INTRODUCTION

In the most recent decades, the need to utilize the voice as a work tool has increased. Approximately, one third of the world's working force works in professions significantly using the voice as an essential work instrument ***(Vilkman, 2000; Vilkman, 2004)***.

Examples of heavy occupational voice users include lawyers, singers, tour guides, stage actors, call-center operators and teachers ***(Vilkman, 2000)***.

Teachers are considered as the biggest group of occupational voice users as they rely greatly on their voice in their daily teaching activities ***(Fritzell, 1996; Titze et al., 1997; Verdolini & Ramig, 2001)***.

The voice is an essential work instrument for class educators in transmitting the learning material to their students. Therefore, an adaptable and sufficiently clear voice is fundamental for an effective learning process ***(Roy et al., 2004a; Pemberton et al., 2008)***.

Since classroom teaching depends essentially on voice use. So, teachers have overwhelming vocally demanding requests as they are teaching regularly for long hours in environments with acoustically difficult characteristics in addition to only having brief periods for voice rest ***(Roy et al., 2004a)***.

That's why teachers were found to have a greater risk to develop voice disorders (VDs) in comparison to the other occupations and to the general population ***(Sliwinska-Kowalska et al., 2006; Angelillo et al., 2009; Van Houtte et al., 2011; Behlau et al., 2012)***.

They are also the most occupational group to seek medical assistance by ENT specialists and speech-language pathologists (SLP) for their voice related complaints in comparison to other professionals ***(Verdolini & Ramig, 2001; Roy et al., 2004b).***

That vocal dysfunction that develop or exacerbate throughout the course of their teaching career and manifest as symptoms of voice disorders is recognized as one of the most important occupational hazards influencing them ***(Johnson et al., 2017)***.

Focus on primary school teachers is justified by being more susceptible to develop vocal health problems in comparison to secondary school teachers ***(Munier & Kinsella, 2008)***.

They differ from the secondary school teachers in the duration of continuous vocal utilization, in the availability of a chance for voice rest, having higher vocal load since they have to compete against children's noise for long durations without

proper rest breaks and they are usually charged by teaching all the subjects ***(Sala et al., 2001)***.

Another study taking in consideration the level of grade taught by teachers, concluded that voice problems are more prevalent among teachers dealing with younger grades ***(Angelillo et al., 2009)***.

For all these differences in working conditions, it is preferable to study primary school teachers as a separate group ***(Munier & Kinsella, 2008)***.

In the literature, variable definitions have been suggested for voice health problems.

Roy and coworkers (2004b) defined self- reported voice disorder as ‘‘any time the voice does not work, perform, or sound as it normally should, so that it interferes with communication.’’

Voice disorders have been also defined as any abnormality in the pitch, loudness level, or quality of the sound produced by the larynx. They are characterized by lack of audibility or stability, inappropriate for the age and gender of the speaker and are associated with easy fatigability, pain and discomfort on phonation ***(Kosztyla-Hojna et al., 2004)***.

Voice disorders are classified into either organic or functional disorder.

The organic voice disorders are physiological in nature occurring due to a physical change in the mechanism of phonation or problems with the laryngeal nerve supply.

On the other hand, the cause of functional voice disorders may be insufficient or inappropriate voice use with a completely normal physical structure ***(Verdolini et al., 2006)***.

Despite the variability in the tools used by the researchers to assess the voice related complaints among the teachers, they obtained similar results.

The most frequently self- reported vocal symptoms by teachers include voice weakness, lower pitch, tired voice, hoarseness, sore throat, or discomfort in the throat ***(Sala et al., 2001; Roy et al., 2004a)***.

Those self-reported vocal symptoms have been referred in several studies as dysphonia prevalence ***(Roy et al., 2004a; Thibeault et al., 2004; Simberg et al., 2005)***.

The prevalence of voice health problems among teachers ranges from 15% to 86% while it ranges only from 6% to 15% in the general population ***(Angelillo et al., 2009)***.

A recent review confirmed the high prevalence of voice problems in teachers that was 2 to 3 times more frequent than for the general population ***(Garcia et al., 2014)***.

Studies that have used self-reported questionnaires to assess vocal complaints among teachers obtained prevalence rates ranging from 20% to 59% ***(Smith et al., 1998b; De Medeiros et al., 2008; Bermudez et al., 2010)***.

The etiology of voice problems among teachers is multifactorial ***(Mattiske & Oates, 1998; De Jong et al., 2001)***.

Several risk factors contribute to the everyday vocal load in teachers. They include:

Sociodemographic factors such as age, gender, social class; ***personal habits and lifestyle factors*** such as smoking, consumption of caffeinated drinks, poor hydration and abusive vocal behaviors; ***occupational factors*** such as number of years of teaching experience, condensed schedule with short breaks, teaching special subjects; ***psychoemotional factors*** such as working in a stressful organization and teacher- student relationship conflicts; ***workplace environmental characteristics*** such as teaching large number of students per classroom, teaching for long periods in a noisy environment, bad classroom acoustics and design, exposure to chalk, dust and viruses, badly aerated and cleaned classrooms and lacking teaching equipment and aids and ***health related factors*** such as chest related problems including recurrent upper respiratory tract infections, nasal or sinus allergy and chest asthma; gatroesophageal reflux disease and thyroid problems ***(De Jong et al., 2006; Kooijman et al., 2006; Thomas et al., 2007; De***

Medeiros et al., 2008; Munier & Kinsella, 2008; Preciado-López et al., 2008; Chen et al., 2010; Charn & Mok, 2012).

The impact of permanent dysphonia can be devastating on their professional performance as it may result in sickness absenteeism and it may even result in ending of their professional career by being reassigned to administrative jobs or early retirement ***(Williams, 2003, Behlau et al., 2012)***.

Dysphonic voice also lessens the quality of the educational process as it affects the students' understanding ***(Rogerson & Dodd, 2005; Lyberg-Åhlander et al., 2014; Morton &Watson, 2014)***.

In addition, financial, emotional, and social aspects are also compromised ***(Williams, 2003)***.

It was estimated that 2.5 billion dollars are spent every year in the U.S. on sick leave and treatment of voice problems of teachers ***(Williams, 2003)***.

It also significantly impairs their communicative ability with its drawbacks on their daily activities and their social life ***(Luce et al., 2014)***.

Despite this vocal distress, teachers continue working to meet their job demands and for fear to be unemployed further complicating their voice problems and needing more complex treatments ***(Hermes & De Oliveira Bastos, 2016)***.

They were also found to be reluctant in seeking professional assistance ***(Sapir et al., 1993)*** as they tend to seek medical services after significant deterioration of their vocal quality and after reaching advanced stages of the voice problem ***(Fortes et al., 2007; Medeiros et al., 2012)***.

This has alarmed to develop many preventive, educational and therapeutic voice care programs, aiming to reduce the incidence of vocal problems among teachers ***(Duffy & Hazlett, 2004)***.

Epidemiological studies are important in planning specific prevention and treatment programs according to the community needs. Since the teaching environment and approaches, and cultural and socioeconomic viewpoints contrast across nations, thus prevalence and risk factors may vary and need to be assessed in each country.

The present study will survey the prevalence and the multiple risk factors of voice disorders among primary school teachers and its impact on their social, professional life and their emotional state with the goal of reducing the occurrence of vocal disorders among them and to contribute to the development of preventive and educational programs for voice disorders in the Egyptian context.

AIM OF THE WORK

Research Questions:

1- What is the prevalence of voice disorders among primary school teachers?

2- What are the possible risk factors associated with occupationally related voice problems among primary school teachers?

3- Do voice health problems have an impact on the social and professional life of primary school teachers? and what are its psychological consequences?

Research Hypothesis:

It was hypothesized that:

1- Voice disorders are prevalent among primary school teachers.

2- There is an association between sociodemographic factors and personal habits (age, gender, smoking, intake of caffeinated beverages…..) and development of voice health problems among primary school teachers.

3- There is an association between workplace environmental factors (crowded classrooms, noise, humidity, bad classroom acoustics…) and development of voice health problems among primary school teachers.

4- There is an association between occupational factors (subjects and grades taught, number of years in teaching

profession, teaching hours per week …) and development of voice health problems among primary school teachers.

5- Voice health problems have an impact on the social life of primary school teachers.

6- Voice health problems have an impact on the professional life of primary school teachers.

7- Voice health problems have an impact on the emotional state of primary school teachers.

Goal of the study:

This study has the goal of reducing the incidence of voice disorders among primary school teachers, helping in the development of preventive, educational and therapeutic voice care programs to improve the vocal health of primary school teachers.

Objectives:

This study aimed to:

1- To estimate the prevalence of voice disorders among primary school teachers in Cairo governorate.

2- To identify potential risk factors associated with occupationally related voice problems among primary school teachers.

3- To determine the impact of these voice problems on their social life, daily activities and ability to communicate, their professional life and their emotional state.

Chapter 1

THE VOICE: AN OCCUPATIONAL TOOL

1.1. The voice: an important work tool (Occupational voice):

The voice is considered as an important professional tool. It was estimated that nearly one third of the working force uses its voice as the essential work instrument. The voice quality and vocal load requirements in working activities can be used for classification of different types of jobs ***(Vilkman, 2000)***. For example, some jobs require high quality and high vocal load such as in acting and singing while others require high quality but only a moderate vocal load as in radio and TV casting and other jobs require a moderate quality but a high vocal load as in school teaching ***(Martin & Darnley, 2004)***.

The term "professional voice user" is applied to those who depend on a consistent, special or appealing voice quality as a primary work tool, and when affected by dysphonia or aphonia would be discouraged in their professions and seek for an alternative job ***(Titze et al., 1997)***.

The group of heavy professional voice users includes singers, stage actors, radio and TV broadcasters, court lawyers, telemarketers, tour guides, customer service assistants, call-center operators, counselors and teachers ***(Vilkman, 2004)***.

Teachers constitute the largest group of them that uses the voice as a primary work tool ***(Roy et al., 2004a; Roy et al., 2004b; Vilkman, 2004; Jardim et al., 2007, Angellilo et al., 2009)***.

1.2. The voice: an important and effective factor in teaching:

Teaching activities depend essentially on voice use. The teacher uses heavily his voice in discussing, instructing and classifying the lessons to his pupils, so he needs a durable and flexible voice to accomplish his job requirements ***(Ahlander et al., 2011)***.

In addition, the teacher's voice plays many important roles such as gaining respect of the students and their attention during classes, influencing the relationship of teachers with students and with their colleagues. The voice quality and way of expressiveness draw the interest of the students to the lessons and affects their understanding ***(Jardim et al., 2007)***.

A study assessing the effect of voice dysfunction on the education of 107 children with a mean age of 9.8 years old, concluded that any vocal alteration either of mild or severe degree has an influence on the speech intelligibility and affects negatively the education of the children ***(Rogerson & Dodd, 2005)***.

1.3. Teachers: a vulnerable group of professional voice users to develop voice disorders:

As a consequence of the high vocal load in teaching 's work usually performed in environments with bad acoustics, teachers are considered a vulnerable population at high risk to develop vocal disorders. Voice disorders are recognized as one of the most important occupational hazards affecting teachers owing to the high prevalence of voice disorders among them ***(Mattiske et al., 1998; Jonsdottir et al., 2001; De Jong et al., 2006)***.

Teachers are heavy voice users as they are required to use a loud voice for long hours without having suitable periods for voice rest, in noisy environments and lacking the access to voice amplification aids and under stressful conditions ***(Roy et al., 2002; Sala et al., 2002; Anderson, 2004; Angellilo et al., 2009; Devadas et al., 2017)***.

All these factors explain why teachers are more susceptible to occurrence of vocal disturbances in comparison to other professional voice users ***(Preciado- López et al., 2008; Ilomaki et al., 2009; Chen et al., 2010; Lee et al., 2010; Devadas et al., 2017)***.

It was reported in a study that more than 50% of the teachers had experienced voice diorders throughout their teaching career ***(De Jong et al., 2006)***, and another study

comparing the prevalence of voice disorders among teachers and among the general population concluded that teaching is a high- risk profession for occurrence of voice health problems which force many teachers to change their occupation ***(Behlau et al., 2012)***.

1.4. Primary school teachers are more prone to develop voice disorders:

Previous studies explored the development of voice disorders among primary and secondary school teachers and even universities professors as one study group, not taking in consideration the difference in their working circumstances and their vocal demands ***(Munier & Kinsella, 2008)***.

In 2008, the first study that examined the voice disturbances among primary school teachers as a separate group appeared ***(Munier & Kinsella, 2008)***.

Thereafter, several studies were conducted on primary school teachers only were published ***(Lee et al., 2010; Bermudez et al., 2011; Da Costa et al., 2012; Kankare et al., 2012)***.

Primary school teachers are more prone to develop vocal disorders as they don't have enough periods for vocal rest during the scholastic day since children in the junior primary classes are more dependent on their teachers to learn how to read and write which heavily increases the vocal loading on the

teachers' voices ***(Morton &Watson, 2001; Rantala et al., 2002; Munier & Kinsella, 2008)***.

In addition, children in that age have a high frequency of otitis media leading to mild hearing loss which force their teachers to talk with a high intensity in order to be heard ***(Bluestone, 1998; Gates et al., 2002)***. It was also found that primary school teachers have to face the loud background noise produced by the young children during classes ***(Jonsdottir et al., 2001; Södersten et al., 2002)***.

1.5. Teachers: a treatment seeking population for voice disorders:

Teachers represent the occupational group that commonly seek medical assistance for their vocal complaints ***(Smith et al., 1996; De Jong et al., 2006; Van Houtte et al., 2011)***, and attending speech therapy sessions for treatment of their voice dysfunction ***(Herrington-Hall et al., 1988)***.

In a Sweden retrospective study, ***Fritzell (1996)*** found by reviewing 1212 case files from phoniatric departments of 8 different hospitals that the prevalence of voice health problems among teachers was 16.3% and 76% of them were females. The most common diagnoses were vocal fatigue and vocal nodules. He concluded that teachers constitute the most common occupational group attending the voice clinics.

In 1997, 15% of the voice clinics attendance were from the teaching population. The majority had functional voice disorders resulting from chronic voice abuse or misuse or from stressful situations and 31% of them had permanent damage of the vocal folds ***(Bufton, 2000)***.

1.6. Treatment seeking behavior of teachers in response to their voice disorders:

Despite the high prevalence of voice disorders among teachers that need medical consultation, treatment and follow-ups, teachers were found reluctant in seeking medical help for many reasons: difficulty in taking days off from work and finding substitute teachers which is not well accepted by the students and affects the continuity of the scholar programs and thus put teachers under stress ***(Bovo et al., 2007; Gebska et al., 2011)***. Another reason is that some teachers are not convinced by the role of medical care, regular exercises and preventive measures in treatment of their problems but searching for drugs or surgery ***(Kotby & El Sady, 2003)***. On the other hand, other teachers think that their voice problems are an inevitable drawback of their profession that doesn't necessitate treatment ***(Morton & Watson, 1998; Russel et al., 1998; Yiu, 2002)***.

Roy et al. (2004b) reported that only 14.3% of teachers sought medical help for their vocal complaints. ***Hamdan et al. (2007)*** found that 79% of dysphonic teachers didn't consult an ENT specialist.