

# **THE EFFECTS OF YOGA ON VOICE – A SYSTEMATIC REVIEW**

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**ALL INDIA INSTITUTE OF SPEECH AND HEARING**

**Naimisham Campus, Manasagangothri, Mysuru**

**August, 2022**

## **CERTIFICATE**

This is to certify that this dissertation entitled “The **effects of Yoga on voice – A systematic review**” is a bonafide work submitted in part fulfillment for the degree of Master of Science (Speech-Language Pathology) of the student Registration Number: 20SLP030. This has been carried out under the guidance of a faculty of this institute and has not been submitted earlier to any other university for the award of any diploma or degree.

Mysuru,  
August, 2022

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## **CERTIFICATE**

This is to certify that this dissertation entitled “The **effects of Yoga on voice – A systematic review**” has been prepared under my supervision and guidance. It is also certified that this dissertation has not been submitted earlier to any other university for the award of any diploma or degree.

Mysuru,  
August, 2022

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## DECLARATION

This is to certify that this Master's dissertation entitled "**The effects of Yoga on voice – A systematic review**" is the result of my own study under the guidance of Dr. K. Yeshoda, Associate Professor, Department of Speech Language Sciences, All India Institute of Speech and Hearing, Mysuru and has not been submitted to any other university for the award of any Diploma or Degree.

Mysuru

August 2022

Registration Number: 20SLP030

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**“Living in the state of gratitude is the gateway to grace”**

-Arianna Huffington

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## **CHAPTER I**

### **INTRODUCTION**

Yoga has long been a component of conventional Indian spiritual practice and is based on Indian philosophy (Feuerstein,1998). Yoga has long been seen as a multifaceted intervention that incorporates ethical living advice, spiritual practice, breathing methods, and meditation in addition to physical activity. Asanas, pranayama, and dhyana are the most often associated aspects of yoga, and several yoga styles have developed with diverse emphasis on both physical and mental exercises. Yoga has gained popularity as a way to support physical and mental wellbeing, even if its ultimate purpose has been defined as bringing the mind, body, and spirit into harmony. This is especially true in the recent past following the pandemic.

There is scientific data supporting the beneficial effects of yoga on a person's physical and mental wellness (Hendriks et al., 2017; Gaiswinkler et al., 2016; Tulloch et al., 2018). There are also very many studies that document the role of Yoga in improving the health condition of many pathological and psychological cases (Cramer et al., 2013; Nagarathna et al., 1985; Ranjita et al., 2016). Yoga has also been proven to be effective in conditions like depression (Cramer et al., 2013; Manincor et al., 2016), post-traumatic stress disorder (van der Kolk et al., 2014), cancer (Danhauer et al., 2017), neurological disorders (Mooventhan et al., 2017), low back pain (Wieland et al., 2017) and many other conditions. According to a research by Lawrence et al. (2017), Yoga has the potential to be included into patient-centered stroke therapy because of its positive effects on functional recovery and quality of life (QoL). There is proof that pranayama offers both physical and mental advantages. Patients with respiratory conditions like bronchial asthma were the ones who most frequently experienced the

positive results. Additionally, it benefited patients with cancer and cardiovascular disease.

The synchronization of the body's many subsystems, including the respiratory, phonatory, resonatory, articulatory, and central nervous systems, results in the complicated, dynamic process of voicing (Manjunatha et al., 2018). Interactions between the power source (the lungs, abdomen and back muscles, and the vocal folds), the oscillator, and the resonator are necessary for voice production (Sataloff et al., 2007). An active involvement of the respiratory muscles is thought to improve and ease voice production. A systematic review by Desjardins et al (2020) tabulated evidence to support the use of respiratory exercises to enhance vocal performance that are tailored to a patient's respiratory and vocal demands.

The interaction between postural use, muscle tension, and vocal use has a very complex relation (Cardoso et al., 2019). It is well acknowledged that proper postural alignment, especially of the cervical spine, is crucial for enhancing voice performance since it is correlated with lung volumes, vocal resonance, and pitch control (Brown.O.L., 1996; McKinney.J.C., 1994; Miller.R., 1993; Peckham.A., 2000; Rubin et al., 2004). A few authors claimed that the voice would benefit from practising Ujjayi Pranayama, Bhramari Pranayama, Nadi Sodhana, and Kapalabhati. (Manjunatha et al., 2018 & 2021; Singh et al., 2019; Jayakumar et al., 2022)

In 2012, Moore described how his clients with Muscle Tension Dysphonia benefited from using Vinyasa and poses from the introductory level of Hatha Yoga. In order to align or anchor the head, neck, and torso, modified yoga postures or stretches were utilized to loosen up tight muscles or to engage the musculature. To help with early postural awareness, yoga was adopted. In 2017, Lloyd et al. developed a four part

programme for professional voice users, particularly singers, that focused on postural optimization, breath coordination, easy onset voice production, and release of maladaptive tension through the amalgamation of physiological principles of voice production with the practices of Yoga and the programme was successful. According to a case study by Sharma et al. in 2021, a patient with dysphonia benefited from 3 weeks of yoga protocol practice that combined Yogic Sukshma Vyayama with certain Asanas, Pranayamas, and Om chanting with mindfulness.

### **1.1 Need for the Study**

The effects of yoga on a range of physical and mental health conditions are currently the subject of research. Research on Yoga therapies is fast expanding. For numerous illnesses, researchers have shown some preliminary effectiveness. However, there are very few studies on Yoga and its impact on the vocal mechanism in the field of Speech Language Pathology. An exploration on the impact of Yoga on voice and the possibilities of the application of Yoga in the management of dysphonia was warranted as there are a handful of studies that have explored this topic. As there are wealth of literature that subjectively establishes the advantages of yoga, an effort is made in the current study to investigate the record of experimental research that objectively quantifies the benefits of Yoga practices on the quality of voice.

The practices of Yoga can help simultaneously target the respiratory aspect and can also contribute to the betterment of the posture. Hence, this review aimed to look at the scope of applicability of these practices to target respiration, breathing, and posture for the production of quality voice in normophonics and or dysphonics.

## **1.2 Aim of the Study**

The present study aimed to summarise and disseminate the existing material on the effects of the practices of Yoga on voice.

## **1.3 Research questions**

An attempt was made to answer the following research questions:

1. Is there any impact of Yoga on voice?
2. Is there any impact of Yoga on disordered voice?
3. If there is an impact of Yoga, what were the outcomes observed?
4. Is there any evidence of Yoga used instead of the standard voice therapy in the management of persons with dysphonia?
5. What are the probable practices of Yoga that could be used to improve voice in the management of persons with dysphonia?

## **CHAPTER II**

### **METHOD**

#### **2.1 Aim of the study**

The purpose of the present review was to systematically analyze the evidence for the effectiveness of the various practices of Yoga on voice in both persons with dysphonia and persons without dysphonia (normophonics).

#### **2.2 Objective of the study**

The objectives of this study were to:

1. Investigate the impact of Yoga on voice.
2. Investigate the impact of Yoga on dysphonia voice.
3. Investigate any evidence of Yoga used instead of the standard voice therapy in the management of persons with dysphonia.
4. Document the probable techniques of Yoga that could be used to improve voice in the management of persons with dysphonia.

#### **2.3 Research Design**

The Preferred Reporting Items for Systematic Reviews and Meta-analyses statement (PRISMA statement) was followed in this systematic review (Page et al., 2020). A comprehensive review of peer-reviewed studies published between 1940 and 2022 was conducted in order to access the oldest and the latest studies published related to Yoga.

## **2.4 Information sources**

The following databases were extensively searched: PubMed/Medline, Google Scholar, Science Direct, Com-Disdome (ProQuest), J – Gate and N-List. However, Web of Science could not be included due to lack of subscription. Lists of references were searched manually for further relevant studies.

## **2.5 Search strategy**

The search was carried out using the key terms that were relevant to the study combined with Boolean operators such as 'AND' and 'OR'. The keywords used were "yoga" OR "asana" OR "pranayama" OR "breathing technique" OR "integrative medicine" OR "alternative medicine" OR "mindfulness" AND "voice".

An additional key term "English" was used with the other key words only in Google Scholar to help narrow the search results that were limited to studies in English only.

## **2.6 Inclusion criteria to select the studies for systematic review**

- Those articles that were available in peer-reviewed journals from 1940 to 2022 were included.
- Studies were selected based on the quality of the method, data, and outcome. The studies that incorporated a standard experimental design were selected.
- Original articles containing human subjects with appropriate samples for standard research and relevant statistics were only considered.
- All studies assessing both pre- and post-treatment measures or the studies with a cohort group were considered.

- Articles published in the English language were considered for the review.
- The selection was based on the PICO criteria (Richardson et al., 1995)

Population: Normophonic OR dysphonic population.

Intervention: Studies that have administered any form of Yoga (postures/asanas, breathing/pranayama, mindfulness/meditation) as a tool for rehabilitation of voice disorders and or to improve the voice quality in normophonics.

Control group: Studies with normophonic individuals as a control group or within-subjects repeated measures designs were selected.

Outcomes: The outcome of the review provided an insight regarding the changes seen in voice quality measures in persons with normophonic voice and or persons with dysphonia post Yoga practice/regimens/ protocol.

## **2.7 Exclusion Criteria**

- Articles with insufficient methodological details, in specific, the articles that did not fit the standard experimental design were excluded.
- Articles published in a language other than English were rejected.
- Case reports, letters to editors, systematic reviews, expert opinions, scoping texts, and editorials were excluded.
- The articles that did not use Yoga for intervention on their subjects were excluded.
- Studies that did not assess either pre-treatment measures or post-treatment measures or both were not considered.
- Full text articles that could not be accessed were excluded.



## **2.8 Data extraction**

The search results were combined manually. The titles and abstracts retrieved from the search techniques were screened to find the studies that matched the inclusion criteria. After that, the full text of the potential studies was retrieved and matched to see if they were eligible. The extracted data included: article title, author details with their affiliation, year of publication, research design, study population, sample size, age group, comparison group, and method employed to ascertain the tasks, analysis tools, extracted acoustic and aerodynamic parameters measured and the outcome measures. The selected articles were sent to two validators for the validation to make sure that these could be included in the study. These validators had completed their Post-graduation in Speech language Pathology and are currently pursuing doctoral studies as the Junior Research Faculty at the institute whose areas of interest included “voice” and “voice pathology”.

## **2.9 Quality assessment**

The studies that were a part of the systematic review were evaluated for methodological quality. The Critical Appraisal Skills Programme (CASP) checklist (Brice, 2018) was used for the cohort study and rated the selected articles with a ‘yes’, ‘can’t tell’ or a ‘no’. All the studies were rated individually.

## **CHAPTER III**

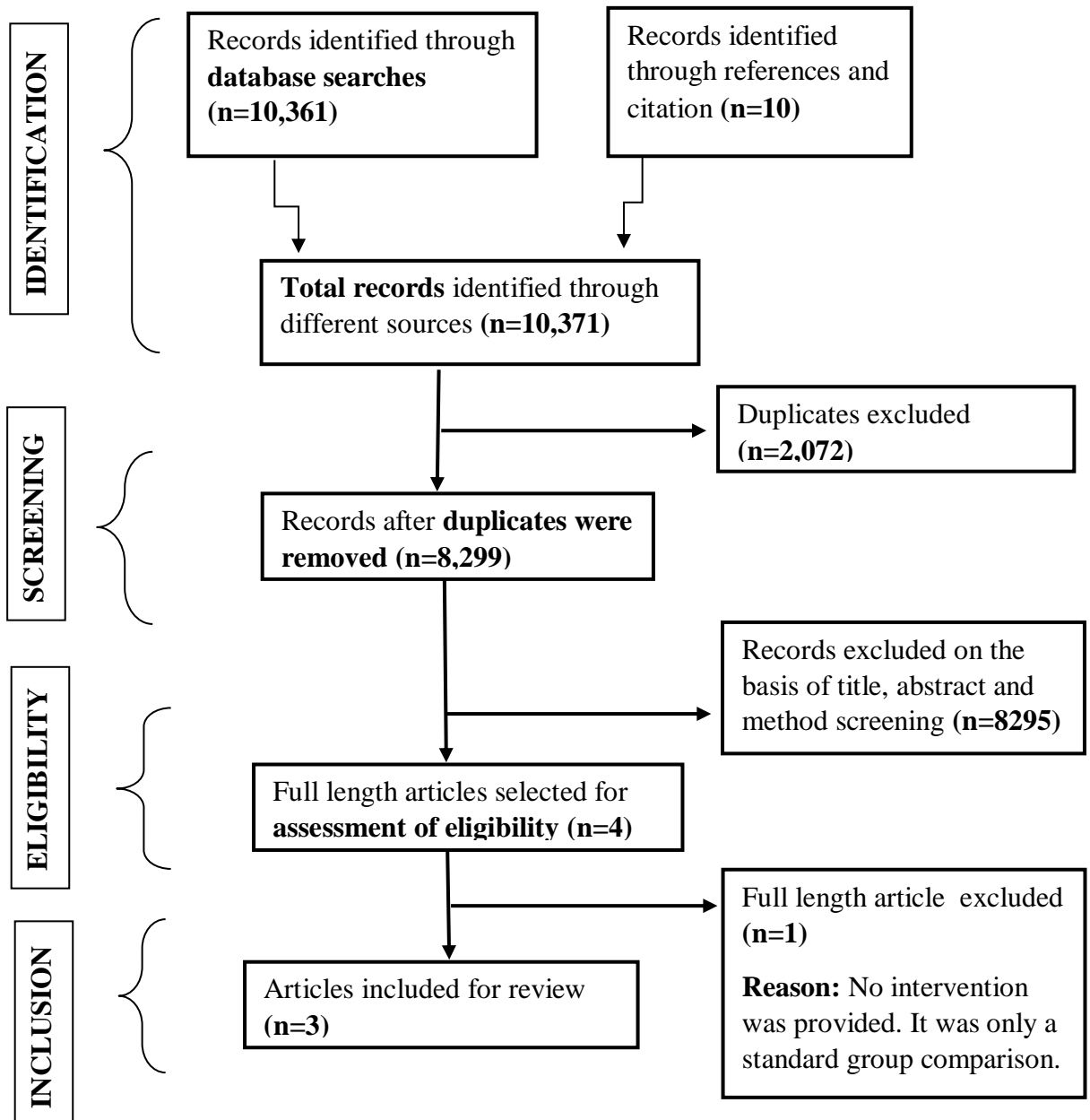
### **RESULTS**

A total of 10,371 articles were identified using database searches. A further total of 8,299 articles were included in the title/abstract screening after eliminating a conservative 2,072 duplicates. Finally, four articles were selected for the full-length article screening. Three articles matched the inclusion criteria in the study. A detailed Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow chart for the selection of the study is shown in Figure 3.

The description of the studies considered for the systematic review are summarized in Table 3.1.

**Figure 3.1**

*PRISMA flowchart for the selection process of articles included in the review*



**Table 3. 1**

*Details of the studies included for review*

<b>Title and Author</b>	<b>Aim of the study</b>	<b>Population type</b>	<b>Intervention</b>	<b>Measures and Tasks</b>	<b>Results</b>
<p><b>A Preliminary Study on the Effect of Bhramari Pranayama on Voice of Prospective Singers (Jayakumar et al., 2022)</b></p>	<p>To investigate the impact of BP on the vocal qualities/characteristics of potential singers.</p>	<p><b>Study group-</b> 30 Healthy singers attending music schools. <b>Age range:</b> 18 to 35 years <b>Control group-</b> No control group as it was a pre-test post-test design.</p>	<p>Addition of BP to the normal schedule of vocal lessons and practices - 21 cycles either early in the morning or late at night for 30 days.</p>	<p><b>Measures:</b> <u>AVQI and its constituents:</u> HNR, CPPS, Shim dB, Shim local, Tilt LTAS, Slope LTAS; <u>MDVP parameters:</u> Jitter, RAP, Shimmer, APQ, NHR, VTI, FFTR, FATR, FTRI and ATRI <b>Tasks:</b></p> <ul style="list-style-type: none"> <li>• Three tries of phonation of the vowels /a/, /i/, and /u/ for</li> </ul>	<ul style="list-style-type: none"> <li>• Increase in mean and median values of HNR, CPPS, Tilt LTAS, Slope LTAS. Reduction in mean and median of Shim local, SimdB and AVQI.</li> <li>• MDVP: mean and median of Shimmer, Jitter, APQ, ATRI, NHR, values are higher before BP compared to after BP. Also, the values of FFTR, RAP, VTI, and FTRI are lower before BP compared to after</li> </ul>

					more than five seconds.	BP.
					<ul style="list-style-type: none"> <li>• Read a standard Kannada passage - Bengaluru passage</li> </ul>	<ul style="list-style-type: none"> <li>• Hence, controlled breathing and humming in BP have facilitated the improvement in the voice quality.</li> </ul>
<b>Immediate effects of 'Ujjayi Pranayama' on aerodynamic, acoustic and self perception parameters of voice in teachers (Manjunatha et al., 2021)</b>	To investigate the immediate effects of UP on acoustic, aerodynamic and self-perception parameters of voice .	<b>Study group-</b> 20 female graduates involved in teaching for a minimum of 3 years . <b>Age range:</b> 20 to 25 years (Mean age: 26.92 ± 1.18 years) <b>Control group –</b> No control group as it was a pre-test post-test design.	Performance of the UP - 12 cycles of 3 sets, giving a minute break between each set.	<u>Acoustic measures:</u> F0, I0, F1, F2, F3, F4, Jitter, Shimmer and NHR <u>Aerodynamic measures:</u> ESGP, MAFR, LAR, LAC, SPL and ESGP <u>Spirometer values:</u> FVC, FEV and PEF <u>Phonation:</u> MPD of the vowels /a/, /i/ and /u/ <u>Self-perception:</u> 4 point rating scale		<ul style="list-style-type: none"> <li>• Decrease in the mean values of all the formant frequencies (F1, F2, F3 and F4) with no statistically significant difference in these formant frequencies.</li> <li>• A considerable change in the jitter % and a decrease in the perturbation variables, such as shimmer and jitter, in the post values, which indicate decreased rate of fluctuation</li> </ul>

<p><b>Effect of Bhramari Pranayama on the Acoustic and Aerodynamic Parameters of Voice in Normophonic Females (Manjunatha et al., 2018)</b></p>	<p>To investigate the effects of BP on aerodynamic and acoustic parameters of voice in healthy individuals.</p>	<p><b>Study group-</b> 24 females (attrition – 2 from the initial 26 females)  <b>Age range:</b> 20 to 25 years  (Mean age = 20.87 ± 1.15 years)  <b>Control group –</b> No control group</p>	<p>Practice of the BP - 12 cycles for 30 sessions.</p>	<ul style="list-style-type: none"> <li>• Tasks: Sustained phonation of /a/, /i/, and /u/ at their comfortable pitch and loudness. Aerodynamic measure: produce alternating syllable string /pa/ in the mask supplied.</li> <li>• Measures: MPD, pitch, loudness, subglottal pressure,</li> </ul>	<p>in the frequency and intensity of the voice samples after practising UP. MPD for all the vowels increased with a significant difference from pre to post values.</p> <ul style="list-style-type: none"> <li>• 80% of the participants rated UP as useful in prepping their voice for the vocal loading tasks.</li> <li>• Significant improvement in the MPD glottal airflow and pressure, SPL, average fundamental frequency, and CPP after practice.</li> <li>• Subglottal pressure decreased considerably after the practice.</li> </ul>
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<p>as it was a pre-test post-test design.</p>	<p>glottal airflow, LAR and LAC along with acoustical parameters such as average F0, shimmer and jitter, SPI, NHR, CPP, and CPPS were analyzed.</p>	<ul style="list-style-type: none"> <li>• BP affects acoustic and aerodynamic factors that are associated to voice.</li> </ul>
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Abbreviations: BP – Bhramari Pranayama, AVQI – Acoustic Voice Quality Index, HNR – Harmonic to Noise Ratio, CPPS – Cepstral Peak Prominence – Smoothed, LTAS – Long-term Average Spectrum, RAP – Relative Average Perturbation, APQ – Amplitude Perturbation Quotient, FTRI – Frequency Tremor Intensity, ATRI – Amplitude Tremor Intensity, VTI – Voice Turbulence Index, MPD – Maximum Phonation Duration, F0 - Fundamental Frequency, I0 - Intensity, F1, F2, F3, F4 - Four formant frequencies, ESGP – Estimated Subglottal Pressure, MAFR – Mean Air Flow Rate, LAR – Laryngeal Resistance, LAC- Laryngeal Conductance, SPL – Sound Pressure Level, FEV – Forced Expiratory Volume, FVC – Forced Vital Capacity, PEF – Peak Expiratory Flow, SPI- Soft Phonation Index, UP- Ujjayi Pranayama

### **3.2 Quality assessment**

Using the Critical Appraisal Skills Programme (CASP) checklist (Brice, 2018) for the cohort study, the quality of the selected studies for the systematic review was evaluated, and the articles were graded as either "yes," "can't tell," or "no."

All of the publications that were chosen had specific aims and objectives, a specified population, stated dependent variables, and extraneous factors that were controlled. The results of the quality assessment for all of the selected studies are provided in Table 3.2



**Table 3.2***Results of the quality assessment for the selected studies using CASP for case control study*

Sl.No		Manjunatha et al., (2018)	Usha,M et al., (2021)	Jayakumar et al., (2022)
<b>Section A: Are the results of the study valid?</b>				
1.	Did the study address a clearly focused issue?	YES	YES	YES
2.	Was the cohort recruited in an acceptable way?	YES	YES	YES
		Purposive Sampling	Simple Random Sampling	Purposive Sampling
3.	Was the exposure accurately measured to minimize bias?	YES	YES	YES
4.	Was the outcome accurately measured to minimize bias?	YES	YES	YES
5. (a)	Have the authors identified all important confounding factors?	NO	NO	YES
5. (b)	Have they taken account of the confounding factors in the design and/or analysis?	NO	NO	YES
		No information about the duration and the frequency of voice usage in the female participants	Discrepancy across normophonic teachers information as given in abstract and in text.	Abstract states normophonic teachers. In the

method,  
 participant  
 inclusion  
 criteria:  
 teachers with  
 voices  
 changes or  
 changing due  
 to profession

- |        |  |     |     |     |
|--------|--|-----|-----|-----|
| 6. (a) | Was the follow up of subjects complete enough? | YES | YES | YES |
| 6. (b) | Was the follow up of subjects long enough?     | YES | YES | YES |

---

**Section B: What are the results?**

- |    |                                     |   |   |   |
|----|-------------------------------------|---|---|---|
| 7. | What are the results of this study? | Improvement<br>in the voice<br>quality based<br>on the<br>objective<br>measures | Improvement<br>in the voice<br>quality based<br>on the<br>objective<br>measures | Improvement<br>in the voice<br>quality based<br>on the<br>objective<br>measures |
| 8. | How precise are the results?        | Yes, as they<br>followed<br>appropriate<br>statistical<br>reporting             | Yes, as they<br>followed<br>appropriate<br>statistical<br>reporting             | Yes, as they<br>followed<br>appropriate<br>statistical<br>reporting             |
| 9. | Do you believe the results?         | YES   | YES   | YES   |

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**Section C: Will the results help locally?**

- |     |   |     |     |     |
|-----|---|-----|-----|-----|
| 10. | Can the results be applied to the local population? | YES | YES | YES |
|-----|---|-----|-----|-----|

11. Do the results of this study fit with other available evidence?

YES

YES

YES

The first study done to objectively measure and support the subjective reports on the benefits of Yoga.

The first study done to objectively measure and support the subjective reports on the benefits of Yoga.

The first study done in singers to objectively measure and support the subjective reports on the benefits of Yoga.

First to report the benefits specific to voice quality changes.

First to report the benefits specific to voice quality changes.

First to report the benefits specific to voice quality changes.

12. What are the implications of this study for practice?

Applicability of Yogic Pranayama practice for voice improvement.

Applicability of Yogic Pranayama practice as a vocal warm up for voice rehabilitation.

Applicability of Yogic Pranayama practice to improve voice quality.

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## **CHAPTER IV**

### **DISCUSSION**

The present study aimed to summarize and disseminate the existing material on the effects of the practices of Yoga on voice quality in both persons with dysphonia and persons without dysphonia (normophonics). Four research articles were initially chosen for this systematic review out of the 10,371 total publications. Three studies were shortlisted based on the selection criteria.

The following research inquiries were attempted to be answered:

1. Does yoga have any effect on voice?
2. Does yoga have any effect on disordered voice?
3. What results, if any, were seen because of yoga?
4. Is there any proof that yoga may be used to treat dysphonia instead of the usual voice therapy?
5. What are the likely yoga poses and breathing exercises that might help people with dysphonia modulate their voices?

According to the current systematic review, yoga has a positive effect on voice as it aids in the improvement of voice quality. From the studies on normophonics, it can be implied that the practices of Yoga have an effect on disordered voice too. There were reports of significant changes in the objective parameters of voice seen post the Yogic practice of Pranayama.

- Higher Cepstral Peak Prominence - Smoothed values and Slope and Tilt Long-term Average Speech Spectrum values suggested better voice quality. Reduced

Amplitude Tremor Intensity scores indicated a more stable voice with reduced tremulousness following Bhramari Pranayama practice (Jayakumar et al., 2022).

- Increased Mean Phonation Duration values of all sustained vowels and higher average fundamental frequency indicated increased glottal airflow. Decreased mean scores of subglottal pressure and laryngeal airway resistance due to more airflow was noticed. Increased Cepstral Peak Prominence indicative of improved harmonic organization which in turn showed more flexibility in voicing post the practice of Bhramari Pranayama was also reported (Manjunatha et al, 2018).
- Increased airflow rate and laryngeal conductance caused an increase in the mean values of fundamental frequency and intensity. Reduced jitter and shimmer in the perturbation variables implied a lower rate of variation in the frequency and intensity of the voice. A rise in vowel Mean Phonation Duration suggested an increase in laryngeal airway conductance, implying an increase in Mean Airflow Rate. Increase in laryngeal airway conductance caused a decrease in laryngeal airway resistance since they are inversely proportionate. Increased Sound Pressure Level and lower Estimated Subglottal Pressure readings are a result of increased airflow rate and laryngeal conductance following Ujjayi Pranayama practice (Manjunatha et al, 2021).

Ujjayi Pranayama aids in channelizing the breath, smoothing airflow, and improving voice quality, which is objectively represented in decreased perturbation metrics. In voice rehabilitation, this pranayama can be used in place of vocal warm-up exercises. The benefits of warm-up exercises for voice rehabilitation include a decrease

in stiffness and tension in the muscles. Since the muscles in the glottis, epiglottis and back of the throat are contracted during inhalation, Ujjayi Pranayama raises the temperature of the air that is breathed in. As a result, a small amount of air moves slowly from the glottis to the lungs, producing a sound similar to an ocean wave. The air that is bounced back into the nasal cavity owing to constriction and the small passage lingers in the nasal cavity, and the body temperature makes the breath warmer than the outside temperature. Even though there is no voicing, noise is created during both inhalation and exhalation owing to constriction (Manjunatha et al., 2018).

Controlled breathing and humming in Bhramari Pranayama facilitate the improvement of voice quality. The Bhramari Pranayama improves respiratory and phonatory synchronization, and breath control can be learned with continued practice. When breathing normally, people frequently pay little attention to their posture or breathing pattern, but when performing Bhramari Pranayama, one should pay close attention to both. As a result, the individual may be able to inhale deeply and expel the same amount of air without exertion since the inspired air may be distributed more uniformly and occupy more space in the lungs. This demonstrates how Bhramari Pranayama enhances lung function and breathing pattern when paired with posture management. Even though there was no difference in the means for glottal resistance or conductance, there was a difference in the mean scores. However, the subglottal pressure and airflow differences were more significant, which was attributed to the benefits of Bhramari Pranayama by lowering vocal effort and phonation threshold pressure. By drawing the practitioner's attention forward and providing a tactile vibratory experience, the formation of vibrating sound during the practice of this pranayama vibrates the whole vocal tract. This technique also promoted a smooth initiation of phonation when performed with appropriate posture and a calm

demeanour. Bhramari pranayama, as discussed in Resonant Voice Therapy, emphasizes on forward focusing the voice with minimal vocal effort, resulting in the best quality and strongest voice possible. The slightly adducted vocal folds used in Bhramari pranayama are beneficial in lowering the phonation threshold pressure and allowing for an easier commencement of phonation (Manjunatha et al., 2018; Jayakumar et al., 2022).

Although no experimental studies have been undertaken on how Yoga practices like Asanas and mindfulness may be used to manage dysphonia instead of standard voice treatment, there are case reports and expert opinions that have employed Yoga practices as an adjunct to or as an alternative to traditional voice therapy. There are many asanas and pranayama practices documented in the yogic literature for voice improvement as stated below. However, none of these were experimentally studied.

According to Rao & Hongsandra (2014), breathing exercises like hands-stretch breathing, dog breathing, and tiger stretching expand the lungs' capacity. Yoga postures like Simhasana assist to release tension from the chest and diaphragm as well as the muscles that are overworked. There are a number of asanas that work the vocal cord muscles like Matyasana, Bhujangasana, Dhanurasana, Ushtrasana, Ardha Chandrasana, Prasarita Paschimottanasana, Vakrasana, Ardhamatsyendrasana, Matyasana, and Prasarita Halasana. Chanting gives the voice more endurance and power and the vocal quality is enhanced by the vibrations and modulations. Chanting "Om" increases lung capacity, relieves tension, and fortifies the mind along with the strengthening of the voice's foundation. According to Singh et al. (2019), singers could benefit from a regular Hatha Yoga routine and also by practising Ujjayi pranayama, Nadi Sodhana, and Kapalabhati.

A case report by Sharma et al. in 2021 claimed the positive effects of 3 weeks of Yoga Protocol Practice that included a mix of Yogic Sukshma Vyayama, specific asanas, pranayamas and “Om” chanting with awareness on the body of a patient with dysphonia. Considerable decrease in the hoarseness of voice was tabulated based on self reported data.

Ozgur (2020) stated that Yoga and other forms of meditation enhance the quality of breath, the ease and the relaxation of the body. Lloyd et al. in 2017 devised a four part program that targeted postural optimization, easy onset voice production, breath coordination, and release of maladaptive tension through integration of physiological principles of voice production with basics of yoga practice for professional voice users, especially the singers which proved to be beneficial.

An expert opinion record by Moore (2012) outlined the use of beginner level Hatha Yoga postures and Vinyasas that were beneficial to his clients with MTD. Modified yoga poses or stretches were used to loosen up tight muscles in certain areas or to activate the musculature to help with alignment or anchoring of the head, neck, and torso. Yoga was used for initial-stage postural awareness. It is necessary conduct empirical, scientific, and statistical investigations on the effectiveness of these Asanas and Pranayama practices.

Yogic practices for managing voice should be prescribed with caution, since doing so might have unfavourable effects if breathing or physical exercises are too difficult or are not closely monitored. These include things like the emergence of abnormal breathing patterns, a loss in wellbeing, general postural holding, and the development of excessive muscular tension patterns. Inadequate practice that has been extended unsupervised or poorly guided, without an integrated awareness of "the body and the



breath," can also result in incorrect habits. Some breathing techniques, such the "Ujjayi breath," can only be used with care since if done improperly, it might result in supralaryngeal constriction.

## **CHAPTER V**

### **SUMMARY AND CONCLUSIONS**

This systematic review summarized the evidence for the effectiveness of the various practices of Yoga on voice in persons with dysphonia and/ or persons without dysphonia (normophonics) from the existing research findings. Three studies were shortlisted based on the selection criteria. Reviews of studies that employed yoga in any capacity to alter voice were done. The review demonstrated that the Yogic practices, namely Pranayama, may be employed to see improvements in voice quality because the results were corroborated by scientific data and evidences.

As a result of normophonic research showing a good effect on the aerodynamic and acoustic characteristics of voice in healthy normophonic persons, yoga may be employed as a component of voice management or can be used as an adjunct therapy. The results demonstrated considerable improvement in the objective characteristics of voice that were evaluated for the study. Also, Yoga was proven to enhance the posture which is vital for the voice.

There is an abundance of literature and articles from time immemorial that link the benefits of Yoga to improved physical and mental health. In the recent times, there were many studies that aimed to elaborate the applications of Yogic practices on voice. However, most of these were either single case studies or expert opinions or scoping studies or subjective estimation of measures or self-rated studies or compilation of the information on the benefits of Yoga on voice from ancient texts. Still, a few were practices that the researchers subjected their patients to, or new programs developed by the researchers or reviews and personal opinions of the author. If experimental in nature, they did not have the pre and post-test comparisons or were not

methodologically sound in the terms of participants selection for consideration of the Yogic practices. Hence, none of these studies were included in the present review. There is a dearth of clinical experimental studies that use objective measures of voice to quantitatively state the results in patient populations. In addition to this, there is limited exploration on the various aspects of Yoga that could be experimented with like Asanas, other Pranayamas, Mudras, Bandhas and meditation practices.

All the three studies reviewed were on females and were in the normophonic population with a small sample size. Hence, it would be interesting to explore the results with a control group, in the dysphonic population, males, on a larger sample of females, short term and long term effects of Yoga on voice and to document the utility of Yoga as a part of the vocal warm up or as an adjunct to the current voice therapy techniques or as a separate voice intervention program. It would also be of interest to objectively compare the existing voice management techniques with Yoga and observe the change in voice parameters. Therefore, further research is necessary for a better understanding of the impact of the various practices of Yoga on voice.

### **5.1 Clinical Implication of the Study**

- This review provides evidence for the Speech Language Pathologists to understand the effect of Yoga on voice.
- The review also provides evidence to implement practices of Yoga as a part of the vocal warm up or as an adjunct management technique for voice management.

- Since there is an increased awareness about Yoga and its benefits, it would be easier to integrate these practices as a part of the management, wherever and whenever possible as it would help in the smooth transition of practicing these along with the currently used techniques of voice therapy.

## **5.2 Future Direction**

- Focused research is needed to understand the influence of Yoga on voice, particularly objective studies that investigate the acoustic and aerodynamic aspects of voice.
- Further research should be conducted with bigger sample size and compare the results across genders, age groups and the different voice disorders employing different practices of Yoga.

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