

# Dysphonia Causative Diagnosis Linked to Voice Handicap Index of the Patients with Dysphonia

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## Abstract

**Background:** Dysphonia has a negative impact not only on communication but also on the patients' social and professional life. Detection of the underlying causes and the role of the predisposing factors in various conditions leading to dysphonia are important to establish definitive management of the patients.

**Purpose:** The purpose of the study is to determine the relationship between dysphonia causative diagnosis and the voice handicap index (VHI) score.

**Materials and Methods:** This study is an analytical study involving 47 patients with dysphonia. History taking, otorhinolaryngology examination, VHI questionnaire, and optic laryngoscopy examination with endoscopy were conducted to establish the primary diagnosis.

**Result:** Most of the patients are male and above 40-year-old. Based on the diagnosis, the most common underlying causes were laryngeal cancer which was found in 22 patients (47%). The overall score of the VHI was mostly in severe level (68%), and a significant relationship between the causative diagnosis of dysphonia and the VHI score was revealed ( $P < 0.05$ ).

**Conclusion:** Based on VHI calculation, dysphonia affects the majority of patient's quality of life, and a relationship was found between the diagnosis and the VHI score itself.

**Key words:** Dysphonia, Quality of life, Voice handicap index

## INTRODUCTION

Every voice disturbance caused by a disorder of the phonation organs, particularly larynx, is known as dysphonia. Dysphonia is not a disease, yet a symptom of diseases or disorders which affects larynx that can lead to impairment of social and professional communication.<sup>[1,2]</sup>

Dysphonia has a negative impact not only on communication but also on the social and professional life of the patients. Patients with dysphonia tend to encounter social isolation, depression, impairment of the quality of life, and increased

working absent rate. Therefore, voice disturbance affects not only on the individuals but also creates a social burden.<sup>[3]</sup>

It has been reported that patients with voice disturbance had a significantly worse quality of life, regardless of the underlying causes. Measuring quality of life has been considered a tool to assess treatment effectiveness.<sup>[4,5]</sup>

One of the instruments to evaluate voice problem in patients with dysphonia is voice handicap index (VHI). VHI is a widely accepted questionnaire and is used in various researches and clinical applications. In 2002, VHI has been accepted by the European Board of Medical Research and Quality as a valid and reliable diagnostic tool.<sup>[4-6]</sup> This study is aimed to determine etiologies, predisposing factors, and quality of life of the patients presented to the Adam Malik General Hospital Otorhinolaryngology outpatient care with dysphonia. Detection various etiologies, role of the predisposing factors, and patients' quality of life presented with dysphonia are very important to establish accurate treatment for the patients.

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## MATERIALS AND METHODS

The study is an analytical cross-sectional study in 47 subjects presented with dysphonia to the Otorhinolaryngology Outpatient Care of Adam Malik General Hospital from the period of June 2017 to August 2017. Patients that are not cooperative to undergo optic laryngoscopy examination are excluded.

The patients were undergone history taking and routine otorhinolaryngology examination than were asked to fill up demographic data which involves age, gender, job, and predisposing factors which include the history of cigarette smoking, alcohol abuse, vocal abuse, septic focus, and inhaler application. Patients were asked to fill up VHI questionnaire and underwent optic laryngoscopy examination with endoscopy to establish the diagnosis. In patients with tumor, micro larynx surgery was performed to determine the histopathology.

Quality of life was measured using the VHI data. It consists of 30 statements, each statement must be read carefully and the patients must be able to determine the frequency of these statements in their actual life, starting from 0 (never), 1 (seldom), 2 (once in a certain period of time), 3 (frequent), to 4 (always). Therefore, the VHI score range is between 0 and 120. The statements represent three subgroups, which reflects functional aspect, physic and emotional aspect, and voice flaw aspect. VHI can be interpreted as mild voice flaw (VHI score 0–30), moderate voice flaw (31–60), and severe voice flow (61–120).<sup>[5]</sup>

Statistic test was performed to determine the relationship between diagnosis and VHI score. To assure that the VHI score is based on the main variable; therefore, two most common predisposing factors were chosen to be tested with the VHI score. The test was done with the application of mean difference test (ANOVA) at  $\alpha = 0.05$ . This study involved a human being as subjects. Hence, regulation was strictly followed and was proved by the Ethical Committee on health research.

## RESULTS

Out of 47 patients studied, 36 patients (76%) were male, and 11 were female (24%), with a range of age of 18–71 years old and the majority age group was >60-year-old (12%). Most of the patients have a predisposing factor of smoking (54%). Other predisposing factors were alcohol (26%), vocal abuse, septic focus, and inhaler use [Table 1].

However, Table 2 shows that there was no significant relationship between the VHI score to smoking and alcohol ( $P > 0.05$ ).

In this study, the most diagnosis which leading to dysphonia was malignant laryngeal tumour (laryngeal carcinoma), as much as 47%, followed by other causes including laryngopharyngeal reflux (LPR), tuberculose laryngitis, paralysis of vocal cord, laryngitis, polyp and nodule of vocal cord, and laryngeal papilloma, and the least amount was intubation granuloma, only 2% [Table 3].

According to the VHI category, most patients have the VHI score with the severe VHI degree (71%). Moderate degree 29%, and none had a mild VHI score, as shown in Table 4.

Figure 1 exhibits that if the VHI values can be seen for each diagnosis in the patient. The highest VHI score was found in laryngeal papilloma, followed by laryngeal

**Table 1: Frequency distribution of subjects based on predisposing factors**

Predisposing factors	n (%)
Septic focus	3 (5)
Smoking	31 (54)
Alcohol	15 (26)
Vocal abuse	7 (13)
Inhaler use	1 (2)

**Table 2: Result of ANOVA test**

VHI	F	P
To smoking	0.063	0.803
To alcohol	0.005	0.944

VHI: Voice handicap index

**Table 3: Frequency distribution of subjects based on diagnosis criteria (n=47)**

Diagnosis	n (%)
Laryngitis	3 (6)
LPR	6 (13)
Tuberculose laryngitis	5 (11)
Malignant tumors	22 (47)
Polyp of vocal cord	2 (4)
Nodule of vocal cord	2 (4)
Papilloma	2 (4)
Intubation granuloma	1 (2)
Paralysis of vocal cord	4 (9)

LPR: Laryngopharyngeal reflux

**Table 4: Frequency distribution of subjects based on the VHI degree**

Degree of VHI	n (%)
Mild	0
Moderate	14
Severe	33

VHI: Voice handicap index

**Table 5: Result of ANOVA test**

VHI	F	p value
To diagnosis	5,516	0,000

VHI: Voice handicap index

malignant tumors, nodule of vocal cord, polyp of vocal cord, laryngeal tuberculose, laryngeal paralysis, LPR, and laryngitis with the lowest score. Statistical tests used ANOVA to diagnosis categories above to see the difference of VHI values to show significant results ( $P < 0.05$ ).

Table 5 shows that a significant relationship between the causative diagnosis of dysphonia and the VHI score was revealed ( $P < 0.05$ ).

## DISCUSSION

Dysphonia is one of many disorders that give negative impacts to the quality of life mainly in the elderly group, which the amount increases rapidly. Early identification of elderly patients with voice impairment and then give an optimal treatment, important to improve their quality of life.<sup>[7]</sup>

In this study, most dysphonia patients were in the age group >60-year-old male. The study carried out by Haryana in 2005 which was performed in the Department of ENT-HN subdivision of endoscopy H. Adam Malik Central General Hospital Medan reported that the highest percentage was in the age group >60-year-old (32 patients) comprising 27 men (38.6%) and 5 women (13.5%).<sup>[8]</sup> Golub *et al.*, in 2006, reported that the prevalence of dysphonia mostly found in patients above 65-year-old, dominated by men.<sup>[9]</sup> This seemed to occur because the majority of the case found in this study were malignant laryngeal tumors. Meanwhile, the malignant laryngeal tumors usually encountered more frequent in the elderly male group. It was assumed that some manly habits may relate to a higher incidence of dysphonia in the male group, such as cigarette smoking, alcohol consumption, and poor oral hygiene.

In Table 1, we obtained that the most predisposing factors of the occurrence of dysphonia were smoking and alcohol. The similar matter was reported by Shinde and dan Hashmi, year 2015 in the study performed in Loni, India in 100 patients with dysphonia reported the most predisposing factor was smoking (68%), followed by alcohol (42%) and vocal abuse (2%).<sup>[10]</sup> Smoking is the main predisposing factor that gives bad to the vocal health. The relationship between smoking to the disorder of larynx and vocal distortion has been empowered by various studies. A number of studies have reported that smoking is the main cause of the histologic change and

laryngeal characteristic. However, in this study, there was no relationship found between smoking and the VHI score ( $P > 0.05$ ). Also with alcohol consumption, which had no relationship with VHI score ( $P > 0.05$ ), seen in Table 2. Since all the patients that were involved in this study had laryngeal disorder (dysphonia), thus no difference on VHI score between smokers and non smokers, alcoholics and non-alcoholics, which was caused by preexisting voice handicap among all patients that were involved in this study. As we knew, dysphonia can be triggered by several predisposing factors such as smoking, drinking excessive amount of alcohol, vocal abuse, focus septic and several more predisposing factors, and each patient is likely to be affected by more than one of these predisposing factors. The same matter also occurred for alcohol consumption.

Table 3 shows that the disease that mostly caused dysphonia was laryngeal malignant tumor, as many as 22 patients (47%). This differs from the study carried out by Cohen *et al.* (2012), reported that laryngitis was the most diagnosis causing dysphonia.<sup>[3]</sup> Parajuli reported that the majority cause of dysphonia was vocal nodule (34.21%), whereas laryngeal malignant tumor was in the second rank (15.78%), and followed by laryngitis, polyp of vocal cord, Reinke's edema, laryngeal papilloma, and intubation granuloma, respectively, until the least.<sup>[11]</sup> This is because the polyclinic of ENT-HN Haji Adam Malik General Hospital Medan is a central refer Rak Hospital In Sumatera Utara, so patients that came were dominated by patients with more severe types of disease (malignancy). Meanwhile, patients with types of disease that was caused by infection or inflammatory process mostly came to tertiary hospitals.

Several studies showed that laryngeal diseases may harm the patient's quality of life. As a consequence, patients may lose time for working, stated disable, worsen economic difficulties of the community and reduced productivity.<sup>[12]</sup> Table 4 shows that most patients have voice distortion and severe voice disability, experienced by 32 patients (68%), moderate voice distortion in 15 patients (32%), and no patients felt mild degree of voice distortion. Each patient examined was asked to report subjectively the voice problem experienced. Individual variation was present and how the individuals felt the progression of health occurring to them would give different perceptions which were an effect of voice distortion that may be affected by job, education, marital, psychological and mental status, requirement of voice condition, and other unknown factors.

The diagnosis of disease as the cause of dysphonia also participated in affecting the VHI score in all patients. Figure 1 explains that laryngeal papilloma

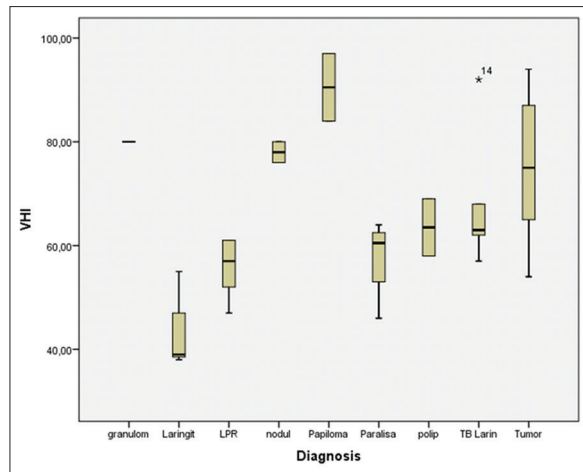


Figure 1: Distribution of voice handicap index score based on the diagnosis

had a high recurrence rate, so patients with laryngeal papilloma tend to experience repeated dysphonia, although treatment has been given. The causal factor in voice distortion was quite complicated, and patients with dysphonia had various difficulties that may affect their quality of life, reflected by the severity of VHI. It is visible that the determinant of VHI score was the diagnosis of disease.

As seen in Table 5, a significant distinction was revealed among the VHI score based on the causative diagnosis of dysphonia ( $P < 0.005$ ). A similar finding was reported by Cohen *et al.* in their study in San Francisco; a significant difference was also revealed among the VHI score based on the diagnosis of various larynx disorders.<sup>[12]</sup>

In this study, the quality of life included voice distortion of a patient with tumor was worse than voice distortion due to infection or inflammation. Aaby and Heimdel(2012) in Norway reported that quality of life of the patients with malignancy was worse than those with no malignancy.<sup>[13]</sup> It can be caused by the difficulties related to many factors, such as psychological, emotional, and professional, and also their impact to the patients' social life. Besides, voice handicap of those with larynx malignancy will last longer than those with other milder larynx disorders.

## CONCLUSION

The measurement of quality of life has been a more important matter as a tool to assess the effectiveness of treatment and management plan. In patients with dysphonia, the quality of life not only depends on the etiology or predisposing factor underlying it but also other various factors. In this study, the authors revealed that there was a significant relationship between various dysphonia causative diagnosis and the VHI score. Based on the calculation of VHI score, found that the voice disability degree in the majority of patients with dysphonia was severe, which means that the majority of patients with complaints of dysphonia experienced the quality of life disturbance.

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