and 73 patients with pathological voices was asked to read aloud a standard text and sustain the vowel /a/. Voice recordings were performed in the clinical setting with *VoiceScreen* app using iPhone 8 microphones. To evaluate the diagnostic accuracy differentiating normal and pathological voice, the receiver-operating characteristic statistics i.e. area under the curve (AUC), sensitivity and specificity, and correct classification rate (CCR) were used.

Results. A high level of precision of AVQI in discriminating between normal and dysphonic voices was achieved with the corresponding AUC=0.937. The AVQI cut-off score of 3.4 demonstrated a sensitivity of 86.3% and specificity of 95.6% with a CCR of 89.2%.

Conclusion. The *VoiceSreen* app represented an accurate and robust tool for dysphonia severity detection and can be used in clinical settings as a sensitive measure for voice pathology screening. Currently, the *VoiceScreen* app is available in several languages: Lithuanian, English, French, German, Spanish, Portuguese, Russian, Polish, Japanese, and Arabic. Due to the portability, user-friendliness, and applicability the VoiceScreen app may be preferred by patients and clinicians for voice assessment and data collection in both home