

*Research Article***Voice changes in patients with renal failure****Haytham M. Mohamed, Effat A. Zaky, Zienab Kh. Mahmoud and Olivia E. Zaki**

Department of E.N.T, El-Minia Faculty of Medicine

Abstract

Introduction: In the broad sense, voice refers to the sound we produce to communicate meaning, ideas, opinions, etc. In the narrow sense, voice, as in this review, refers to sounds produced by vocal fold vibration. **Aim of the work:** The aim of this work is to determine and analyze voice problems in patients with renal failure to establish a base line data about the size and distribution of the propable voice disorder in these patients in order to facilitate early detection and proper management of these voice problems. **Subjects and Methods:** This study included 110 individuals, age ranging from 25 years to 70 years. **Results: I. Descriptive and comparative analysis: The individuals in this study included in two groups: The study group (GI):** patients suffering from chronic renal failure (n=54). They were 38males(70.3%) and 16 females (29.6%),with a mean age of 46.66 ± 12.65 and a range of 25 years to 70years. **The control group (GII):** This group included 56 individuals not suffering from renal failure. They were 40 males (71.4%) and 16 females (29.5%), with a mean age 45.55 ± 11.05 and a range of 25 years 70 years. **Conclusion & Recommendation:** The results of our study revealed that subjects with chronic failure exhibit a clinical evidence of voice disorders and proving that there is interplay of different body systems and the larynx.

Keywords: Voice changes, renal failure**Introduction**

In the broad sense, voice refers to the sound we produce to communicate meaning, ideas, opinions, etc. In the narrow sense, voice, as in this review, refers to sounds produced by vocal fold vibration.⁽¹⁾

According to⁽²⁾:**The main parts of voice production:**

- The Power Source: Your Lungs
- The Vibrator: Your Voice Box
- The Resonator: Your Throat, Nose, Mouth, and Sinuses

The Power Source: The power for your voice comes from air that you exhale. When we inhale, the diaphragm lowers and the rib cage expands, drawing air into the lungs. As we exhale, the process reverses and air exits the lungs, creating an airstream in the trachea. This air stream provides the energy for the vocal folds in the voice box to produce sound. The stronger the air stream, the stronger the voice.

The Vibrator: The larynx (or voice box) sits on top of the windpipe. It contains two vocal folds that open during breathing and

close during swallowing and voice production. When we produce voice, the air stream passes between the two vocal folds that have come together. These folds vibrate very fast from 100 to 1000 times per second, depending on the pitch of the sound we make. Pitch is determined by the length and tension of the vocal folds, which are controlled by muscles in the larynx.

Aim of the work

The aim of this work is to determine and analyze voice problems in patients with renal failure to establish a base line data about the size and distribution of the propable voice disorder in these patients in order to facilitate early detection and proper management of these voice problems.

Subjects and Methods**Subjects****Sample size:**

This study included 110 individuals, age ranging from 25 years to 70 years. The **(study group)** included 54 patients with chronic renal failure. The study group were compared to another group **(control**

group), which included 56 individuals with no renal problems. Both of the study and control group were statically matched in comparative data age and sex distribution.

The study group (G1):

Includes 54 patients diagnosed as chronic renal failure. They were 38 males (70.3%) and 16 females (29.6%), with a range of age of 25 years to age 70years, referred to our phoniatics unit from nephrology unit of El-Minia university hospital and El-Minia general hospital.

The subject-inclusion criteria for the clinical group:

Those with chronic renal failure as diagnosed by experienced nephrologist; undergoing hemodialysis three times per week for more than one year

The exclusion criteria were:

- History of voice misuse or abuse
- History of laryngeal surgery

Results

I. Descriptive and comparative analysis:

The individuals in this study included in two groups:

The study group (GI): patients suffering from chronic renal failure (n=54). They were 38males(70.3%) and 16 females (29.6%),with a mean age of 46.66 ± 12.65 and a range of 25 years to 70years.

The control group (GII): This group included 56 individuals not suffering from renal failure. They were 40 males (71.4%) and 16 females (29.5%), with a mean age 45.55 ± 11.05 and a range of 25 years 70 years.

Table: Sociodemographic data in case and control groups

Socio-demographic characteristics	Cases N=54	Control N=56	t (df) P- value
Age (years)	46.66 ± 12.65	45.55 ± 11.05	4.89 (104.93) 0.01
Sex			
Male	38 (70.3%)	40 (71.4%)	5.84 (1)
Female	16 (29.6%)	16 (29.5%)	0.01

-Non- significant ($p>0.05$), significant ($p<0.05$), -highly significant ($p<0.001$).

There were non-statistically significant differences between patient group (GI) and control group (GII) regarding the age ($p=0.01$).

There were non-statistically significant differences between patient group (GI) and control group (GII) regarding the sex ($p=0.01$).

Discussion

The world's disease profile is changing, the causes of chronic kidney diseases reflect this change and diabetes, together with hypertension, are now the major causes of end-stage renal failure worldwide, not only within the developed world, but also increasingly within the emerging world⁽³⁾.

A voice is disorder said to exist when a person's quality, pitch and loudness of voice differ from those persons of similar age, sex, cultural background and geographical locations⁽⁴⁾.

Voice problems associated with end –stage renal disease (ESRD) have attracted such a good attention in the field of clinical researches, however, impairments observed in the voice quality of hemodialysis patients can be an important source of anxiety for the patients and their relatives⁽⁵⁾.

CRF can affect the voice production, both directly, associated with pulmonary complications, and indirectly, as a side effect of hemodialysis and medications or associated concurrent diseases⁽⁶⁾.

This study aimed to determine and analyze voice problems in patients of chronic renal failure **G1** in comparison with normal persons **G2** in order to early properly manage them.

Our study consisted of 54 patients with chronic renal failure diagnosed by experienced nephrologist: undergoing hemodialysis three times per week for more than one year and by renal functions include (serum urea, serum creatinine and glomerular filtration rate) and 56 normal individual, each individual of both groups were subjected to a full voice evaluation which include elementary diagnostic procedures (patient interview, auditory perceptual assessment (APA) of voice by the phoniatician), clinical diagnostic aids (telescopic laryngeal examination), VHI and acoustic measurements.

Conclusion & Recommendation

The results of our study revealed that subjects with chronic failure exhibit a clinical evidence of voice disorders and proving that there is interplay of different body systems and the larynx.

CRF can affect voice and its production by multifactorial mechanisms: one of which, the affection of CRF on the respiratory system, because respiration is a part of well-coordinated process necessary for phonation, in addition to the dehydration state which occurring with hemodialysis sessions.

Also the emotional state of the CRF which considering such a very important factor.

The voice problems can vary between CRF patients depending on duration of hemodialysis and leading causes of CRF.

It is recommended in this study for coming studies to include stroboscopy and airflow measures that may help further in understanding the present findings, and to generalize a routine voice examination for CRF patients.

References

1. Alessandra, G., Itamar, S., Renata, R., Camila, M., Laurie, P., Isabela, J., & Paulo, A. (2017): Diabetes mellitus and sensorineural hearing loss: is there an association? *Baseline of the Brazilian Longitudinal Study of Adult Health (ELSA-Brasil)* 72(1):5-10.
2. Baer, T. (1987): Vocal jitter, a neuromuscular explanation. In: Lawrence V, Veinberg B, eds. *Transcripts of the Eighth Symposium: Care of the Professional Voice*. New York: Voice Foundation; 19–24.
3. Colton, R., & Casper, J. K. (1996): *Understanding voice problems: A physiological perspective for diagnosis and treatment* (2nd ed.). Baltimore: Williams & Wilkins.
4. Dumasius, V., & Angelos, P. (2010): Parathyroid surgery in renal failure patients. *Otolaryngol Clin North Am.* 43(2):433–40.
5. Eman, S.H. (2014): Effect of chronic renal failure on voice: an acoustic and aerodynamic analysis. *The Egyptian journal of otolaryngology* 30(1) 53-57.
6. Fisher, K. V., Ligon, J., Sobecks, J. L., & Roxe, D. M. (2001): Phonatory effects of body fluid removal. *J Speech Lang Hear Res.* 44(2):354–367.