

# Vocal Fatigue Assessment in Female Islamic Scholars

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**Abstract:** *Alimiah are female Islamic scholars who are regarded as professional voice users since they utilize their voices on a regular basis to impart knowledge. The S/Z ratio is a vocal function indicator that aids in determining whether voice issues occur. Thirty Alimiah were enrolled in the current study, which evaluates the s/z ratio among them. The results of the current study, which comprised 30 Alimiah, indicated that the majority of them had higher than usual s/z ratios, which suggests that they are at risk of having voice issues.*

**Keywords:** Alimiah, S/Z ratio, Voice problem

## 1. Introduction

Phonation is the production and the utterances of speech sounds resulting from the vibration of the vocal folds. Phonation defined as one of the laryngeal motor behaviours used for speech production, which indulges coordination of both laryngeal and respiratory neuromuscular control. Poletto, C.J., Loucks, T.M., Simonyan, K., Reynolds, C.L., and Ludlow, L.C. (2007)

Respiration has an advanced importance in phonation, as voice is generated by the airflow from the lungs, when air passes from lungs to the atmosphere results in the movements of articulators, which are due to muscle contraction and the whole process which are controlled by nervous system, that is the physical production of speech is produced by an air stream from the lungs via the nasal, oral, and tracheal passages.

Coordination between the lower airway and the larynx is essential for normal voice production, air expelled from the lungs makes vocal fold vibrate, the vocal folds vibrate faster when they are pulled longer, thinner and more and vibrate slowly when they are shorter, thicker, these resulting vibration makes a person to sing, speak and to produce other vocal sounds. and an accurate breath support is essential for better voice production. When an individual does not have good breath support, creates grater tension in the larynx which leads to strain and poor voicing (The Voice Foundation ,2017)

Voice problems generally include discomfort or pain when you speak, or have difficulty in controlling the pitch, loudness, resonance, quality. Muscle tension dysphonia, vocal fold lesions, cysts, vocal fold scarring and also age-related alterations are the most common problems among professional voice users (Andrus, G.J., &Franco, R.A. 2007)

Professional voice user is the one whose voice is visible essential for their job, like singers, actors, teachers, clergies, alimiah are all those who rely more on their voice, where voice disorders are more likely to develop in professional voice users.

S/Z ratio is used to assess the integrity of phonatory glottal closure, where s/z ratio has no units of measurements, both /s/ and /z/ are produced in the same manner, in which the tongue

is in contact with the hard palate just behind the upper front teeth; with a narrow channel left open between the tongue and the palate to allow the outflow of air. This narrow channel produces the airflow, which is the sole source of /s/ sound and the /z/ sound are produced by the vocal fold vibration.

Measuring s/z ratio has been suggested as a diagnostic tool for voice evaluation which is being first proposed by (Eckel,F.C.,&Boone,D.R.1981).This measures the time a person could sustain 's' sound and 'z' sound individually and then divides the two figures to obtain a numerical ratio .Person with normal vocal fold function is expected to prolong the voiceless /s/ and voiced /z/ sound for about same time, where the ration result upto 1, with normal duration of production of /s/ and /z/ for 10 second in children and 20-25 second for adults and 95% people who have vocal fold problems have an s/z ratio of greater than 1, greater the likelihood of laryngeal pathology (Williamson ,2018).The ratio 1.0 with reduced duration of /s/ and /z/ indicates possible respiratory inefficiency ,the higher the value the person is in difficulty with phonation.

Alimiah is an women religious scholar in Arabic, who acquired knowledge in various Islamic sciences, an Alimah is distinguished by her deep knowledge of Islamic teachings. Alimiah plays major roles in community leadership, contributes to several educational aspects, participates in social and welfare activities, apart they take up a crucial role as educators, teaching Islamic sciences to other women and children, also serves as counselors too. Alimah continues to seek knowledge by staying updated on contemporary issues and development in Islamic thought. (Alimaa Learning ,2023)

Alimiah are the one who involves in more vocal demands as by teaching women and children in schools, colleges, madrasas, also through online mode by delivering religious knowledge, for the recitation of the Quran it requires an intentional modification of pitch, loudness and vowel prolongations, moreover a good breath support is essential for the recitation.

Alrahim, A.A., Alanazi, A.R., and Al-bar, M.H. (2018) Conducted a cross-sectional survey among general population and teachers in Khobar, Saudi Arabia, in accordance to find out the prevalence of developing

hoarseness among teachers, total of 400 surveys, 187 teachers responded and results suggested a total of 27% teachers had higher prevalence of voice disorders.

Anirban, D., Haripriya, C.H., and Sadiqunisha (2018) Did a study to know the vocal parameters in Quranic teachers and Regular School teachers in the age range of 20-40 years, total of 30 teachers participated in the study, the acoustic analysis of vowels /a/, /i/, /u/ were examined. The results suggested that the Quranic teachers are at higher risk of developing voice problems.

Byeon (2019) did a systematic review and meta-analysis to identify the risk factors of getting voice disorders among teachers, and results suggested that the meta-analysis showed upper respiratory tract infection, caffeine consumption, speaking loudly and a greater number of classes per week are the associated risk factors of voice disorders in teachers.

Kwok, M., and Eslick, G.D. (2019) examined the impact of vocal and laryngeal pathologies among professional singers, thorough meta-analysis, results suggested that the professional singers are at higher risk of laryngeal pathologies.

Roy, R., and Meghana, S. (2019) Studied professional voice users to compare the pre and post aerodynamic measures, professional voice users like teachers, singers, speech language pathologist, lawyers and working in call centers in the age range of 25-45 years participated in the study. The results suggested that all showed increased aerodynamic values.

Zaky.E.A., Mamdouh, H., and Khalaf, Z. (2020) Compared the risk of vocal dysfunction among teachers and nonteachers in Egypt, both primary and secondary school teachers were included in the study and both male and female teachers participated in the study, results suggested that female teachers had history of voice change more than male teachers.

Devadas (2020) Carried out a survey by including questionnaires among Carnatic singers, this study aims to find out the prevalence of possible risk factors of voice problems, this study reveals a higher prevalence rate of voice problems.

Jayakumar, T., and Yasin, H, M, H. (2021) explored the voice usage and knowledge of voice care among students pursuing the Alimah course, total of 150 undergraduate students pursuing Alimah degree in and around Nagapattinam and Thanjavur districts in Tamil Nadu, India, through a self-reporting questionnaire. The results suggested that the students pursuing the course were at a high risk for developing voice problems and limited knowledge of vocal issues.

Sankar, G., Ganesan, V.M and Shantharam, R, V. (2022) Examined the prevalence of voice disorder among government school teachers in Kancheepuram districts. The results suggested that the prevalence of voice disorder was found to be high.

Krishna, Y., and Rajasudhakar, R. (2022) compared the subjective vocal aerodynamic measures in teachers and

nonteachers, participants included both male and female teachers teaching for minimum of 5 years and more. The results suggested that there is significant increase in measured parameters (MPT and S/Z) ratio, which shows an existence of occupational risk factors.

Alharbi, N.S., Alotaibi, Alhari, and Alzahrani. (2024) did a study to obtain the prevalence of voice disorders among teachers in Saudi Arabia, study was carried out with a set of questionnaires, which helps to identify the existing risk factor, participants included both male and female teachers and results suggested that higher prevalence of voice disorder, smoking, longer teaching experience existed as risk factors.

## 2. Need of the Study

Using the voice on a daily basis as part of the job makes it more chances of getting a voice disorder, Alimiah is the one who uses their voices more and there are only limited existing data on S/Z ratio among Alimiah populations (Jayakumar, T., & Yasin, H, M, H.2021).

The need of this study is to make them aware and to provide voice care tips to prevent from getting their voice worsen or from getting into high risk of voice disorder.

## 3. Methodology

### 3.1 Aim

The aim of the current study was to measure the S/Z ratio among Alimiah.

### 3.2 Participants

30 Alimiah's who were in the field for long term has been participated in the present study

#### Inclusive criteria:

Participants with at least one year of experience were selected from specific regions of Kerala and Karnataka.

#### Exclusive criteria:

Study specifically excluded individuals who had speech, language and hearing impairments, as well as those who did not meet the criteria of being Alimiah.

### 3.2.3 Procedure

Initially the purpose of the study has been explained to the participants, later instruction has been given to the participants as follows; Take a deep breath and make the longest /s/ you can and then sustain the longest /z/ you can. Sustained /s/ and /z/ production is been measured, and then determine s/z ratio by dividing the /s/ by the /z/ production.

#### Statistical Analysis:

Categorical data was summarised by frequency and percentages. Quantitative normal data was summarised by mean, s. d and confidence interval. Comparison of quantitative normal data was compared by one way ANOVA and repeated measures ANOVA along with Bonferroni post hoc analysis.

#### 4. Result and Discussion

S/Z ratio among alimiah were analysed by comparing the /s/ value to the /z/ value and the results are discussed below.

##### 4.1 Table

**Table shows the S/Z ratio among Alimiah**

	Frequency	Percent	Binomial test p value
Abnormal	25	41.7	0.000, HS
Normal	5	8.3	
Total	30	50	

HS-Highly significant

Above table shows the /s/ to /z/ ratio among alimiah. Alimiah showed an abnormality in the phonation of /s/ and /z/ which resembling a high significant difference. 8.3% displayed a typical result for the /s/ to /z/ ratio, while 41.7% displayed an abnormal ratio.

#### 4.2 Discussion

The aim of the current study was to find the /S///Z/ ratio among Alimiah to rule out the possibility of vocal issues because they utilize their voices more frequently on a daily basis. The study included total of 30 alimiah. The result from the current study suggested that most of the alimiah showed the s/z ratio with greater than 1, indicating the risk of developing voice problems and they show limited knowledge about vocal problems. The result of the current study is in accordance with the Indian study among Alimiah course pursuing students (Jayakumar et al. 2021) and western study among female teachers (Krishna et al, 2022).

#### 5. Summary and Conclusion

s/z ratio is a standard, simple and reliable clinical method of evaluating vocal function. (Gelfer, 2006). Thiry young female adult alimiah were included in this study, participants were made to produce /s/ and /z/. The result from the current study suggests that alimiah showed longer s/z ratio duration, which shows that they either have voice issues or are at risk of acquiring.

##### Limitation of the Study

- Study was done of limited population
- Focused only on Alimiah from specific areas

##### Future Implications

- Can increase the sample size
- Can be focused on other states

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