Research Article

Assessment of Level of Depression, Stress and Anxiety in Patients with Non-Organic Voice Disorders and Minimal Associated Pathological Lesions (Mapls)

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Abstract
Purpose: The aim of this work is to assess the levels of depression, anxiety and stress in patients with non-organic voice disorders and minimal associated pathological lesions of the vocal folds for understanding the exact voice problems, proper management and designing proper therapeutic programs for voice problems. **Patient and methods**: This study was conducted on two groups of subjects: The (study group) consisted of ١٠٠ patients with change of voice which was compared to another group (control group), which included ١٠٠ individuals with no change of voice. Both of the study and control group were statically matched in comparative data age and sex distribution. The study group (G١) were ٥٣males (٥٣٪) and ٤٧ females (٤٧٪), with a mean age of ٣٥.٤ ±١٣.٣ and a range of ١٣ years to ٧٠ years. These patients were selected randomly from outpatient clinic of Phoniatrics unit, Minia University hospital, in the period from September ٢٠١٤ to November ٢٠١٥. The control group (G٢) included ١٠٠ individuals not suffering from change of voice. They were ٥٥ males (٥٥٪) and ٤٥ females (٤٥٪), with a mean age of ٣٦.٢±١٢.٥٤ and a range of ١٤ -٦٦ years. They were selected randomly from outpatient clinic of Internal medicine, Minia University hospital. Each individual of both groups was subjected to the following protocols of assessment. [A]- The full voice evaluation protocol in the Phoniatric Unit, Minia University. [B]- The Voice Handicap Index (VHI), [C] - Psychiatric evaluation: Depression Anxiety Stress Scales (DASS). **Results**: A highly statistical significant difference was obtained between the study and the control group as regarding depression, anxiety and stress scale (p<٠.٠٠١). **Conclusion**: The results from this study revealed that stress, anxiety, and depression may play important role in patients with non-organic voice disorders and patients with minimal associated pathological lesions of both vocal folds.

Key Words: Depression, Stress , voice disorders

Introduction
Anxiety, love, tenderness and anger can all be transmitted by changes in vocal parameters. It has to be remembered when considering disordered voices, that there are psychological aspects of voice disorders in general, not only voice disorders whose primary etiology is psychogenic[١].

Milutinovic[٢] reported that psychological behavior, emotions, voice and speech are closely interrelated. Thus voice disorders in this respect may be of psychogenic background. He reported that almost all voice disorders can have a psychological element, whether as a cause or as a result.

The World Health Organization International Classification of Disease-١٠ (ICD-١٠)[٣], the classification of Mental and Behavioral Disorders; there are two classes which are probably most relevant to patients with voice disorders. These are:

I- Neurotic, stress-related and somatoform disorders: This includes anxiety, depression and impaired insight, in the absence of any loss in perception of external reality.

II- Abnormalities of adult personality and behavior. The clinician has to bear in mind that, psychological aspects of voice disorders might be primary (the cause of the voice disorder), concurrent (pre-existing or co-existing with the voice disorder) or secondary (the result of the voice disorder) .

A voice disorder is 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[٤]. Kotby[٥] in a study estimating the etiological factors in non-organic dysphonia concluded that there was evident psychogenic background for some types of non-organic voice disorders, namely, incomeplete mutation, phonasthenia and non-organic aphonia. White[٦] found nosignificant difference in personality traits.

It is acknowledged that emotional distress may be both primary and secondary to a voice disorder, thus potentially promoting a vicious cycle[٧]. One condition that has been particularly emphasized along those lines is primary muscle tension dysphonia (MTD) or "psychogenic", "functional", or "non-organic" dysphonia[٨].

It is well accepted that MTD is a multifactorial voice disorder with various potential contributing etiologies that include stress[٩]**.** More broadly, the notion has been put forth that nonorganic voice disorders should be considered as a *spectrum* rang from psychogenic aphonia to MTD as a chiefly muscular phenomenon[١٠]. Of note, stress in patients with MTD has been anecdotally reported to have more to do with daily anxieties than with frank psychiatric problems[٧].

Regarding the MAPLs of the vocal folds, Roy[١] concluded that the majority of individuals with vocal fold nodules, in their study, had extravert personality while the majority of individuals with functional dysphonia were introverts. Also;Yano[١٢] in a study for evaluation of the personality characteristics of patients with vocal fold diseases reported that extroversive personality was one of the important factors relating to the pathogenesis of vocal fold polyp and nodule. Abeida[١٣] revealed that perceived stress and personality features factors related to vocal nodules. Increased anxiety is one of the most frequently mentioned features of patients with non-organic voice disorders. Patients are described as being socially anxious, non-assertive with a tendency toself-restraint and anxious concerning everyday lifestyle[١٤]. The role of the psychogenic background of voice disorders is still unclear in conjunction with being due to abuse and misuses of voice only, in absence of comprehensive assessment protocol that rule out the effect of psychogenic factors in causation of voice disorders[١١].

Patients and Methods

Subjects:

This study is cross sectional that was conducted on two groups of subjects: The (study group) consisted of ١٠٠ patients with change of voice. This study group was compared to another group (control group), which included ١٠٠ individuals with no change of voice. Both of the study and control group were statically matched in comparative data age and sex distribution. The study group (G١) included ١٠٠ patients suffering from change of voice. They were ٥٣males (٥٣٪) and ٤٧ females (٤٧٪), with a mean age of ٣٥.٤ ±١٣.٣ and a range of ١٣ years to ٧٠ years.

It divided into ٢ sub-groups:

Group A: it included ٥٠ patients who diagnosed as a non-organic voice disorders (NVDs) including {١٧(٣٤٪) of them had hyperfunctional dysphonia, ١٢(٢٤٪) of them had psychogenic dysphonia, ٩(١٨٪) had psychogenic aphonia, ٤(٨٪) had incomplete mutational voice disorder, ٣(٦٪) had phonathenia, ٢(٤٪) had hypo-functional dysphonia, ٢(٤٪) had chronic habitual hyperfunctional childhood dys-phonia, ١(٢٪) had ventricular dysphonia}. **Group B:** it included ٥٠ patients who diagnosed as minimal associated patho-logical lesions (MAPLs) of the vocal folds including {٢٠(٤٠٪) of them had vocal folds nodules, ١٦(٣٢٪) had vocal fold polyps, ٨(١٦٪) had vocal folds Reinke's edema, ٤(٨٪) had vocal fold cysts and ٢(٤٪) had vocal fold

contact granuloma}. These patients were selected randomly from outpatient clinic of Phoniatrics, Minia University hospital, in the period from September ٢٠١٤ to November ٢٠١٥.

The control group (G٢)
This group included ١٠٠ individuals not suffering from change of voice. They were ٥٥ males (٥٥٪) and ٤٥ females (٤٥٪), with a mean age of ٣٦.٢±١٢.٥٤ and a range of ١٤ years -٦٦ years. They were selected rando-mly from outpatient clinic of Internal medicine, Minia University hospital.

Methods:
Each individual of both groups was subjected to the following protocols of assessment and all the patients and individuals signed consent to be enrolled in the study.

[A]- The full voice evaluation protocol in the Phoniatric Unit, Minia University Hospital[١٥] which includes:
I- Elementary Diagnostic Procedures:
Patient Interview:
This includes personal data of the patient (name, age, sex, residence, marital status, number of children, and their ages, education and occupation).
II- Auditory Perceptual Assessment (APA):
III- Clinical Diagnostic Aids:
All patients in the study underwent Telescopic rigid fiberolaryngoscopy in the Phoniatric department at Minia University using rigid fiber optic laryngoscope Henke-Sass Wolf angle ٩٠.

[B]- The Voice Handicap Index (VHI)
All individuals in the study were asked the questions of VHI and the researcher filled the answers.
The Arabic version of the VHI was used**,** it consist of ٣٠ items self-administrated questionnaire that asked the individuals to describe their voice and quantify the functional, physical and emotional impacts of a voice disorder on a patient's quality of life[١٦]. This questionnaire was constructed with a ٣ sub-scales structures: functional scale, physical scale and emotional scale. Each sub-scale contains ١٠ items and is worth ٤٠ points.
The subscales are divided into mild, mode-rate and severe according to the Score [١٧]

- Functional scale: mild if >١٠, moderate if >١٢, severe if >١٨.
- Physical scale: mild if >١٥, moderate if >١٨, severe if >٢٢.
- Emotional scale: mild if >٨, moderate if >١٣, severe if >٢٠.

So the VHI total score can be divided into mild if >٣٣, moderate if >٤٤ and severe if >٦١.

[C]- Psychiatric evaluation:
All individuals in the study were subjected to Depression Anxiety Stress Scales (DASS)**: The** DASS is a ٤٢-item questionnaire which includes three self-report scales designed to measure the negative emotional states of depression, anxiety and stress[١٨]. This scale was psychometrically validated to the Arabic culture by[١٩]. This screening and outcome measure reflects the experience of the person over the previous ٧ days.

Each of the three scales contains ١٤ items; the depression scale assesses dysphonia, hopelessness, devaluation of life self-deprecation, and lack of interest/involve-ment. The anxiety scale assesses autonomic arousal, skeletal muscle effects, situational anxiety, and subjective experience of anxious affect. The stress scale (items) is sensitive to levels of chronic non-specific arousal. It assesses difficulty relaxing, nervous arousal, and being easily upset/ agitated, irritable/over-reactive and impatient.

Individual of both groups are asked to use ٤-point like scale severity/frequency ranges from did not apply to me at all to applied to me very much or most of the time. Scores of depression, anxiety and stress are calculated by summing the scores for relevant items. Reliability of three scales is considered adequate, and test -retest reliability is likewise considered adequate with ٠.٧١ for depression, ٠,٧٩ for anxiety and ٠.٨١ for stress[٢٠].

Table (١): The score classification of the level of DASS

	Depression	Anxiety	Stress
Normal	٠-٩	٠-٧	٠-١٤
Mild	١٠-١٣	٨-٩	١٥-١٨
Moderate	١٤-٢٠	١٠-١٤	١٩-٢٥
Severe	٢١-٢٧	١٥-١٩	٢٦-٣٣
Extremely Severe	+٢٨	+٢٠	+٣٤

Results

١) Demographic data:

Distribution of individuals of our study [N=٢٠٠] according to demographic data:

Non- statistical significant difference was obtained between the study groups (G١) and the control group (G٢) as regard the age and sex (P≥٠.٠٥).

Table (٢): Comparison of age between patients and controls:

Age	Study group (n=١٠٠)	Control group (n=١٠٠)	t	P-value
	Mean ± SD (Range)	Mean ± SD (Range)		
Age (in years)	٣٥.٤ ± ١٣.٣ (١٣-٧٠)	٣٦.٢±١٢.٥٤ (١٤-٦٦)	٠.٠٥٨	٠.٢٣

Non- significant(P≥٠.٠٥), significant(p< ٠.٠٥), Highly significant(p< ٠.٠١)

Table (٣): Comparison of gender distribution between patients and controls:

Gender	Study group (n=١٠٠)		Control group (n=١٠٠)		X^2	P-value
	Freq.	%	Freq.	%		
Male	٥٣	٥٣	٥٥	٥٥	٠.٠٨١	٠.٧٧٧
Female	٤٧	٤٧	٤٥	٤٥		

Non- significant(P≥٠.٠٥), significant(p< ٠.٠٥), Highly significant (p< ٠.٠١)

٢) Depression scale:

A highly statistical significant difference was obtained between the study and the control group as regarding depression scale (p<٠.٠٠١). As regard mild, moderated severe a degree of depression, highly statistical significant P-value in G١ in comparison to G٢ (Table٤) (Fig.١-٢).

Table (٤): Comparison of depression scale between study group and control group

Depression Scale	Study group (n=١٠٠)	Control group (n=١٠٠)	X^2	P-value
	Freq. (mean± SD)	Freq. (mean± SD)		
Normal	٥ ٢.٨± ٢.٧	٤٤ ٤.٠٩± ٣.٠٣	٣٩.٠٣٢	<٠.٠٠١*
Mild	٢٣ ١١.٩± ١.٠٢	٣٨ ١١.٧± ١.٠٦	٤.٦٢٣	٠.٠٣٢*
Moderate	٣٤ ١٨.٦± ١.٦	١٤ ١٧± ٢.١	٩.٨٩٦	٠.٠٠٢*
Severe	١٨ ٢٤.٩± ١.٦	٤ ٢٥.٧± ١.٢	٨.٦٣١	٠.٠٠٣*
Extremely severe	٢٠ ٣٤.٤± ٤.٢	٠ -	٢٠.٠٥٦	<٠.٠٠١*
Total	١٠٠ ٢٠.٥٩± ٩.٠٥	١٠٠ ٦.٠٢± ٠.٥٢	٧١.٩٧٢	<٠.٠٠١*

Non- significant(P≥٠.٠٥), significant(p< ٠.٠٥), Highly significant(p< ٠.٠١)

Fig. (١): Distribution of depression scale among the study group

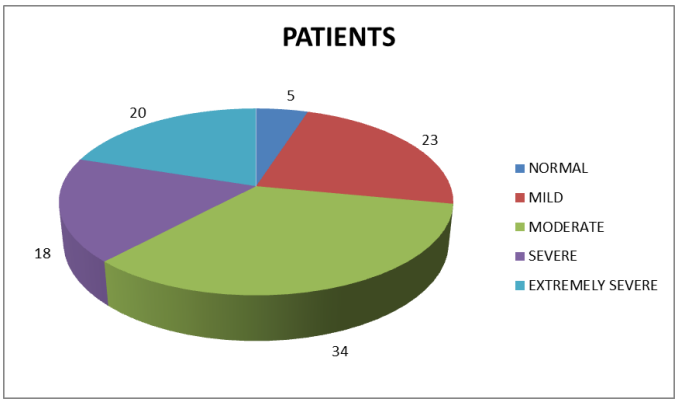
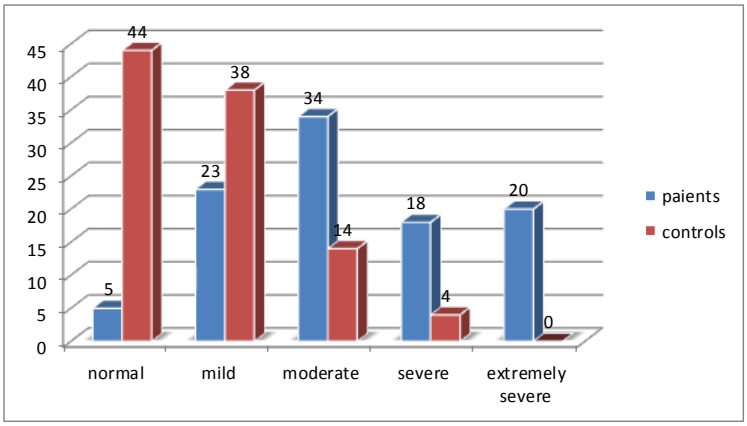


Fig. (٢): Comparison of depression scale between study group and control group



As regard Comparison of depression scale between NVDs and MAPLs, Non statistical significant differences were found between the two groups as regard the depression scale P-value (٠.٩٣٢). As regard mild, moderate, sever and highly sever degree of depression, non-significant P-value was obtained (Table ٥, fig. ٣-٤&٥).

Table (٥): Comparison of depression scale between NVDs and MAPLs

Depression Scale	NVDs (n=٥٠)	MAPLs (n=٥٠)	X^2	P-value
	Freq.(%) (mean± SD)	Freq.(%) (mean± SD)		
Normal ٠-٩	٣(٦) ١± ١	٢(٤) ٥.٥± ٢.١	٠	١
Mild ١٠-١٣	١٢(٢٤) ١٢.١٦± ٠.٨٣	١١(٢٢) ١١.٧± ١.١	٠	١
Moderate ١٤-٢٠	١٥(٣٠) ١٩.٣± ١.٠٤	١٩(٣٨) ١٨± ١.٩	٠.٤٠١	٠.٥٢٦
Severe ٢١-٢٧	١٠(٢٠) ٢٥.٤±, ١.٥	٨(١٦) ٢٤.٣± ١.٨	٠.٠٦٧	٠.٧٩٤
Extremely severe ٢٨+	١٠(٢٠) ٣٤.٣± ٤.٦	١٠(٢٠) ٣٤.٥± ٤	٠.٠٦٢	٠.٨٠٢
Total	٥٠(١٠٠) ٢٠.٧± ٩.٥	٥٠(١٠٠) ٢٠.٤٦± ٨.٧	-٠.٠٨٥	٠.٩٣٢

Non- significant (P≥٠.٠٥), significant (p< ٠.٠٥), Highly significant (p< ٠.٠١).

Fig. (٣): Distribution of depression scale among NVDs patients

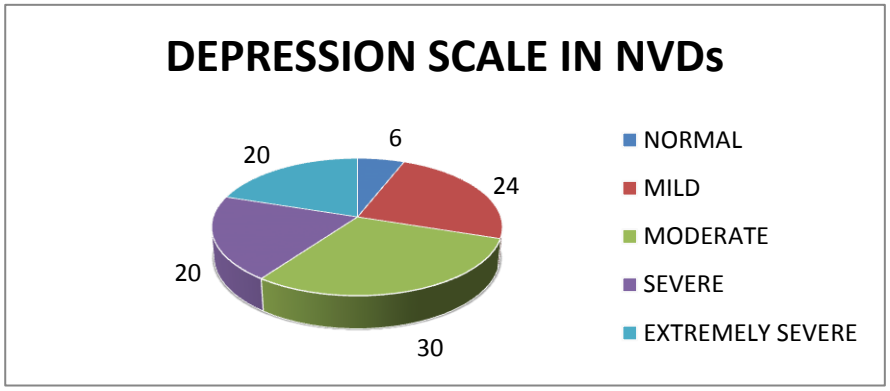


Fig. (٤): Distribution of depression scale among MAPLs patients

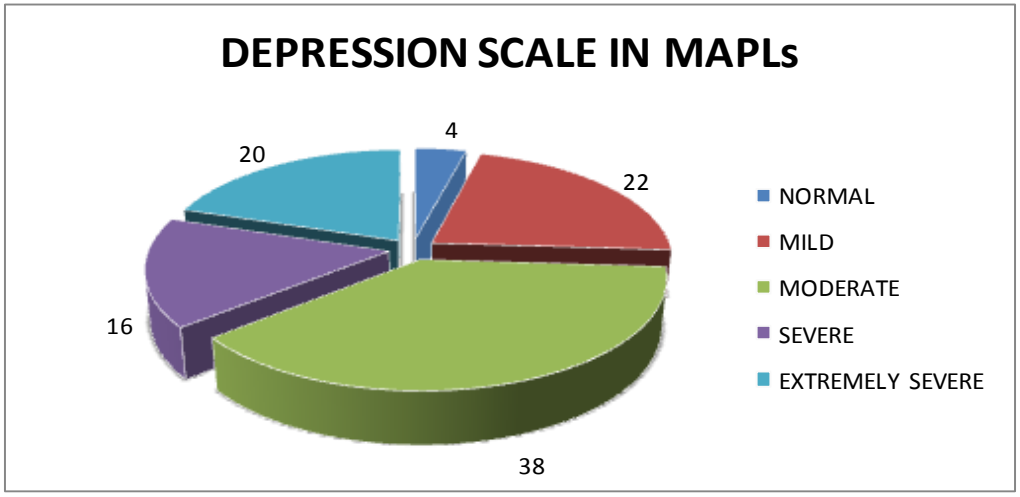
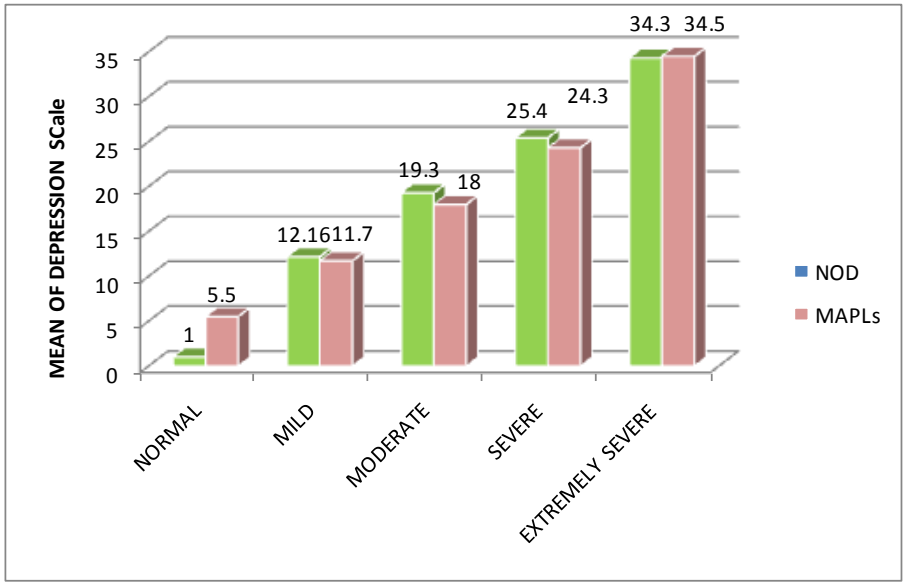


Fig. (٥): Comparison of mean of depression scale between NVDs and MAPLs.



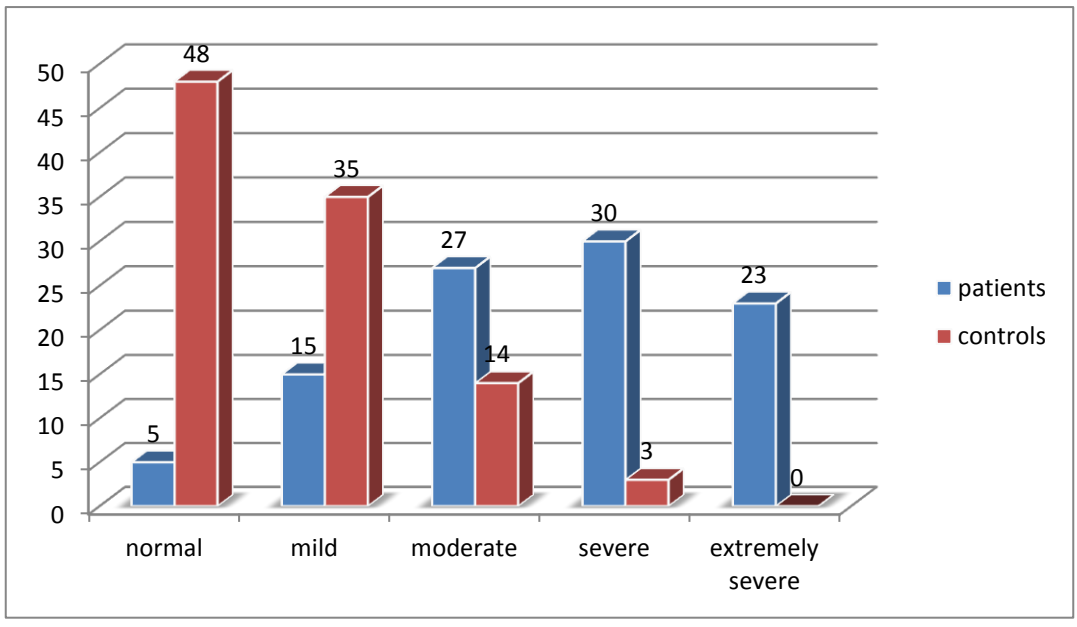
٣) Stress Scale:
A highly statistical significant difference was obtained between the study and the control group as regarding stress scale ($p<٠.٠٠١$). As regard mild, severe and highly severe degree of stress, highly statistical significant P- value was obtained in G١ in comparison to G٢. As regard moderate degree of stress, statistical significant P- value was obtained in G١ in comparison to G٢ (Table ٦, fig. ٦).

Table (٦): Comparison of stress scale between study group and control group

Stress Scale	Study group (n=١٠٠)	Control group (n=١٠٠)	X^2	P-value
	Freq. (mean± SD)	Freq. (mean± SD)		
Normal	٥ ٥±, ٥.١	٤٨ ٥.٩١± ٣.٥٨	٤٠.٥٦	<٠.٠٠١
Mild	١٥ ١٧.١٣± ٠.٩٩	٣٥ ١٦.٤٢± ١	١٣.٠٨٣	٠.٠٠١
Moderate	٢٧ ٢١.٤٦± ٢.٢٦	١٤ ٢١.٩٢± ١.٩٧	٢.٨٦٧	٠.٠٣
Severe	٣٠ ٢٩± ٢.١٩	٣ ٢٨.٥± ٢.١٢	٢٧.١٢١	<٠.٠٠١
Extremely severe	٢٣ ٣٧.٦٥± ٢.١٢	٠ -	٢٥.٠٤٧	<٠.٠٠١
Total	١٠٠ ٨.٩± ٠.٩	١٠٠ ٧.١٩± ٠.٧	٩٣.٩٨٥	<٠.٠٠١

Non- significant (P≥٠.٠٥), significant (p< ٠.٠٥), Highly significant (p< ٠.٠١)

Fig. (٦): Comparison of stress scale between patients and controls



As regard Comparison of stress scale between NVDs and MAPLs, Non statistical significant differences were found between the two groups as regard the stress scale P-value (٠.٥٤٢). Non-significant P-value was obtained as regard absence of stress symptoms. As regard mild, moderate and severe and highly severe degree of stress, non- significant P-value was(Table ٧, fig. ٧-٨&٩).

Table (٧): Comparison of stress scale between NVDs and MAPLs

Stress Scale	NVDs (n=٥٠) Freq. (%) (mean, SD)	MAPLs (n=٥٠) Freq. (%) (mean, SD)	X^2	P-value
Normal ٠-١٤	٢(٤) ٣, ٢.٨	٣(٦) ٦, ٦.٥	٠	١
Mild ١٥-١٨	٨(١٦) ١٧, ٠.٩	٧(١٤) ١٧, ١.٢	٠	١
Moderate ١٩-٢٥	١٨(٣٦) ٢١, ٢.٤	٩(١٨) ٢٢, ٢	٣.٢٤٧	٠.٠٧
Severe ٢٦-٣٣	١٠(٢٠) ٣٠, ٢.٢	٢٠(٤٠)٣ ٢٩, ٢	٣.١٠٨	٠.٠٧
Extremely severe ٣٤+	١٢(٢٤) ٣٨, ٢.٥	١١(٢٢) ٣٨, ١.٧٥	٠.٠٥٤	٠.٨
Total	٥٠(١٠٠) ٢٦, ٩.١	٥٠(١٠٠) ٢٦.٥, ٨.٧	-٠.٦١٢	٠.٥٤٢

Non- significant (P≥٠.٠٥), significant (p< ٠.٠٥), Highly significant (p< ٠.٠١)

Fig. (٧): Distribution of stress scale among NVDs patients

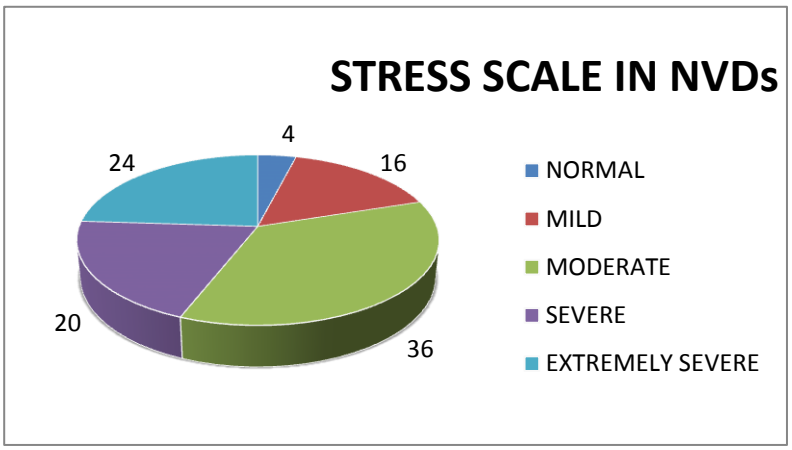


Fig. (٨): Distribution of stress scale among MAPLs patients:

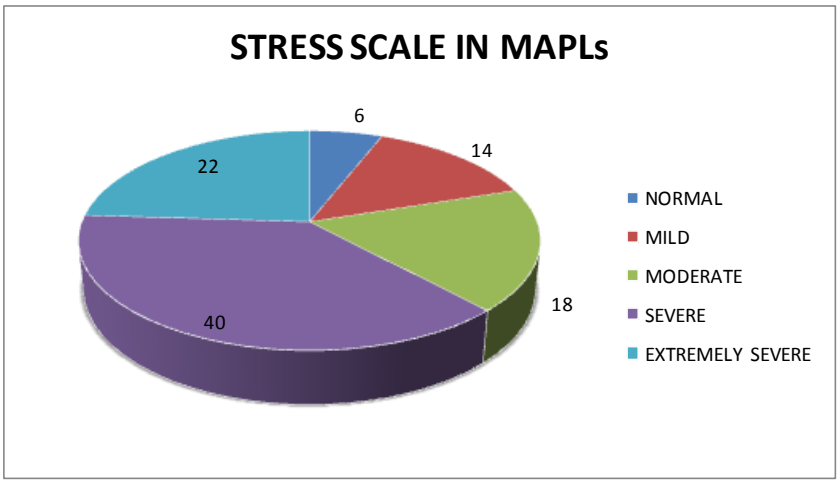
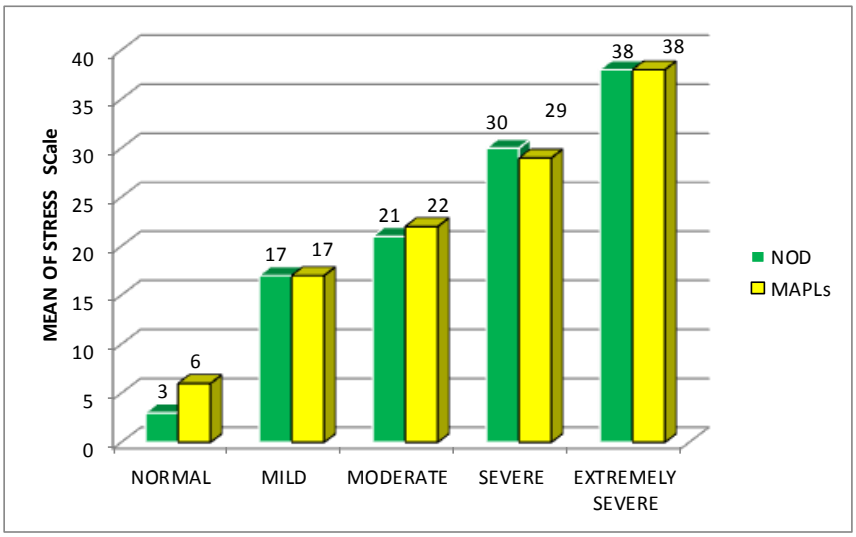


Fig. (٩): Comparison of mean of stress scale between NVDs and MAPLs.



٤) Anxiety Scale:

Highly statistical significant difference was obtained between the study and the control group as regarding anxiety scale (p<٠.٠٠١). Highly statistical significant P-value (<٠.٠٠١) was obtained as regard absence of anxiety manifestations. As regard mild, severe and extremely severe degree of anxiety in G١ in comparison to G٢ and highly statistical significant P- value was obtained (Table ٨, fig. ١٠-١١&١٢).

Table (٨): Comparison of anxiety scale between study group and control group

	Study group (n=١٠٠)	Control group (n=١٠٠)	X^2	P-value
	Freq. (mean± SD)	Freq. (mean± SD)		
Normal	١ ٠± -	٤٩ ٤.٠٢± ١.٨	٦٠.٦٤	<٠.٠٠١
Mild	٩ ٨.٧± ٠.٤٤	٤٠ ٨.٦± ٠.٤٩	١٧.٧٩٢	<٠.٠٠١
Moderate	٢١ ١٣.١٩± ٠.٨٧	٨ ١١.٨± ١.٤٥	٢.٩٢٦	٠.٠١
Severe	١٧ ١٨.١١± ٠.٩٩	٣ ١٧.٣٣± ١.١٥	٩.٩٨٢	٠.٠٠٢
Extremely severe	٥٢ ٣٠.٩٦± ٦.٠٧	٠ -	٦٩.٤١٣	<٠.٠٠١
Total	١٠٠ ١٠.٠٤± ١	١٠٠ ٣.٥٢± ٠.٣٥	١٢٧.٤١٣	<٠.٠٠١

Non- significant(P≥٠.٠٥), significant(p< ٠.٠٥), Highly significant(p< ٠.٠١)

Fig. (١٠): Comparison of anxiety scale between patients and controls

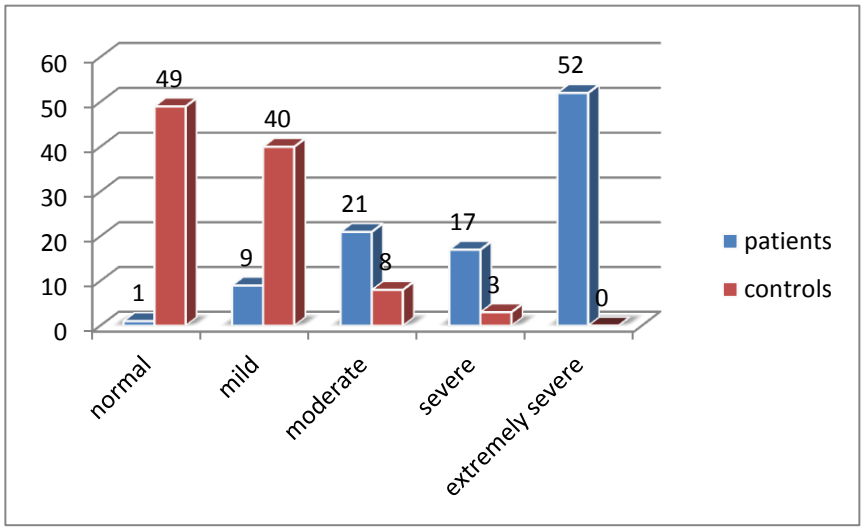


Fig. (١١): Distribution of anxiety scale among the study group

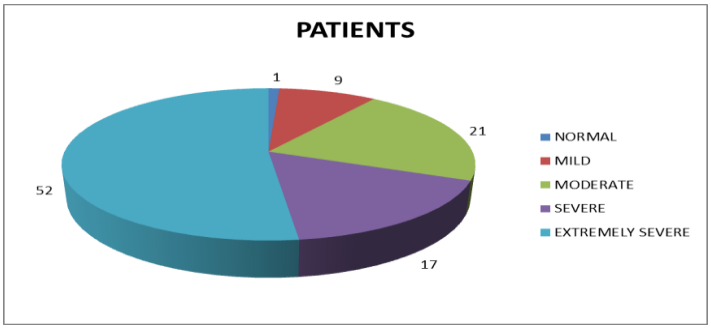
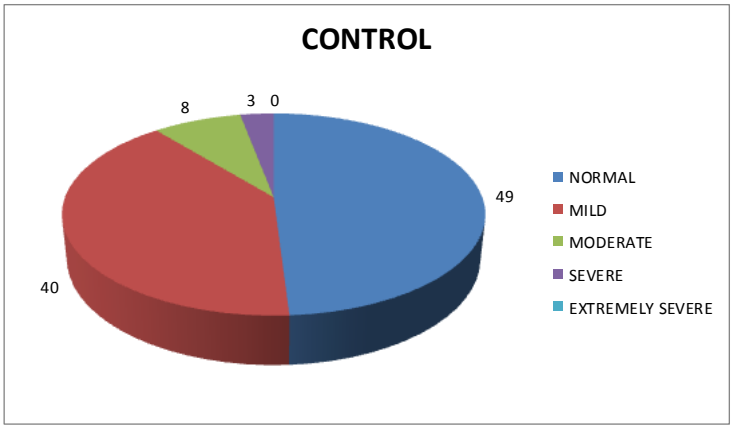


Fig. (١٢): Distribution of anxiety scale among the control group.



As regard Comparison of anxiety scale between NVDs and MAPLs, non-statistical significant difference was found between the two groups as regard the anxiety scale, P-value (٠.٩٣٠). (Table ٩, fig. ١٣&١٤).

Table (٩): Comparison of anxiety scale between NVDs and MAPLs

Anxiety Scale	NVDs (n=٥٠) Freq.(%) (mean± SD)	MAPLs (n=٥٠) Freq.(%) (mean± SD)	X^2	P-value
Normal ٠-٧	١(٢) ٠± -	٠(٠) -	٠	١
Mild ٨-٩	٢(٤) ٨± ٠	٧(١٤) ٩± ٠	١.٩٥٤	٠.١٦٢
Moderate ١٠-١٤	١٤(٢٨) ١٣± ١	٧(١٤) ١٣± ٠.٧	٢.١٧	٠.١٤
Severe ١٥-١٩	٧(١٤) ١٨± ١.٤٦	١٠(٢٠) ١٨± ٠.٦	٠.٢٨٣	٠.٥٩٤
Extremely severe ٢٠+	٢٦(٥٢) ٣١± ٦.٧	٢٦(٥٢) ٣١± ٥.٥	٠.٠٤	٠.٨٤
Total	٥٠(١٠٠) ٢٣± ١٠.٥	٥٠(١٠٠) ٢٣, ٩.٧	٠.٠٨٨	٠.٩٣٠

Non- significant (P≥٠.٠٥), significant (p< ٠.٠٥), Highly significant (p< ٠.٠١)

Fig. (١٣): Distribution of anxiety scale among NVDs patients

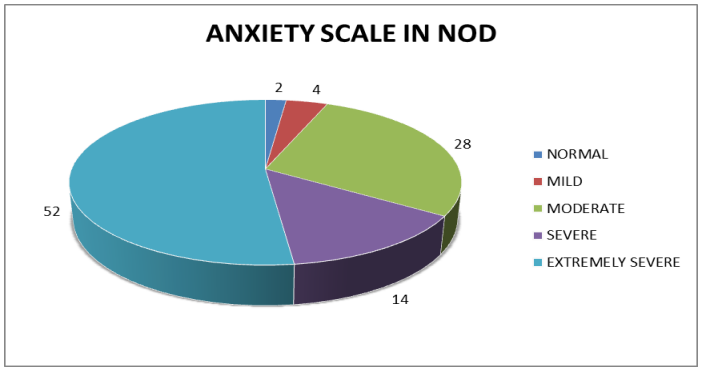
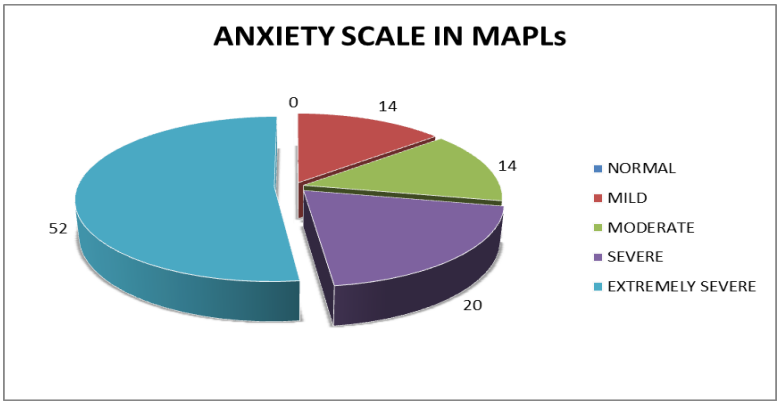


Fig. (١٤): Distribution of anxiety scale among MAPLs patients



٥) Voice handicap index (VHI):
Highly statistical significant difference was obtained between the study and the control group as regarding VHI grading (p<٠.٠٠١) (Table ١٠).

Table (١٠): Comparison of VHI between study group and control group:

VHI grading	Study group Mean ± SD	Control group Mean ± SD	P-value
VHI	٦٩ ± ٢٢	٠ ± ٠	<٠.٠٠١*

Non- significant (P≥٠.٠٥), significant (p< ٠.٠٥), Highly significant (p< ٠.٠١)

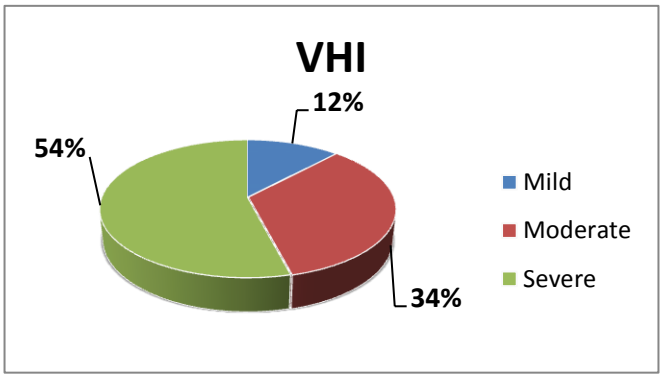
As regard Voice handicap index grading among the study group, results of the study revealed that ١٢(١٢٪) of patients are mild,٣٤(٣٤٪) of patients are moderate and ٥٤(٥٤٪) of patients are severe(Table١١, figure ١٥).

Table (١١): Voice handicap index grading among all patientsin study group(n-١٠٠):

VHI	Freq.	%
Mild	١٢	١٢
Moderate	٣٤	٣٤
Severe	٥٤	٥٤

Non- significant (P≥٠.٠٥), significant (p< ٠.٠٥), Highly significant (p< ٠.٠١)

Fig. (١٥): Voice handicap index grading among all patients



Non-significant difference was observed between two groups of study group as regard Voice handicap index grading (Table ١٢).

Table (١٢): Comparison of Voice handicap index grading between NVDs and MAPLs

VHI	Mean ± SD (RANGE)	T	P-value
NVDs	٦٩ ± ٢٤ (٣٣-١٠٩)	٠.٠٤٤	٠.٩٦٥
MAPLs	٦٩ ± ٢١ (٤٠-١١٢)		

Non- significant (P≥٠.٠٥), significant (p< ٠.٠٥), Highly significant (p< ٠.٠١)

Results of the study revealed significant correlation between VHI and depression, anxiety and stress in the study group (p value ≤ ٠.٠٥), there was moderate positive Correlation between VHI grading and anxiety but there was mild positive Correlation between VHI and both depression and stress (Table ١٣).

Table (١٣): Correlation between VHI and anxiety, depression and stress

VHI grading	VHI	
	R	P-value
Anxiety	٠.٩٦	٠.٠٠١*
Depression	٠.٥١	٠.٠١*
Stress	٠.٥٢	٠.٠١*

Non- significant (P≥٠.٠٥), significant (p< ٠.٠٥), Highly significant (p< ٠.٠١)

A significant positive correlation was obtained between the stress in correlation with vocal folds nodules and polyps of MAPLs in the study group (P<٠.٠٥).A significant positive correlation was obtained between the depression in correlation with vocal folds nodules and polyps of MAPLs in the study group (P<٠.٠٥). A significant positive correlation was obtained between the anxiety in correlation with vocal folds nodules and polyps of MAPLs in the study group (P<٠.٠٥) (Table ١٤).

Table (١٤): Correlation between anxiety, stress, depression and MAPLS in the study group

	Stress			Depression			Anxiety		
	Correlation	SIG.	r.	Correlation	SIG.	r.	Correlation	SIG.	r.
Vocal fold nodules	+ve	S	٠.٥٧	+ve	S	٠.٥٥	+ve	S	٠.٧٦
Vocal fold polyp	+ve	S	٠.٦٨	+ve	S	٠.٥٨	+ve	S	٠.٦١
Vocal fold reinke' soedema		NS	٠.٠٣		NS	٠.٠٢		NS	٠.٠٤
Vocal fold cyst		NS	٠.١٤		NS	٠.٠١		NS	٠.٠٣
Contact granuloma		NS	٠.١٤		NS	٠.٠٦		NS	٠.٠١

Non- significant (P≥٠.٠٥), significant (p< ٠.٠٥), Highly significant (p< ٠.٠١)

A high significant positive correlation was obtained between the stress, depression and anxiety in correlation with hyperfunctional dysphonia in the study group (P<٠.٠١). A significant positive correlation was obtained between the stress, depression and anxiety in correlation with phonasthenia in the study group (P<٠.٠٥). A significant positive correlation was obtained between the stress, depression and anxiety in correlation with psychogenic dysphonia in the study group (P<٠.٠٥) (Table ١٥).

Table (١٥): Correlation between anxiety, stress, depression and NVD in the study group

	Stress			depression			Anxiety		
	Correlation.	SIG.	R	Correlation	SIG.	r	Correlation	SIG.	R
Hyperfunctional dysphonia	+ve	HS	٠.٩٢	+ve	HS	٠.٠٨٩	+ve	HS	٠.٨٧
Phonasthenia	+ve	s	٠.٥٣	+ve	s	٠.٧٧	+ve	s	٠.٥٩
Ventricular dysphonia		NS	٠.٠١		NS	٠.٠٠٣		NS	٠.٠٤
Psychgenicaphonia		NS	٠.٠١		NS			NS	٠.٠٤
Psychogenic dysphonia	+ve	S	٠.٦٦	+ve	s	٠.٦٢	+ve	s	٠.٦١
Hypofunctional dysphonia		NS	٠.٠٢		NS	٠.٠٤٠		NS	٠.٠٢
Chronic habitual childhood dysphonia		NS	٠.٠٤		NS	٠.٠٠٢		NS	٠.٠٢
Spasmodic dysphonia		NS	٠.٠٥		NS	٠.٠٠١		NS	٠.٠٢
Incomplete mutation		NS	٠.٠١		NS	٠.٠٠١		NS	٠.٠٢

Non- significant (P≥٠.٠٥), significant (p< ٠.٠٥), Highly significant (p< ٠.٠١)

Discussion

Several studies suggested that symptoms of psychological distress often accompany dysphonia, and in some cases psychosocial factors may play a role in the etiology of the dysphonia. However the validity of the role of the psychogenic factors in causation of certain types of dysphonia whether non-organic, organic with some pathology (MAPLs) or purely organic is still unclear [٢١].

For all these reasons, it was the selection of the category of non-organic voice disorders and MAPLs as common types of voice disorders. The emphasis of this study was to assess the levels of the psychogenic factors (depression, anxiety and stress) in patients with non-organic voice disorders and MAPLs of the vocal folds. To reach our goal it was necessary to apply a full skilled assessment protocol for voice, as well as assessment of the psychological profile of the patients.

Although everyone experiences stress, anxiety and depression, it is not known why only certain people respond with an abnormal voice. It is possible that certain people are predisposed by personality or physiology to hyper-reaction through a particular neuromuscular organ system. Beyond this explanation, the answer to the question remains mystery [٢٢].

We observed a striking prevalence of clinically significant psychosocial distress (including depression, anxiety, and stress) among a cohort of all comers to our outpatient Phoniatric clinic, most of whom did not carry any previously related psychological diagnosis. In this study there was highly significant difference between the control group and the groups of non-organic voice disorders and MAPLs concerning depression, anxiety and stress. This study agreed with Roy,[٨] who reported that individuals may develop a voice

disorder caused or exacerbated by stress, emotional, or personality factor. And also Seifert and Kollbrunner,[٧] reported that emotional distress may be both primary and secondary to a voice disorder, thus potentially promoting a vicious cycle. Also our study agreed with Roy et al.,[١٤], who reported in their study that increased anxiety is one of the most frequently mentioned features of patients with non-organic voice disorders and Patients are described as being socially anxious, non-assertive with a tendency to self-restraint and anxious concerning everyday lifestyle. Our study agreed with Roy[٢٣], who suggested that MAPLs may be considered a predisposing factor for psychiatric disturbance as anxiety and depression which in turn aggravates the coexisting illness, while House and Andrews[٢٤] claimed that stress factors can produce disturbance of voice only if their duration, frequency and strength exceed the level of capability of the individual to overcome.

The result in our study group as compared to the control group is explained that most patients of the study group were socially anxious, restless, irritable, and had muscle tension and physical symptoms in the form of tremors, tachycardia, tachypnea, sweaty palms also some patients had feeling of being under threat in stress situations as well as some of them were agitated and had inability to relax, sense of loneliness, diminished interest and loss of energy.

Ultimately, results from our study may have both clinical and research implications. The data indicates that stress, anxiety, and depression may be individual factors in some conditions affecting voice and individual patients may be affected differentially. Thus, there may be merit in addressing them at various points during the treatment process as potentially: (١) (co)causal, (٢) precipitating, (٣) exacerbating, or (٤) maintaining for the conditions. So, attempts to break the potential vicious cycle of stress, anxiety, and depression in voice disorders in susceptible individuals become a foremost goal.

Rammage[٢٥], described several psycho-pathological process that might be active in symptoms formation, One such mechanism was conversion reaction. In conversion, the voice loss is believed to represent a symbolic somatization of psychodynamic conflict, patients convert psychic distress into a somatic symptom, in such disorders, the dysphonia is typically described in relation to primary and /or secondary gain.

In addition to conversion, other psycho-logical processes have been proposed to explain functional dysphonia, including the combined interaction of organic and psychogenic mechanism. One example of this interaction is the "specificity hypothesis" offered by Alexander[٢٦], This theory suggests that a specific stimulus (emotional conflict) elicits a distinctive response, or illness, and the organ affected (larynx) is determined by a genetic weakness or vulnerability.

Milutinovic[٢٧], recognized the extensive etiologic overlapping of organic and functional voice disturbance and suggested that "genetic factors", the state of endocrine and neuro-vegetative systems, and psychological factors are significant in the development of functional dysphonia". He believed that psychogenic aphonia and dysphonia should be considered as phononeurosis, since over half of his phonneurotic patients had documented infection in upper respiratory airways preceding the voice disturbance. He concluded that a direct connection existed between the pathological state of the mucosa and the development of functional dysphonia. He speculated that organic changes in the larynx, pharynx and nose facilitate the appearance of a functional voice problem; that is they direct somatization of the psychodynamic conflict.

In addition to acknowledging the conversion explanation for functional dys-phonia, Nichol[٢٨], suggested that "tensional symptoms arise from over activity of autonomic and voluntary nervous systems

in individuals who are unduly aroused and anxious". He added that such over activity lead to hypertonicity of the intrinsic and extrinsic laryngeal muscles, resulting in muscle tension dysphonia sometimes associated with adjustment and anxiety disorders, or with certain personality trait disturbance. This generalized laryngeal hypertonicity is also a recurrent theme in the writings of[٢٩].

Most authors have viewed psychological factors as strongly influential in the development of functional dysphonia, and have virtually ignored the possibility that such processes could be the consequence of coping with an incapacitating voice disorder. Depression, anxiety and stress are frequent psychological concomitants of chronic illness[٣٠]**.** The notion that such squeal could be considered outcomes of a severe voice disturbance, rather than causal agents, has received little attention.

Also results of our study revealed that there were non statistical significant differences between the group of NVDs and the group of MAPLs as regard depression ,anxiety and stress scales, this agreed with[١] who reported that there are psychological aspects of voice disorders in general, not only voice disorders whose primary etiology is psychogenic.

A significant positive correlation was obtained between the stress ,anxiety and depression in correlation with vocal folds nodules and polyps of MAPLs in the study group. These findings are supported by Goldman[٣١], who found that patients with vocal fold nodules had significantly increased scores of anxiety, voice use, and somatic complaints and also Baraka[٣٢], in their study reported that there were significant differences between group of MAPLs and control group in some of the psychiatric scales and indicate that there was an evident psychogenic background for certain types of MAPLs of the vocal folds, namely: vocal folds nodules, vocal folds polyps and contact granuloma. Karkos and McCormick[٣٣], reported that a range of personality (e.g., socially dominant, aggressive and impulsive), psychosocial factors (e.g., psychological stress, anxiety, and voice use) and somatic status (e.g., trouble sleeping, headache, and heartburns), have been deemed to be associated with vocal fold nodules, but Abeida[١٣], revealed that perceived stress and personality features of hyperactivity and impulsivity are independent factors related to vocal nodules.

In our study, results revealed that there was high significant positive correlation was obtained between the depression, anxiety and stress in correlation with hyperfunctional dysphonia, phonathenia and psychogenic dysphonia in the study group. These results can be explained as histories of Patients with hyperfunctional dysphonia, phonathenia and psychogenic dysphonia usually give indications of acute or chronic emotional stress with voice loss and show an emotional immaturity, neurotic life adjustment, and mild to moderate depression. Patients feel tense and overburdened also they had higher number of problems in their private lives; their coping was characterized by a higher escape tendency**.** This result agreed with Sunwoo[٣٤], who found that that voice disorder is related to depression and Seifert and Kollbrunner,[٧] who reported that stress in patients with MTD has been reported to have more to do with daily anxieties than with frank psychiatric problems. Also Patel[٣٥]found that patients with MTD to either be more "stress reactive" based on scores on the "stress reaction" subscale of the Multidimensional Personality Questionnaire (MPQ) or have increased stress in their lives as indicated by stressful life event measures. Also our study agreed with Kessler[٣٦] that based on "life event" measures have found the highest levels of life stress in patients with functional aphonia followed by patients with muscle tension dysphonia. While, Kotby[٥] in a study estimating the etiological factors in non-organic dysphonia concluded that there was evident psychogenic background for some types of non-organic voice disorders, namely, incomplete mutation, phonathenia and non-organic aphonia.

The opinion of the patients about their well-being should always be taken into consideration when trying to comprehend the actual impact of a disease. Thus, it is

important to assess the individual's perception about the effect of an illness on their personal, social, and professional lives. The use of quality of life questionnaires such as the 'VHI' for dysphonic patients is important as the impact that a voice deviation has on the life of an individual does not necessarily have a direct relationship with the degree of dysphonia. VHI is a useful measure that could help the patient and the clinician to assess the degree of disability that a voice disorder is causing. Dysphonia can affect the patient's life and this may be reflected in VHI (total scores and its three domains). This can be seen in our results from the significant differences in the results of VHI grading between both groups, which were higher in study group in comparison with control group. Also results of the study revealed significant correlation between VHI grading and depression, anxiety and stress. These results were explained as dysphonia is hypothesized to be a reliable reflection of the degree of voice handicap. The more severe is the degree of dysphonia, the more difficult for people to hear, the more restriction in joining conversation with the resultant emotional effects on the patient herself. This may lead to the feeling of upset, incompetence, tension or anxiety. This explanation agreed with Jones,[٣٧] who founding in their study that dysphonia was significantly correlated to voice related quality of life and VHI scores. This is in agreement with the results of Ghandour[٣٨] who found a significant correlation between VHI scores and the degree of dysphonia. Also our result agreed with Shoeib[٣٩] who reported in their study that, there were significant association between the patient's self-evaluation of his voice handicap and anxiety state and such a high association advocates for both vocal education programs and psychiatric consultations also Elam[٤٠] revealed in their study that VHI had been shown to be influenced by depression mainly. Also Stephaine[٤١] in their study reported that the severity of psychosocial distress and vocal handicap were positively related.

Conclusion: The results from this study revealed that stress, anxiety, and depression may play important role in patients with non-organic voice disorders and patients with minimal associated pathological lesions of both vocal folds. This may necessitate combined assessment of voice and psychological profile of all patients with non-organic voice disorders and MAPLs, followed by suitable therapeutic program including: behavioral readjustment voice therapy as well as, psychiatric treatment when needed.

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