Prevalence of Voice Disorders in Singers: Systematic Review and Meta-Analysis

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Summary: Objective. The study aimed to review the prevalence of self-reported voice disorders in singers.
Study Design. The study is a systematic review and meta-analysis.
Methods. A systematic review of five major scientific databases was conducted. An extensive search strategy was used considering the rules of each database. Original articles were included only if they had data related to self-perception of dysphonia in the past. Furthermore, heterogeneity and its relative significance were assessed.
Results. There were 2371 articles identified; duplicates were deleted, screenings were conducted, and inclusion and exclusion criteria were applied. The final analysis was conducted on 11 studies. The most implemented instruments for the study were customized questionnaires. The findings about singing styles, voice use, and age were found to be different among subjects. The overall prevalence of self-reported dysphonia in singers was 46.09% (95% confidence interval: 38.16–54.12). The heterogeneity was considerable among the studied samples ($I^2 = 90.59\%$). Four groups were then established—students, teachers, classical, and nonclassical—and compared regarding overall prevalence (21.76% in students, and significantly higher and nondifferent in the other three groups, 55.15%, 40.53%, and 46.96%, respectively) and heterogeneity (low only for the students' studies).
Conclusion. Although with low homogeneity, singers present a high prevalence of self-perceived dysphonia over their careers. Singing students were the group with a lower prevalence. On the other hand, traditional and popular music singers, as well as singing teachers, revealed significantly higher prevalence of self-perceived dysphonia. Overall, singers are likely to report voice disorders, no matter their singing style or skills. This highlights the need of a preventive approach to address voice disorders in traditional and untrained singers.
Key Words: Voice–Singer–Dysphonia–Occupational health–Self-perception.

INTRODUCTION

"Singer" is a term that, in a broad sense, can include anyone: a young singing student, an untrained popular or traditional singer, or a famous classical singer. Obviously, among them, the demands, the training, and the effects of their voice use will vary.

Singers are considered elite vocal performers among all the professional voice users.[1] As suggested by Phyland,[2] "singers could be considered vocal athletes in the sense that they have to carry out complex phonatory maneuvers, and require endurance, flexibility and vocal tract control that exceed the needs of the speaking voice." The same author assumes that they will rely on a quality voice for longer periods of time and under less than ideal conditions for vocal health. The age of the performers as well as the training they went through will influence their ability and use of voice.[3]

A disruption in voice quality brings a negative impact on performers' careers as well as on business' profits.[4] For some voice professionals, even a slight voice disorder represents a significant, functional, and occupational impairment, and affects their quality of life related to work.[5]

Naturally, to seek help or treatment, the voice user must recognize the voice problem. Compared with the other laryngological assessment procedures, "perceptual measurement has become the accepted 'gold standard' for voice assessment."[6] The perception of voice plays an important role in a singer's life, as they are more likely to notice subtle changes in their voices.[2]

If the perceptual assessment of voice is conducted by someone other than the self, its impact on the quality of life will not be reflected.[6] The importance assigned to self-perception of voice disorders has increased, and in the last few years some important research tools have emerged based on it.[7–10] Most of them have been translated and adapted to other languages or specific clinical populations. On singing voice, an original instrument evaluation of the ability to sing easily (EASE) was created,[11] and some adaptations of others (eg, voice handicap index (VHI)) were already conducted.[12–17]

Among professional voice users, singers have been pointed out as the most demanding vocal group.[18] Even though they are recognized as being more susceptible to voice disorders, studies corroborating such prevalence are scarce.[2,19,20] The great variability among the existing ones is mainly related to inconsistent definitions of what a voice disorder is.[21] Previous authors relied on self-perception, and considered a voice disorder to be "any time the voice does not work, perform, or sound as it normally should, so that it interferes with communication." The sample in that epidemiological study was the general population.[21]

Some studies[4,22] report epidemiological data about voice disorders in singers. Among them, Titze et al[4] found that 11.5% of the clinical voice population was composed of singers, and there was a high representation of nonclassical singers. The size of that study allowed them to conclude that singers represent 0.22% of the US workforce.

These results contrast with others that found 2.43% of singers among voice patients.[22] Among the working treatment-seeking population, there is an estimation of 71.9% of professional voice users,[3] whereas among the general population 8.8% report past vocal problems and 6.2% refer to voice problems at that moment.[19]

Until now, the authors did not find any study comparing data about prevalence of voice problems in singers. Besides, this systematic review allows an understanding of the importance of voice disorders associated with different singing styles.

This study aims to find out the prevalence of self-reported voice disorders among singers using a meta-analysis.

MATERIALS AND METHODS

Search strategy

Studies included in this research were selected through a systematic search of literature in the PubMed, Web of Science, Academic Search Complete, current nursing and allied health literature (CINAHL), and Medline databases. Gray literature was not included. An extensive search strategy was adopted (detailed and presented in Appendix I). Searches were restricted to original papers written in English, Portuguese, or Spanish, and published in peer-reviewed journals.

A senior librarian was asked about the queries and search strategy to be used.

Study selection

Study design

The following study types were included: retrospective and prospective cohort, cross-sectional, case-control, and transversal. The excluded studies were intervention, reviews, case reports, or editorials.

Participants

Studies about animals were excluded. It was a must for the participants in the selected studies to be singers of any style. There was no age limit; for instance, there are young boys and girls performing, as well as choirs with elderly artistes or singers. Those studies in which the subjects were healthy were not included.

Timing

No minimum time limit was applied. Studies published up to January 15, 2016 were included.

Disorder

All the studies reporting data of self-reported voice disorders in the past were included.

Other disorders

Cases with voice problems not associated with occupational use were excluded from the study.
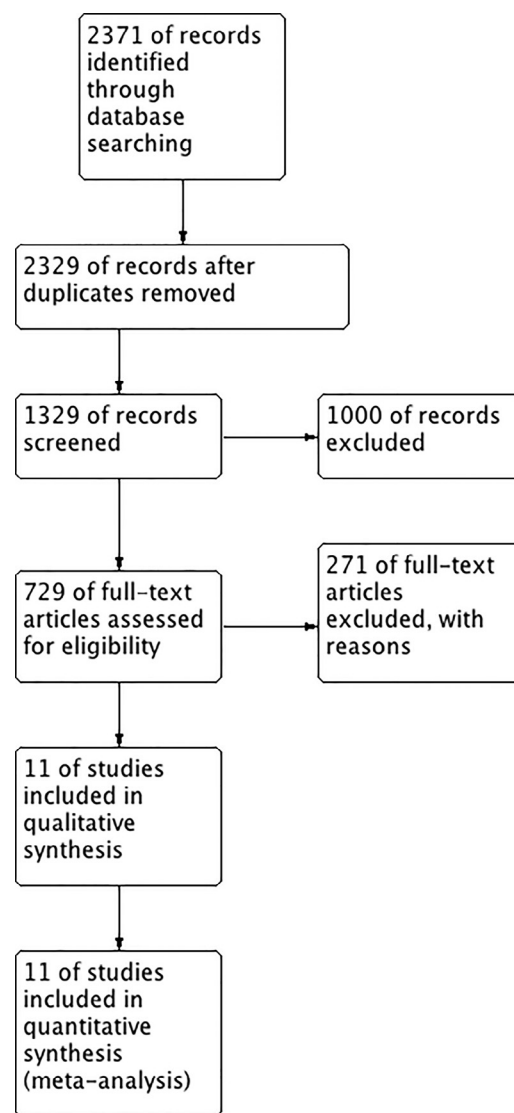

FIGURE 1. Study flow diagram.

Data extraction

There was a screening of the results based on four different phases. In phase 1, duplicates were detected (42) and removed using *Mendeley Desktop*, London, UK. In phase 2, obviously irrelevant papers were excluded based on titles (1329). Phase 3 aimed to exclude irrelevant studies based on abstract (729). The previously presented criteria were reapplied in the last phase. The study selection is detailed in Figure 1.

Statistical analysis

All calculations and graphs were made using the software *MedCalc* 14.8.1.0 (Ostend, Belgium). The statistical heterogeneity among studies was assessed using the inconsistency index, I^2 measure. The analysis was conducted with a random-effects model, and the standardized mean difference with 95% confidence intervals (95% CI).

The authors were as detailed as possible in order to make this research reproducible in the future. This systematic review and meta-analysis do not intend to compare interventions. This is