

Prevalence of voice problems, Risk factors, Vocal Hygiene Practices, and Knowledge of Vocal Mechanism in Professional Carnatic Singers

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Part A

1.0 Title of the Project: Prevalence of voice problems, Risk factors, Vocal Hygiene Practices, and Knowledge of Vocal Mechanism in Professional Carnatic Singers and Non-singers.

Area of research: Speech, language and hearing

1.1 Principal Investigator :Dr. Usha Devdas

1.2 Co-Investigator: Dr. Santosh M

1.3 Collaborating Institution: School of Allied Health Sciences, Manipal University

1.4 Total Grants required: ₹ 5,28,000

1.5 Duration of the project: One Year

2.0 Project Summary:

The main objective of this study is to investigate and compare the frequency of current and past voice problems, associated risk factors, knowledge of vocal mechanism, voice care techniques, and impact of voice problems in professional Carnatic singers and non-singers. Using self-reported questionnaire, data will be collected from professional Carnatic singers and non-singers. The sample size for the present study will be estimated based on the pilot study. The proposed research has potential to throw light on the voice problems and its related issues in Carnatic singers in comparison with non-singers. In general, this comprehensive approach allows us to better understand the role of different risk factors for the development of voice problems and voice care techniques followed by these singers. Thus, this work's direct relevance to public health lies in its contributions through the counseling and rehabilitation of these individuals.

3.0. Introduction

Voice is the medium of communication and the power of expression. Even though voice is basically referred as vehicle of communication, it is also used artistically for singing, oration, narration, drama etc., Each type of these expressions demands a different style of voice production. Singers need to use their voice in sophisticated manner as per different styles of music (Sundberg, 1990). For effective singing, voice should be trained and cultured because singing requires a more delicate control over the muscles and a more

complex pattern of their coordination with the brain. The singing voice requires training in different aspects such as effective breath control, enhancing breathing capacity and sound perception, flexible speech organs, good oral resonance, effective pronunciation of words, adjusting the voice to different tempos or speeds, controlling of volume or amplitude as per the need and imaginative power to improvise (mental perception)

Carnatic singing requires powerful low pitched and loud voice (Arunachalam, Boominathan, & Mahalingam, 2013). Singing in right *Shruti* or tonality and appropriate breathing are given main emphasis in this style of music (Durga, 1997). To achieve good singing voice, these singers should learn forward placement of voice with open throated singing (Datta, Ganguli, & Majumder, 1983). The vocal lessons in Carnatic singing are graded with skills on pitch matching, flexibility of voice across range, and open-throated projected voice with good tone. However, in the Carnatic singing training no formal training or exercises are given to achieve appropriate breath support for singing (Arunachalam et al., 2013). Generally, singers are more prone to develop voice problems due to their strenuous schedules, nature of singing, poor vocal hygiene and health practices (Boominathan, Neelakantan, Krishanan & Nagarajan, 2004). Specifically, Carnatic singers were found to engage themselves in long duration singing, irregular eating habits and frequent throat clearing which may pose enormous stress on the vocal apparatus and put them at high risk for developing voice problems. In only available published evidence, point prevalence of voice problems in Carnatic singers was reported to be 48% (Boominathan, Rajendran, Nagarajan, Seethapathy, & Gnanasekaran, 2008). According to Stemple, Glaze, and German (1995), singers are at greater risk for developing voice problems than general population. This is because singers' vocal demands vary according to different situations. They sing in varying sizes of halls, in diverse mediums, with sometimes little rehearsals. A vocalist's ability to perform well is highly depending on his/her vocal health. Singers can get affected by illness that affects any body part that directly or indirectly alters vocal mechanism (brain, lungs, vocal folds, pharynx, mouth, & nose). Hence, maintaining good physical and mental health is a prerequisite for beautiful singing.

Thus, it is well accepted fact that, singing voice is unique and understanding singer's voice problems are very essential. In western countries, every music school has

professionals like the laryngologist - a medical specialist who will analyse the structure of the larynx and a voice specialist who will analyze the use and the scope of the larynx and recommend a suitable pitch for the student. Apart from these specialists, a psychologist and a musician evaluate the aptitude of the student for learning music. The students are admitted to music classes only after undergoing these initial steps and at every stage, the team monitors the use of the voice by the student. In India, all this is still a rarity (Arunachalam et al., 2013).

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Mainly singers have difficulty in maintaining the voice at a very low or very high pitch. They have difficulty in singing or executing long phrases through the range. The voice breaks while transiting registers / scales (for example - from Mandara sthayi to Madhya sthayi and Tara sthayi). Also they have problems in maintaining appropriate volume and dependence on microphone amplification causes deterioration in the quality of the output. Many a time, singers do not recognize the false vocal folds vibrating in tension, which leads to less clarity in the voice.

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The right technique and musicianship alone may not be sufficient for singing. We need to maintain the larynx to have a healthier voice. In order to maintain the larynx, there are certain practices called vocal hygiene. Use of appropriate and natural voice, avoiding throat clearing, smoking and liquor are a few suggestions. Screaming, singing in inappropriate registers / scales and overuse of voice may lead to problems.

Vocal diet is part of vocal hygiene. Intake of sufficient water with frequent sips of water, natural doses of vitamins through vegetables and fruits are good vocal diets. But one must avoid those vegetables and fruits you are allergic to. Supplements of protein to manage wear and tear are suggested. So you must take milk and pulses. Avoid recreational and 'across-the-counter' drugs.

In spite of speaking and singing voices are created from the same anatomical structures there are subtle differences the way these structures used for singing and speaking. Singing requires larger lung pressures than speaking. Articulators are used for better articulation in speech whereas, in singing these articulators are also used for improving resonance and projection of voice.

3.1 Definition of the problem

Singing is one of the most powerful vocal expressions of the collective consciousness of people. It is manifested in different socio-cultural constrains such as classical singing, light music singing, folk, religious, jazz, etc. In these different types of singing, singers' voice demands specific artistic performance than other professional voice users such as teachers, clergy, politician, and coaches. That is, singing requires a more prolonged and sustained voice production while speech is a series of transient sounds. Singers are the vocal athletes and are sensitive to subtle changes in their voice irrespective of whether they are trained or untrained singers (Sataloff, 2000). Hence, they report more disability and emotional distress during voice problem than other group of professional voice users.

There are different variables which influence the vocal demands of professional voice users such as; number of hours of voice use/day, demands on the voice quality, vocal and non-vocal habits, mental stress, maintaining vocal loudness, knowledge of voice care techniques and travelling. Even though the number of hours of voice use/day less in singers compared to teachers, singing requires proper sequencing of pitch and intensity over time and it is not only about words and communication. Apart from this, they experience great deal of mental stress and need to travel regularly. According to Timmermans, Vanderwegen, and De Bodt (2005) vocal demands also varies with type of singing. They reported popular singing styles (pop, belt, jazz, rock) elicit poor vocal behaviors as vocal strain and a tense or lifted vocal apparatus than singers following classical singing techniques (opera). Trained singers are more aware of the influencing risk factors for voice difficulties and how to use their voices correctly compared to untrained singers (Timmermans, De Bodt, Wuyts, Van de Heying, 2003). Therefore, the singers, particularly those who have not been given good vocal education and do not realize their voice misuse or overuse are more susceptible to voice problems.

Hypothesis

Voice problems in singers are very common in carnatic singers who require rigorous training for loud low pitch singing. They are less aware of the structure (anatomy) and function (physiology) of their singing instrument. They have less awareness about the different factors which can lead to vocal loading. Hence, are more prone to develop voice problems because of different influencing risk factors. Their voice problems have significant effect on their quality of life.

Key research questions

Using a self-reported questionnaire the current study aims to;

1. Investigate frequency of current and past voice problems in professional Carnatic singers and non-singers.
2. Identify the different variables associated with increased risk of voice problems in Carnatic singers when compared to non-singers
3. To identify the singers and non-singers' knowledge about vocal mechanism and techniques of voice care.
4. Identify the functional impact of voice problems using Voice Disorder Outcome Profile (VDOP)(Kannada version) in singers and non-singers

3.2 Specific objectives

The proposed area of research employs self-reported questionnaire and VDOP questionnaire to collect data. This comprehensive approach allows us to compare the frequency of current and past voice problems, associated risk factors, knowledge about vocal mechanism, voice care and impact of voice problem between Carnatic singers and non-singers. These findings will have great significance in the professional voice care and improving knowledge of these individuals about vocal mechanism. It will also help the singing teachers to implement a lesson on anatomy and physiology of vocal mechanism in their regular singing class curriculum for their students.

Objective 1

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Frequency of current and past voice problems in professional Carnatic singers and non-singers.

As per our knowledge, there is limited published work on the prevalence of voice problems in professional Carnatic singers. We will be studying the frequency of current and past voice problems using operational definition as follows: “respondent’s report of a voice problem with voice functioning beyond difficulties typically encountered in singing, which includes any self-perceived abnormalities in voice output, phonatory effort or any other voice related function” (Miller & Verdolini, 1995) In addition to self rating, point prevalence will also be estimated using auditory-perceptual evaluation of voice.

Objective 2

Identify the different variables associated with increased risk of voice problems in Carnatic singers and non-singers

Singers are more prone to develop voice problems and even mild vocal difficulties affect their performance. Singers are reported to have poor knowledge about vocal mechanism and factors influencing their voice functioning. They may also adapt inappropriate singing strategies. Present study we will be investigating the different risk factors for the development of voice problems using a self-reported questionnaire and compare them with the reporting of such risk factors in non-singers.

Objective 3

To identify the singers’ and non-singers’ knowledge about vocal mechanism and voice care

The literature data reports that generally singers have poor knowledge of vocal mechanism (anatomy and physiology) and voice care techniques (vocal hygiene). The present study will attempt to find out the knowledge of vocal mechanism and voice care in Carnatic singers and how it is different from non-singers.

Objective 4

Identify the functional impact of voice problems in singers and non-singers using VDOP(Kannada version)

Again, there is very limited information about impact of voice problem in Carnatic singers and how it is different from non-singers. This will be investigated using Kannada VDOP (Konnai, Jayaram, & Scherer, 2010).

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3.3 Review of status of research and develop in the project

3.4 International Status

Kitch and Oates (1994) conducted a study in performers (10 actors/10 singers) via a self-report questionnaire where they rated the severity of their voice-related changes when vocally fatigued. Similar frequency patterns and perceptual features of vocal fatigue were found across subjects. Actors rated "power" aspects (e.g., voice projection) and singers rated vocal dynamic aspects (e.g., pitch range) of their voices as most affected when vocally fatigued. Vocal fatigue was evidenced by changes in kinesthetic/ proprioceptive sensations and vocal dynamics. The causes and context of vocal fatigue were vocal misuse, being "run down," high performance demands, and using high pitch/volume levels.

Phyland, Oates, and Greenwo, (1999) administered a vocal health questionnaire was to three groups of professional singers and a group of nonsingers in Melbourne, Australia. The responses of 79 opera, 57 musical theatre and 31 contemporary (excluding rock) singers and 86 nonsingers were analysed. The questionnaire compiled information regarding biographical data speaking and singing voice-use behaviours, and vocal health over the previous 12 months in terms of experiences of vocal impairment, vocal disability, and handicap. Significant differences between singers and nonsingers in the prevalence and nature of voice problems were reported. Of the singers, 44% reported one or more occurrences of a diagnosed vocal condition compared to 21% of nonsingers and 69% of singers experienced vocal disability compared to only 41% of nonsingers, over the previous 12 months. In contrast, no significant differences were found between the three different styles of singers in their experience of vocal impairment, disability or handicap.

Castelblanco, Habib, Stein, Quadros, Cohen, and Noordzij (2014) conducted a study to correlate the Singing Voice Handicap Index (SVHI) scores with videostrobolaryngoscopy in healthy professional singers as a measure of self-perceived vocal health versus actual pathology seen on examination. SVHI scores were as expected for healthy singers. However, although all singers self identified as healthy, laryngeal abnormalities were relatively common. Greater than expected laryngeal pathology was seen in these professional singers, who identified themselves as healthy, which possibly indicates a minimal impact on their singing voice and/or perception of vocal health.

National status

Arunachalam, Boominathan, and Mahalingam (2013) reported the nature of voice problems and apply a routine protocol to assess the voice. Voice change, difficulty in singing higher pitches, and voice fatigue were major complaints. Most of the singers suffered laryngopharyngeal reflux that coexisted with muscle tension dysphonia and chronic laryngitis. Speaking voices were rated predominantly as “moderate deviation” on GRBAS (Grade, Rough, Breathy, Asthenia, and Strain). Maximum phonation time ranged from 4 to 29 seconds. Singing frequency range was reduced. Dysphonia severity index (DSI) scores ranged from 3.5 to 4.91. Singing frequency range and DSI did not show significant difference between sex and across clinical diagnosis. Self-perception using voice disorder outcome profile revealed overall severity score of 5.1 (SD: 2.7). Findings are discussed from a clinical intervention perspective. Study highlighted the nature of voice problems (hyperfunctional) and required modifications in assessment protocol for Carnatic singers. Need for regular assessments and vocal hygiene education to maintain good vocal health are emphasized as outcomes.

Maruthy and Ravibabu, (2014) conducted a study in Carnatic classical singers and the main objectives of this study were to compare dysphonia severity index (DSI) and its parameters between Carnatic classical singers and nonsingers and to investigate the effect of age on DSI and its parameters in both singers and nonsingers. Singers had significantly greater highest phonational frequency, longer maximum phonation time, and higher DSI values. When compared with the younger participants, older participants had significantly reduced

highest phonational frequency, maximum phonation time, and DSI values. The results of this study suggest that DSI values vary between Carnatic classical singers and non-singers, and hence separate normative data may need to be established for this group of singers for clinical comparison purposes.

3.4 ⁶ Importance of proposed project in the context of current status

Vocal and non-vocal habits play an important role in the life and career of a vocalist. Yet, most professional singers do not have a clear awareness of the effects of the same due to which phonotraumatic behaviors are generally present as the prime cause of their vocal problems. Professional Carnatic singers are ever under pressure, like any other group of professional voice users, to maintain good vocal health. Poor vocal health may put their professional careers at risk, may lead them to compromise on their performance. The actual prevalence or frequency of voice problems reported by Carnatic singers and their knowledge related to vocal mechanism and voice care is not studied extensively. Professional impression is that improper vocal techniques while singing and speaking and vocal abusive behaviors are commonly seen among classical singers. Lack of proper vocal education related to voice mechanism and some of the influencing risk factors which enhance the probability of developing voice disorders, puts these artists at high risk for developing vocal problems. Presence of voice problem is assumed to have greater impact on their quality of life. Since, Carnatic singing style is one of the important singing type of South Karnataka, it is important to explore the difficulties experienced by these singers and provide preventive vocal care education and in turn improve their quality of life.

⁶ 4.0 Work Plan:

4.1 Method

Subjects

The subjects for this study will be adult professional Carnatic singers and non-singers. The professional Carnatic singers will be contacted with the help of different singing training

teachers in Mysore. Sample size for the current study will be estimated based on the results of a pilot study.

The subjects will be included in the study based on following inclusion criteria:

1. Carnatic classical singers, aged 18 years and above (males and females)
2. With minimum five years of experience in professional Carnatic singing
3. Those who currently practicing singing

Age and gender matched non-singers will be selected from Mysore and results will be compared between singers and non-singers. Singers will be recruited through snow ball sampling.

Procedure

All the participants will be contacted personally, and the researcher will explain the purpose of the study. Those who are willing to participate in the study will be provided self-reported questionnaires along with consent form. They will be asked to fill the questionnaire as per the instructions. Participants will be assured that their responses would be kept in strict confidence.

Study tool

A questionnaire will be developed to address issues like, frequency of current and past voice problem (by giving operational definition of voice problem), demographic details, voice use patterns, lifestyle and health related factors and medications, knowledge of vocal anatomy, physiology, and voice care. The questions under each category will be included based on the inputs from similar studies in the literature and questionnaire will be validated using appropriate methods. Apart from this participants will also be asked to fill the VDOP (in Kannada language) questionnaire to understand the impact of voice problem if any.

The estimation of point prevalence will also be quantified using the auditory-perceptual evaluation of voice. GRBAS (Hirano, 1981) rating scale will be used to perceptually rate the severity of the voice problem.

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6.0 Implications of results of the study

Even though Carnatic singing is a popular singing style of South Karnataka limited knowledge is available about the frequency of voice problems experienced by these singers. Further, there is limited information related to these singers knowledge about voice care and vocal mechanism. Hence, it becomes important that, SLPs should pay attention to this special group of professional voice users and understand their problems related to voice. Information obtained will help SLP to develop adequate voice care programs and improve their knowledge about vocal anatomy and physiology and the risk factors which influence the development of voice problems. Training these singers in these aspects will help them to develop in their career.

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7.0 Utilization of results of the study

The results of the study in Yakshagana artists will provide knowledge about preventive vocal care education and in turn improve their quality of life.

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