Grade of Dysphonia: Correlation with Patient Self-Assessment Questionnaire and Acoustic measures

Thesis

Submitted for the partial fulfillment of the requirement
of Master Degree in Phoniatrics

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2018

First of all, thanks to **Allah** for helping and guiding me in accomplishing this work and for everything else I have.

Words are not sufficient to express my sincerest appreciation and my deepest gratitude to **Prof. Dr. Rasha Mohammed Shoeib**, Professor of Phoniatrics, Faculty of Medicine, Ain Shams University, for her continuous encouragement, and her precious remarks which guided me to present this work in its proper way, it was indeed an honor to have been supervised by her.

I would like to thank **Dr. Yomna Hassan Elfiky**, Lecturer of Phoniatrics, Faculty of Medicine, Ain Shams University, for her guidance and suggestions which were of great value to me.

An endless thanks for **my family** for their support without it, I would never completed this work.

Fatma El-zhraa Mohamed El-Metwally

Contents

Page No.

LIST OF FIGURES

LIST OF TABLES

List of Abbreviations

AC ..... Arytenoid Cartilage.

APA..... Auditory perceptual assessment.

APQ%..... Amplitude perturbation quotient.

Arabic CSHI…Arabic Classical Singing Handicap index.

Arabic p-VHI... Arabic Pediatric Voice Handicap Index.

Arabic VHI…Arabic Voice Handicap Index.

Arabic VHI-10…Arabic voice Handicap Index-10.

CAJ ..... Cricoarytenoid Joint.

CC ..... Cricoid Cartilage.

CSHI ..... Classical Singing Handicap Index.

CT ..... Cricothyroid muscle.

CTJ ..... Cricothyroid Joint.

dB ..... Decibel.

DLP ..... Deep layer of lamina propria.

E ..... Epithelium.

F0..... Fundamental Frequency.

FVD ..... Functional voice disorder.

HRQOL ..... Health related quality of life.

IA..... Interarytenoid Muscle.

ICF ..... International Classification of Functioning.

ILP ..... Intermediate layer of lamina propria.

Jitt% ..... Jitter percent.

LCA..... Lateral Cricoarytenoid muscle.

LP ..... Lamina propria.

MAPLs..... Minimal Associated Pathological Lesions.

MDVP ..... Multi-Dimensional Voice Program.

MOS..... Medical outcomes study.

MTD..... Muscle tension disorder.

NHR ..... Noise-to-harmonic ratio.

OVD ..... Organic voice disorder.

p-VHI..... Pediatric Voice Handicap Index.

PVOS ..... Pediatric Voice Outcomes Survey.

PV-RQOL.... Pediatric Voice-Related Quality of Life.

QOL ..... Quality of life.

RAP%..... Relative average perturbation.

RFS ..... Reflux Finding Score.

RSI ..... Reflux Symptom Index.

SD ..... Standard Deviation.

SF-36..... Short firm-36.

SF-36v2..... Short firm-36 version 2.

Shim% ..... Shimmer percent.

SLP..... Superficial layer of the lamina propria.

SVHI ..... Singing Voice Handicap Index.

SVHI-10..... Singing Voice Handicap Index-10.

TA ..... Thyroarytenoid muscle.

TC ..... Thyroid Cartilage.

VAPP ..... Voice Activity and Participation Profile.

VDQOL ..... Voice disordered quality of life.

VHI ..... Voice Handicap Index.

VHI-10..... Voice Handicap Index-10.

VHI-P..... Voice Handicap Index-Partner.

VoiSS..... Voice Symptom Scale.

VOS..... Voice Outcomes Survey.

VPQ..... Vocal Performance Questionnaire.

V-RQOL..... Voice-Related Quality of Life Measure.

WHO..... World Health Organization.

INTRODUCTION

Health-related quality of life refers to patient-perceived impact of disease and treatment on physical, psychological, and social functions. One of the main domains in health-related quality of life is voice disordered quality of life **(Dehqan et al., 2017).**

As the primary means of communication, voice plays an important role in daily life. Voice also conveys personal information such as social status, personal traits, and the emotional state of the speaker **(Zhang, 2016).** It is an important tool and plays a significant role in todays' society as well as in one's personal life. This is indicated by the fact that over 25 % of the working society depend on their voice during practicing their profession. Because of vocal abuse and vocal misuse, patients develop voice problems **(Stuut et al., 2014)**.

Voice is the complex, dynamic product of vocal fold vibration that allows us to vocalize (i.e. make sound) and verbalize (i.e. produce language through speech) **(Justice, 2006).** In other words, voice is the acoustic outputs from the Larynx that are characterized by their dependence on Vocal fold vibratory inputs. The quality of the voice is wholly dependent upon the vibratory characteristics of the laryngeal structure **(Daniel and Stanley, 2016)**.

Disruption of the voice function may occur as a result of fault in one or more of the following: the range of movement of the vocal folds, movement of the mucosa over the deeper structures, the coaptation of the vocal fold's edges, the timing between the closure of the vocal folds and the pulmonary exhalation, the motor force, the pulmonary breath control, and the tuning of the vocal fold musculature **(Kotby et al., 2016).** There are other definitions of voice disorder including: "an abnormality of one or more of the three characteristics of voice: pitch, intensity, and quality", "any time the voice does not work, perform, or sound as it normally should, so that it interferes with communication". Among various definitions, those ones adequately suggest that a voice disorder occurs when there is some physical and perceptual difference in the voice of an individual **(Byrd et al., 2013).**

Voice disorders can be classified into **(Kotby et al., 2016)**:

- Organic voice disorders where there are detectable morphological changes in the vocal apparatus.
- Non-organic voice disorders where no visible structural or neurological pathology exists to explain the voice disturbance (the larynx is organically free).
- Minimal Associated Pathological Lesions (MAPLs) which is non-neoplastic, non-inflammatory, traumatic

lesion of the vocal fold. This group occupies a position somewhere between the organic benign, and non-organic groups as they are usually associated with and might have been predisposed by long standing non-organic vocal dysfunction.

- Accompaniments of neuro-psychiatric ailments as an element of dysarthrophonia or personality and mood changes.

There are different symptoms of voice disorders ranging from ***Dysphonia*** "change of voice", ***Aphonia*** "loss of voice", ***Dysodia*** "change of singing voice", and ***Phonasthenia*** "voice fatigue". Phonasthenia gives rise to symptoms like; throat dryness, throat soreness, frequent clearance of the throat, tightness in the neck over the larynx and difficulty in swallowing sticky throat **(Kotby et al., 2016)**.

As the individual's expressions in all social realms manifested through the voice; hence the impact of voice disorders will be major on the patient. It is estimated that 50–60 % of patients with voice disorders experience social, psychological and physical problems due to their voice problem. The impact varies per patient and depends on several factors such as personal and professional demands and the ability to cope with the problem and adjust to the problem **(Stuut et al., 2014)**. Therefore, voice problems have

negative impact on patient's quality of life. The definition of quality of life is broad and subjective, comprehending aspects related to the population's health, culture, and socioeconomic conditions **(World Health Organization, 1997).**

There are many protocols and measures to assess the severity of voice disorders however, measuring the severity of voice disorders is difficult as methods have ranged from subjective measures including perceptual judgements to objective measures of voice characteristics (e.g. acoustic analysis and aerodynamic measurements) **(Roy et al., 2013).**

The vocal assessment process should consider the multidimensionality involved in the demonstration of a voice disorder. The assessment should include a perceptual assessment of vocal quality, visual examination of the larynx, aerodynamic measures, acoustic analysis, and vocal self-assessment procedures. Each of these items has a specific relevance and provides particular information on voice disorder, whether in view of the clinician or the patient. Clinical decisions for treatment to be offered should use the integrated interpretation of these data, enabling the characterization of vocal behavior, identification of the possible etiology and triggering and maintaining factors, and description of the vocal adjustments used and the association

between the vocal aspects and the impact caused on patient's communication **(Lopes et al., 2016).**

Auditory perceptual assessments are often the golden standard to assess voice disorders in clinical decisions and are the standard where the objective measurements are being compared to **(De Bodt et al., 2015).** However, auditory perceptual assessment classifies severity of vocal disorders but does not address the impact of the vocal disorder has on quality of life. The impact that the disorder has on quality of life may go beyond the level of perceived voice change. In practical terms, two subjects with similar dysphonia may experience different impacts on their quality of life, depending on their vocal needs. So, self-perception of vocal changes, as in any other specific health issue, is a factor that is difficult to measure and highly relevant to the voice therapy intervention process **(Spina et al., 2009).**

Therefore, various quality of life questionnaires have been developed for populations with voice disorders such as the **Voice Symptom Scale** (VoiSS) **(Deary et al., 2003)**, the **Voice Related Quality of Life Measure** (V-RQOL) **(Hogikyan and Sethuraman, 1999),** the **Vocal Performance Questionnaire** (VPQ) **(Carding et al., 1999)**, and the **Voice Handicap Index** (VHI) **(Jacobson et al., 1997)**. Although all of these questionnaires were valuable but VHI was more accepted and has been used widely in