Assessment of the Impact of Dysphonia on Egyptian Teachers' Quality of Life by Voice Activity and Participation Profile

HASSAN H. GHANDOUR, M.D.*; SHARIF A. ABDELHAMEEM, M.D.**; SAFINAZ N. AZAB, M.D.*** and SHAIMA AHMED, M.Sc.***

The Departments of ENT, Phoniatric Unit, Faculties of Medicine, Ain Shams University* and Beni Sewif University**,***

Abstract

Background: Voice disorders have been traditionally defined in terms of deviant quality, pitch, and loudness and by deviant structure and/or function of the laryngeal mechanism. The definition of voice disorders in an occupational context depends on the demands set upon the voice, and voice endurance is an essential criterion. Professional voice users are those who depend on their voice for practicing their profession. Various studies have reported that voice problems are common among professional voice users, especially teachers, than in other voice demanding professions. Although most of voice problems are not life threatening conditions, they have significant negative impacts on the occupational, social, psychological, physical and communicative areas of a dysphonic individual. Traditional clinical voice evaluation methods do not capture the impact of the voice problem on an individual’s daily functions in the context of personal, social, and environmental perspectives. Therefore, other tools have been developed recently to assess the impact of voice disorders.

Aim: The aim of this work is to assess the impact of dysphonia on teachers’ quality of life and daily voice activities either participation or limitation using the Voice Activity and Participation Profile.

Material and Methods: The study included 60 adult subjects divided in two groups, (group A): 30 dysphonic subjects and (group B): 30 dysphonic teachers, their age ranged between 25 and 59 years old, both males and females with variable social class, gender distribution of the studied groups was 22 male (37%) and 38 female (63%), Male: Female ratios 1.7:1, their age ranged from 26 years – 56 years, Mean 40.9, Median 40. All patients were subjected to Auditory perceptual assessment of their voice following modified GRBAS scale and the domains were graded according to 0-3 scale where 0 (normal) and (3) (severe). All the patients were examined by videolaryngoscopy using fiberoptic nasofibrolaryngoscopy. All participants were asked to complete the Arabic version of The Voice Activity and Participation Profile (VAPP) that contains five sections:

• Self-perceived severity of voice disorder (1 question).
• Work section (4 questions).
• Daily communication section (12 questions).

Results: Female teachers reported a higher frequency of vocal symptoms than males (38% vs. 26%), and more absence from work due to voice complaints. A significant difference was found for the frequency of voice problems among age groups, 6 at group 1 (20%) their age ranged from 25 years -35 years, 13 at group 2 (37%) their age ranged from 35-45 years, 11 at group 3 (43%) their age ranged from 45-56 years. The mean scores for daily communication, social communication, and emotions domains of dysphonic female teachers were found to be significantly higher in the three domains than those of dysphonic male teachers Primary and secondary school teachers both have experienced voice problems however the prevalence was significantly higher in primary school teachers.

Conclusion and Recommendations: Voice problems occur more frequently and to a larger extent in teachers. This is related to their exposure to vocal abuse and misuse, biological, environmental, and psycho-emotional risk factors, in addition to other predisposing factors. Measuring Self-perception of voice problem and how much it affects quality of life by applying (VAPP) questionnaire is recommended, provides important information and is essential for the adherence to therapeutic processes.

Key Words: Voice – Quality of life – Dysphonia – Protocols – Faculty – Questionnaires.

Introduction

VOICE disorders have been traditionally defined in terms of deviant quality, pitch, and loudness [1] and by deviant structure and/or function of the laryngeal mechanism [2].

The definition of voice disorders in an occupational context depends on the demands set upon
the voice, and voice endurance is an essential criterion [3]. It is recognized that certain professions are exposed to conditions that put them at a higher risk of developing voice disorders [4]. Professional voice users are those who depend on their voice for practicing their profession and various studies have reported that voice problems are common among professional voice users, especially teachers, than in other voice demanding professions [5].

Kooijman et al., [6] classified the influencing risk factors for developing voice disorders into four groups: I Vocal load (e.g., hours of voice use, number of communication partners). II Physical factors (e.g., physical condition, mucosal problems). III Psycho-emotional factors (e.g., stress, emotions, work pressure). IV Environmental factors (e.g., acoustics, humidity).

Questionnaire studies reporting vocal symptoms among classroom teachers and daycare center teachers. 58.6% of 1775 teachers have symptoms during career time [7], 15% of 2103 teachers have current symptoms [8], 69.9% of teachers have symptoms during past 12 month [9] and 59% of 282 teachers have current symptoms [10].

Prevalence rates have not only focused on the general amount of voice problems in the teaching population, but they have also focused on gender. Most studies have focused on female teachers, because females are a majority in the teaching profession, and they also are known to have about twice voice problems more than males [11].

Although most of voice problems are not life threatening conditions, they have significant negative impacts on the occupational, social, psychological, physical and communicative areas of a dysphonic individual. Because a teacher's voice is one of the most important tools of the profession, without a well-functioning and enduring voice, interaction with the students is severely impaired, and professional duties cannot be fulfilled. The most common consequences of voice problems were reported to be missing work, affecting job performance, social activities, and emotions [12]. Traditional clinical voice evaluation methods do not capture the impact of the voice problem on an individual’s daily functions in the context of personal, social, and environmental perspectives. Therefore, other tools have been developed recently to assess the impact of voice disorders [13]. One of these tools is The Voice Activity and Participation Profile “self-assessment questionnaire” developed by Ma E. et al., [14] to measure voice related quality of life.

The Voice Activity and Participation is designed to measure the impact of voice problems at various levels of disablement. It uses the theoretical framework of the International Classification of Function, Disability and Health [15]. The Voice Activity and Participation Profile 28-item assessment tool that evaluates the perception of voice problem, activity limitation, and participation restriction using the International Classification of Impairments, Disabilities and Handicaps [14].

The Voice Activity and Participation Profile provides a better description of the extent of functional handicap, it contains five sections: 1- Self-perceived severity of voice disorder (1 question). 2- Work section (4 questions). 3- Daily communication section (12 questions). 4- Social communication section (4 questions). 5- Emotion section (7 questions) [16].

**Aim of the work:**

The aim of this work is to verify how the impact of dysphonia in teachers is characterized according to the protocol VAPP (Voice Activity and Participation Profile), and to analyze the correspondence of information obtained by this instrument.

**Material and Methods**

The study was done between Oct. 2012 – May 2013 and patients were collected from outpatient clinic of Phomiatric Unit Faculty of Medicine Beni-Suef University.

The study included 60 adult subjects divided in two groups, (group A): 30 dysphonic teachers and (group B): 30 dysphonic subjects, their age ranged between 25 and 59 years old, both males and females with variable social class.

**Exclusion criteria:**

- Smoking, alcohol or drug abuse.
- Those with respiratory tract infections on the day of assessment.
- History of severe respiratory allergies, asthma, thyroid pathologies, neuromotor impairment, hearing impairment, or psychiatric problems.

All patients were subjected to the following protocol of assessment:

**Full voice assessment which included:**

1. **Patient’s interview:**

   The patient’s name, age, sex, marital status, address, education and occupation. Then, analysis of the complaint was done as concerning the onset, course and duration of the symptoms.
An important attention is given to the analysis of the patients’ vocal environmental demands and hazards.

2- Auditory perceptual assessment:
After careful listening to the patient’s voice, changes in the following voice parameters were measured: Overall grade, character, pitch, register, loudness, glottal attacks and associated laryngeal functions, evaluated and tabulated according to the modified GRBAS scale [17].

II- Clinical diagnostic aids:
Visualization of the glottis:

a- Indirect laryngoscopic examination:
The larynx was visualized simply by using laryngeal mirror. It helps in assessment of vocal fold structure, configuration and gross mobility.

b- Flexible nasofibrolaryngoscopy:
Which has the advantage that the examiner may visualize the vocal folds during various articulatory maneuvers since it does not disturb the vocal tract? Also it facilitates examination of patients with hyperactive gag reflex. Stated that nasofibrolaryngoscopy allows visualization not only of the larynx but also of supra-glottal structures and even velopharyngeal mechanism [18].

III- The Voice Activity and Participation Profile (a specialized battery for our study):

The Voice Activity and Participation is designed to measure the impact of voice problems at various levels of disablement [15].

It uses the theoretical framework of the International Classification of Functioning, Disability and Health (ICF) of WHO. According to the ICF framework, diseases and disorders can be viewed at three levels of disablement:
The first level is the impairment of body function and body structures. The second level is the disablement that involves activity limitation and participation restriction of individuals.

The third level refers to the environmental and personal factors that affect the degree of activity limitation and participation [15]. The Voice Activity and Participation Profile contains five sections:

1- Self-perceived severity of voice disorder (1 question).
2- Work section (4 questions).
3- Daily communication section (12 questions).
4- Social communication section (4 questions).
5- Emotion section (7 questions).

Besides the five mentioned parameters, it is still possible to measure activity limitation and participation restriction the first is calculated by the sum of the first questions of each parameter, and the second is calculated by the sum of the first questions of each parameter, and the second is calculated by the sum of the second questions of each parameter. For each question, the participant’s answer according to their perception is represented on an analog scale of 10 cm: not affected (left) and affected (right) [16].

A- Each section of the questionnaire constitutes a section score. Therefore, there were five section scores:

- Self-perceived voice problem score (one question, maximum score 10).
- Job section score (four questions, maximum score 40).
- Daily communication section score (12 questions, maximum score 120).
- Social communication section score (4 questions, maximum score 40).
- Emotion section score (7 questions, maximum score 70).

B- The sum of the five section scores gave rise to the total score (maximum score 280).

C- Items in each of sections 2 (job), 3 (daily communication), or 4 (social communication) were further computed to give rise to two additional scores for each section:

1- Activity limitation score (ALS): Computed from the first question of each situation, which determine the extent of activity limitation.

2- Participation restriction score (PRS): Computed from the second question of each situation, which determine the extent of participation restriction.

In this study, the Arabic version of The Voice Activity and Participation Profile was used, some items in the Arabic version of the VAPP have been modified to be better culturally adapted and understandable by the Arabic speakers, like in questions number 4, 6, 7, 8 & 9, this modification was done after several requests of patients to clarify the meaning of these questions.

All participants were asked to complete the VAPP. The present study applied the version of VAPP that used visual analogue scale a 10-cm long (100 units), “not affected” representing “0” and always affected representing “10”.
Results

This study included (Group A) 30 dysphonic teachers and (Group B) 30 dysphonic subjects, gender distribution of the studied groups was 22 male (37%) and 38 female (63%), Male: Female ratio= 1.7:1, their age ranged from 26 years – 56 years, Mean 40.9, Median 40.

Table (1): Age distribution of group A.

<table>
<thead>
<tr>
<th>Age group</th>
<th>Dysphonic teachers</th>
<th>Mean</th>
<th>Standard deviation (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1 (25-35)</td>
<td>6</td>
<td>30.6</td>
<td>±2.2</td>
</tr>
<tr>
<td>Group 2 (35-45)</td>
<td>13</td>
<td>40.8</td>
<td>±2.7</td>
</tr>
<tr>
<td>Group 3 (45-56)</td>
<td>11</td>
<td>50.5</td>
<td>±2.6</td>
</tr>
</tbody>
</table>

Table (2): Job, daily communication, social communication, and emotion scores of patients with variable diagnosis.

<table>
<thead>
<tr>
<th>Section score</th>
<th>Dysphonic male teachers</th>
<th>Dysphonic female teachers</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Job (possible maximum score 40):</td>
<td>26.1±10.3</td>
<td>33.5±6.3</td>
<td>&gt;0.05 Not significant</td>
</tr>
<tr>
<td>Range</td>
<td>7-40</td>
<td>18-40</td>
<td></td>
</tr>
<tr>
<td>Daily communication (possible maximum score 120):</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>74.1±33</td>
<td>109.7±9.5</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Range</td>
<td>27.5-119.5</td>
<td>48-120</td>
<td></td>
</tr>
<tr>
<td>Social communication (possible maximum score 40):</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>21.6±13.1</td>
<td>35.7±6.1</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Range</td>
<td>0-40</td>
<td>20-40</td>
<td></td>
</tr>
<tr>
<td>Emotion (possible maximum score 70):</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>23.7±16.3</td>
<td>61.6±10.9</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Range</td>
<td>4.5-63</td>
<td>34-70</td>
<td></td>
</tr>
</tbody>
</table>

Table (3): Total activity limitation scores ALS and participation restriction scores PRS of female and male teachers.

<table>
<thead>
<tr>
<th>Section score</th>
<th>Dysphonic male teachers</th>
<th>Dysphonic female teachers</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total ALS (possible maximum score= 100):</td>
<td>61.9±25.5</td>
<td>89.5±10.5</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Range</td>
<td>15.5-100</td>
<td>73-100</td>
<td></td>
</tr>
<tr>
<td>Total PRS (possible maximum score= 100):</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>55.8±28.7</td>
<td>85.1±10.5</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Range</td>
<td>29.5-99.5</td>
<td>72.5-100</td>
<td></td>
</tr>
</tbody>
</table>

Table (4): Total VAPP score of group A & B.

<table>
<thead>
<tr>
<th>Section score</th>
<th>Group A</th>
<th>Group B</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total VAPP score (possible maximum score= 280):</td>
<td>214.4±65.4</td>
<td>53.5±16.5</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Range</td>
<td>73-280</td>
<td>18-70</td>
<td></td>
</tr>
</tbody>
</table>

Fig. (1): Gender distribution of the studied groups.

Fig. (2): Prevalence of voice problems between primary and secondary schools' teachers.

Fig. (3): Comparison of self-perceived severity of voice problem between dysphonic male teachers and female teachers on a 5-point scale (0 no Affection, 10 always affected).

Fig. (4): Comparison between dysphonic male teachers and dysphonic female teachers: Job, daily communication, social communication, and emotion scores on a 6-point scale (0 no Affection, 120 always affected).
Discussion

The definition of voice disorders in an occupational context depends on the demands set upon the voice, and voice endurance is an essential criterion [3]. A number of studies have focused on the teaching population and showed that the prevalence of vocal dysfunction was significantly higher in teachers (ranging from 1.1% to 8.1%) compared with non-teachers with vocal dysfunction (ranging from 1.0% to 36.1%) [19]. This high prevalence is because of intense and prolonged occupational voice use, speaking in a noisy environment, and inefficient phonation techniques. Teachers are more susceptible to aphonia, edema, polyps, and nodules than other vocal professionals [20]. Vocal dysfunction leads to a lesser quality of teaching, an increased absence, and a major financial burden. Serious personal and emotional consequences may also result for the individual teacher. Teachers feel limited in their current job performances and in their future job or career options because of their voice problems [21]. Dysphonia is manifested in different ways, such as hoarseness, voice loss, pain, and fatigue when speaking, voice failures, lack of voice projection, and difficulty in speaking with high intensity. Such complaints cause sick leave, removal, and functional re-adaptations, with clear damage for the teacher, the school community, and the society as a whole [22].

The VAPP was used by Yiu E. et al., [15] to assess cultural differences in the perception of impact of voice disorders and found that the VAPP scores were different between dysphonic subjects from different cultural backgrounds, so that they illustrated that the VAPP is a sensitive tool in identifying possible differences in the perception of impact of voice problems because of cultural backgrounds [23]. Used The VAPP to evaluate the performance of call center operators and found that individuals with poor professional performance are typically poorer on some components of the VAPP.

With the development of the Arabic version of VAPP, Arab clinicians will have better opportunities to properly address the patients’ voice problem and degree of severity. This facilitates the assessment and management programs of voice disorders and focuses on treatment strategies that fit the needs of voice disorders of VAPP between the two participant groups (Group A, Group B) there was significant difference between the two groups in the four sections’ scores of VAPP regarding self-perceived severity of voice problem, the job, daily communication, social communication, emotions domains, activity limitation and participation restriction scores, this indicated that voice problems had significant effect on dysphonic teachers’ quality of life, while non-teacher dysphonic subjects did not have the same degree of problem concerning their voices so that little effect on their activities was detected. These results are consistent with the study of Kleemola L. et al. [16], which was conducted in Tampere University Hospital in 2004 and 2005. By Comparing the results of 142 teachers having diverse chronic voice pathologies with the results of non-teachers who were 127 known individuals with dysphonic voices and found that The VAPP of teachers were found significantly higher in all score means than score means of the non-teachers group.

Results of this study showed that the mean scores for daily communication, social communication, and emotions domains of dysphonic female teachers were found to be significantly higher in the three the domains than those of dysphonic male teachers, while the mean of job domain of dysphonic female teachers was not significantly higher than those of dysphonic male teachers. Females are more often affected by vocal loading [25]. And also female teachers have been found to have “higher depression levels” in a study comparing occupational differences in anxiety and depression [3].

The present study results indicated that primary and secondary school teachers both have experienced voice problems however the prevalence was significantly higher in primary school teachers, and no significant difference was found between
VAPP mean scores except the emotion domain and the total VAPP mean score. Primary school teachers’ scores were significantly higher than secondary school teachers. This is due to teaching a large group like in primary schools requires more vocal effort and increased vocal intensities with consequent voice problems [26].

The present study results of VAPP described before showed that the impact on quality of life resulting from voice disorder is not correlated to the severity of diagnoses. On the other hand, it was observed that the negative impact on quality of life is correlated to the perception of the individual about his or her voice. To be precise, the more dysphonic the individual consider himself or herself, the higher the VAPP results are, reflecting limitation on daily activities related to voice use. This result is consistent with Krischke S. et al., [27] results who found that, voice disorders significantly influence patients’ Health Related Quality of Life. There are no statistically significant differences between patients suffering from organic and functional voice disorders. Surprisingly, it seems that the manner in which a person experiences a voice disorder depends on the individual cultural background, as patients with functional voice disorders have similar reduction in Health Related Quality of Life as those with organic voice disorders.

Conclusion and Recommendations:

Voice problems occur more frequently and to a larger extent in teachers. This is related to their exposure to vocal abuse and misuse, biological, environmental, and psycho-emotional risk factors, in addition to other predisposing factors. This shows the multifactorial genesis of voice disorders among teachers. Prolonged voice use often against high background noise in the presence of poor acoustic conditions is probably the most important risk factor. Dysphonia is manifested in different ways, such as hoarseness, voice loss, pain and fatigue when speaking, voice failures, lack of voice projection, and difficulty in speaking with high intensity. Such complaints cause clear damage for the teacher, the school community, and the society as a whole. Measuring Self-perception of voice problem and how much it affects quality of life by applying questionnaires provides important information and is essential for the adherence to therapeutic processes. Voice problems especially functional disorders were more prevalent among female teachers and primary school teachers as they are subjected to high vocal load. Dysphonic female teachers had poorer quality of life than dysphonic male teachers. Quality of life resulting from voice disorder was not correlated to the severity of diagnoses. On the other hand, it was observed that the negative impact on quality of life is correlated to the perception of the individual about his or her voice.

- Periodic voice care workshops on efficient voice use and vocal hygiene should be routinely available to all teachers, not only occasionally. It would be of great importance to make voice-training programs a part of the normal schedule both for teachers and for those who are training to be teachers.

- VAPP Questionnaire is a reliable measure can be used to properly address the patients’ voice problem and degree of severity.

This facilitates the assessment and management programs of voice disorders and focuses on treatment strategies that fit the needs of voice disorders of Arabic speaking patients.

- Improving the class rooms acoustics and building new schools especially primary schools is beneficial for teachers and students as well.

- Acceptable noise levels in occupational and domestic environments should established on the basis of speech and communication criteria determined by WHO, this criteria indicates that for good speech intelligibility indoors, background noise of less than 45 dB are required. While for outdoors, noise levels of less than 55 dB are required.

References
6- KOOIJMAN P.G.C., De JONG F.I.C.R.S., OUDES M.J., HUINK W., VAN ACHT H. and GRAAMANS K.: Muscular tension and body posture in relation to voice handicap


