# Voice Disorders Among Teachers in Al-Ahsa, Eastern Region, KSA: Vocal Complaints, Treatment-Seeking Behaviors, and Knowledge of Vocal Care

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**Summary: Background.** Voice disorders are a serious and common complaint among teachers, yet there are no published studies on these conditions in the context of Al-Ahsa city in the eastern region of the Kingdom of Saudi Arabia. This study analyzed the vocal complaints of Saudi teachers, investigated their treatment-seeking behaviors, and assessed their knowledge of vocal care.

**Methods.** A cross−sectional online survey was randomly distributed to 604 Saudi teachers from December 2021 to March 2022. The data included sociodemographic characteristics, academic statuses, vocal symptoms and their effects, and attitudes toward voice problems. Statistical analysis was done using the Statistical Package for the Social Sciences (v. 23). Categorical variables were expressed as frequencies and percentages. A chi-square test was conducted to verify the association between the categorical variables.

**Results.** Of the participants, 62.1% were female. 65.4% reported having voice-related problems, with the most frequently reported symptoms being hoarseness (68.35%), throat dryness (60.76%), and sore throat (56.46%). Out of the participants who reported voice problems, 32.15% stated being affected by absenteeism from school. Only a minority of teachers sought medical help (5.1%) or received information about the vocal care (29.5%). The factors that were found to be significantly associated with voice complaints include female gender, positive family history of vocal disorders, speaking in a loud voice, being non-smoker, and having the high number of classes per week ($P < 0.05$).

**Conclusion.** Voice-related complaints were highly prevalent among Saudi teachers for multiple factors, most of which were manageable. This study strongly recommends the vocal educational programs to be implemented during student teacher training.

**Key Words:** Teachers−Voice disorders−Al-Aahsa region−Vocal care.

## INTRODUCTION

Voice disorders (VDs) are defined as changes in health that affect the size, shape, organic state, or motor control of the vocal tract, which alter its acoustic output.[1] The common presentations of VDs are hoarseness, throat pain, and vocal fatigue.[2,3] Teachers are at a high risk of developing VDs compared with other professionals who capitalize on their voices in their work, including singers, call center operators, and broadcasters, because they use their voices as the main tool for carrying out their duties.[1,3−5] A study in Goa reported that 50% of the participating teachers were complaining of voice problems characterized by hoarseness, vocal fatigue, and effortful production.[4] VDs considerably affect the quality of teaching and job performance of educators, and these disorders diminish their ability to communicate with students, thereby negatively influencing students' performance.[2,3,5,6] Various risk factors for the condition have been identified, such as long teaching hours, years in the occupation, stressful environments, and family history of vocal problems. Other social and personal risk factors include age, gender, allergies, and smoking.[2,3,7,8]

A study in Dammam reported that hoarseness among educators occurs to a greater extent in public schools than in private schools.[2] Another study in Riyadh reported that female teachers develop voice problems about four times more frequently than their male counterparts. Additionally, teachers who speak loudly were found to be at a significantly higher risk of developing voice problems.[7] Therefore, it is extremely important to diagnose and treat VDs early to help teachers maintain a healthy voice and prevent complications.[3,7] Research in Goa revealed that 71.42% of teachers are aware that they suffer from voice problems and attribute this issue to their profession.[4] This problem highlights the need to raise awareness of the significance and consequences of VDs. Although similar studies were conducted previously in Saudi Arabia, no explorations have been devoted to this issue in the context of Al-Ahsa in the eastern region of Saudi Arabia. Correspondingly, the current work analyzed the vocal complaints of Saudi teachers in the aforementioned region, investigated their treatment-seeking behaviors, and assessed their knowledge of vocal care.

## METHODS

### Study type

A community-based retrospective cross-sectional study was conducted in Al-Ahsa, Eastern Province, Saudi Arabia from December 2021 to March 2022.

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### Population and sample size

The target population was all teachers working in Al-Ahsa City's public and private schools. The inclusion criteria were teachers who were working at the time of the study and were residents of Al-Ahsa. Retired teachers, kindergarten teachers, and teachers residing outside the study region were excluded from the recruitment. A minimum sample of 377 teachers was required, as calculated using Raosoft at a 95% level of confidence and a 5% margin of error.

### Data collection

Questions were adapted from a questionnaire used in a study by Malki conducted in Riyadh city, and other questions were formulated on the basis of the current author's experience.[7] Minor modifications were made to make the survey fit the study sample. The final questionnaire contained five main categories including the demographic data and the living circumstances, the teaching circumstances, the presence of vocal symptoms and their effects on teachers, teachers' behaviors toward seeking medical help, and vocal hygiene. At the beginning of the survey, a brief description of the purpose of the study was stated, and a question to take consent for participation was added. Then, the first section included a question regarding working status, questions about nationality, residency, gender, age group, marital status, the number of children, and smoking status, and finally questions about vocal habits, family history of vocal disorders, and activities other than teaching that depends heavily on voice. The second section included questions in regard of experience in teaching by years, sector of school, educational level of teaching, teaching subject, students per class, and working hours per week. The third section started with a screening question about whether the participant have experienced any vocal symptoms during their teaching career. Then, more detailed questions about what symptoms they have experienced and whether they had any co-existing disorders that might affect the voice like asthma, upper respiratory tract infection, rhinosinusitis, chronic cough, and GERD were asked. Questions about the effect of vocal symptoms were also asked in this section. In the final section, questions about whether the respondent sought medical help or not, the reason behind not seeking medical help if refrained from that, the methods used to take care of their voice, and the willingness of the participant to attend educational courses about the vocal training & care were asked.

All questions were translated into Arabic, which is the primary language of the sample. After that the questionnaire was electronically distributed to the community in a Google Forms link via the different platforms of social media. It is estimated that at least 3–4 minutes is required to fill the form. The questionnaire got distributed among nearly 19197 teachers working in Al-Ahsaa City. Out of which 690 responses were received. Finally, 604 responses were included, and 86 responses got excluded according to the stated criteria.

### Statistical analyses

Data analysis was performed using the Statistical Package for the Social Sciences (version 23). Categorical variables were expressed as frequencies and percentages. A chi-square test was conducted to verify the association between the categorical variables. The level of significance was set at 0.05.

## RESULTS

Total of 690 responses were received in this study. Then 86 participants were excluded, and 604 participants were included. Table 1 shows the sociodemographic profile of the participants. Most of the participants (55.6%) were between 41–50 years of age. As for gender, female constituted 62.1% of our sample. Regarding nationality, 599 participants (99.2%) were Saudi. In terms of marital status, 560 (92.7%) were married. Concerning the numbers of the offspring, 84 participants (13.9%) did not have children, 195 (32.3%) had 1–3 children, and 325 (53.8%) had more than 3 children. Forty-four (7.3%) of the participants were smokers, and 560 (92.7%) were not smokers.

Table 2 displays the participants' voice use and their academic profile. 315 participants (52.2%) reported that they often speak with loud voices in their work or daily life activities. 138 (22.8%) reported family history of vocal complaints / disorders. 159 (26.3%) reported engaging in activities other than teaching that depend primarily on using the voice. As for the participants' academic profile, 101 participants (16.7%) had less than 10 years of teaching experience, 265 (43.9%) had 10–20 years of teaching experience, and 238 (39.4%) had more than 20 years of teaching experience. In terms of their school sectors, the vast majority of

**TABLE 1.**
**Socio-Demographic Profile of The Participants (n = 604)**

| Demographical Charactaristics | n | % |
|---|---|---|
| Age | | |
| 21–30 years | 30 | 5.00 |
| 31–40 years | 173 | 28.60 |
| 41–50 years | 336 | 55.60 |
| 51–60 years | 65 | 10.80 |
| Gender | | |
| Male | 229 | 37.90 |
| Female | 375 | 62.10 |
| Nationality | | |
| Saudi | 599 | 99.20 |
| Non-Saudi | 5 | 0.80 |
| Marital Status | | |
| Single | 44 | 7.30 |
| Married | 560 | 92.70 |
| Number of offspring | | |
| Do not have children | 84 | 13.90 |
| 1–3 offspring | 195 | 32.30 |
| More than 3 offspring | 325 | 53.80 |
| Do you smoke? | | |
| Yes | 44 | 7.30 |
| No | 560 | 92.70 |

**TABLE 2.**
**Voice Use and Academic Profile (n = 604)**

| Question | n | % |
|---|---|---|
| Voice Use Profile | | |
| Do you often speak with loud voice in your work environment or during daily life activities? | | |
| Yes | 315 | 52.2 |
| No | 289 | 47.8 |
| Have your parents or siblings ever had vocal complains/disorders before? | | |
| Yes | 138 | 22.8 |
| No | 466 | 77.2 |
| Besides teaching, do you practice activities that depends primarily on using your voice? | | |
| Yes | 159 | 26.3 |
| No | 445 | 73.7 |
| Academic Profile | | |
| Years of experience as a teacher | | |
| Less than 10 years | 101 | 16.7 |
| 10–20 years | 265 | 43.9 |
| More than 20 years | 238 | 39.4 |
| School Sector | | |
| Private | 570 | 94.40 |
| Governmental | 34 | 5.60 |
| Which school grade do you teach? | | |
| Primary | 289 | 47.8 |
| Intermediate | 142 | 23.5 |
| High school | 173 | 28.6 |
| Number of students per class: | | |
| Less than 20 students | 70 | 11.6 |
| 20–30 students | 271 | 44.9 |
| More than 30 students | 263 | 43.5 |
| Number of classes per week: | | |
| Less than 10 classes | 28 | 4.6 |
| 10–20 classes | 300 | 49.7 |
| More than 20 classes | 276 | 45.7 |

participants (94.4%) were working in private schools. 289 participants (47.8%) were primary school teachers, 142 (23.5%) were intermediate school teachers, and 173 (28.6%) were high school teachers. Regarding the number of students per class, 70 participants (11.6%) reported having less than 20 students per class in their school, 271 (44.9%) reported having 20–30 students per class, and 263 (43.5%) reported having more than 30 students per class. Regarding the number of classes per week, 28 participants (4.6%) had fewer than 10 classes per week, 300 (49.7%) had 10–20 classes per week, and 276 (45.7%) had more than 20 classes.

Figure 1 presents the participants' responses to the following question: What subjects do you teach? The most common subject taught by the participating teachers was Arabic (190 teachers, 31.5%), followed by mathematics (142 teachers, 23.5%), science including biology, chemistry, and physics (140 teachers, 23.2%), and Islamic studies (128 teachers, 21.2%). The least common subjects among the participating teachers were art education (92 teachers; 4.6%), social science (35 teachers; 5.8%), and English language (65 teachers; 10.8%).

Figure 2 presents the frequency of medical conditions that can affect the voice. 267 participants (44.2%) did not have any condition that could influence the voice, 240 (39.7%) had nasal allergies, 80 (13.2%) had repeated the upper respiratory tract infections, 74 (12.3%) had heartburn, 73 (12.1%) had chronic coughs, and 28 (4.6%) had asthma.

Figure 3 illustrates the occupation–lifetime prevalence of voice problems among teachers. 395 participants (65.4%) reported having a history of voice problems during their occupation life.

Table 3 shows the profile of voice problems among the teachers. The most commonly experienced symptoms of the

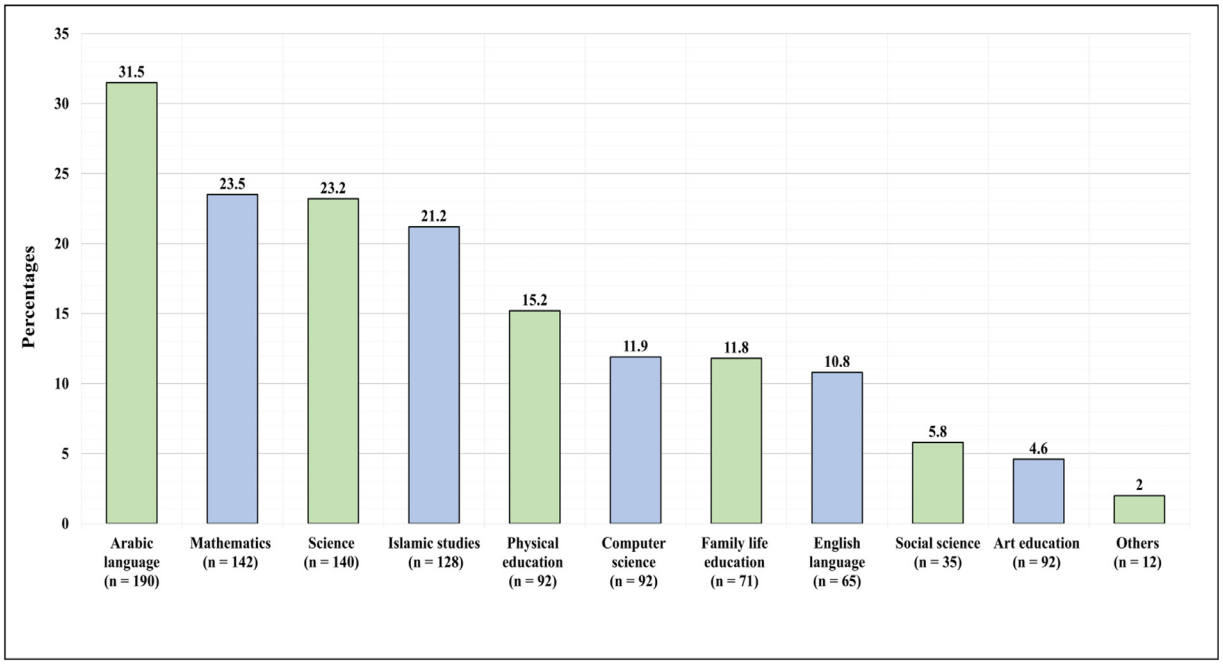


**FIGURE 1.** Participants' response towards what subject do you teach?

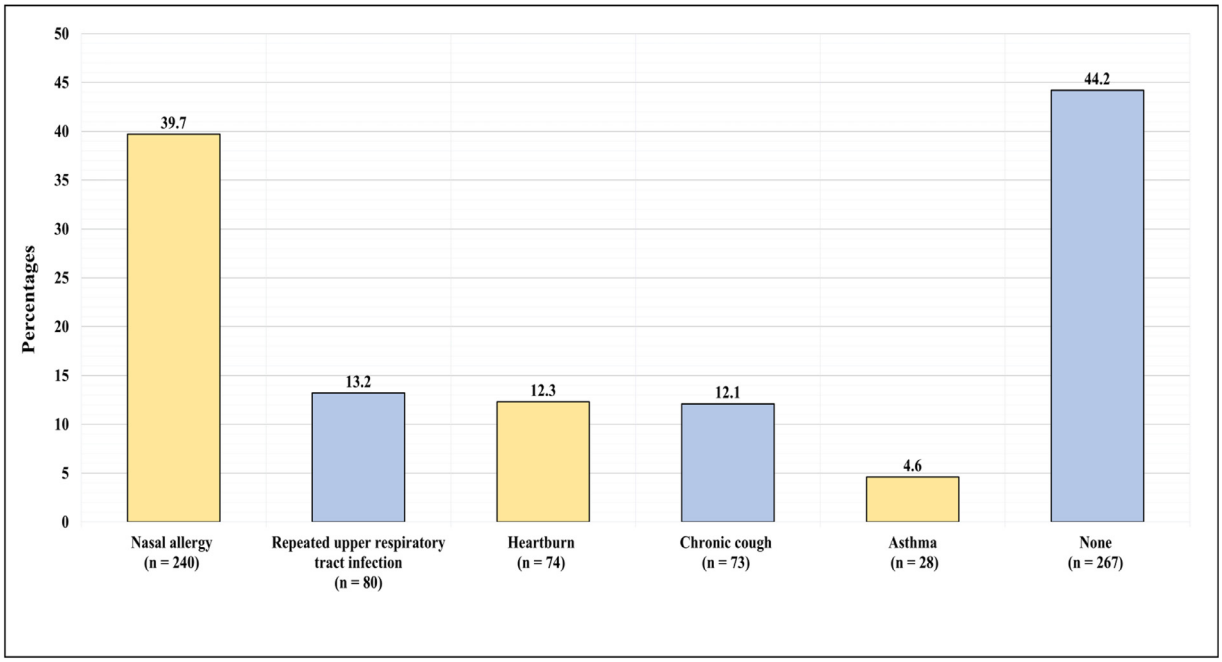


**FIGURE 2.** Do you develop any of the following medical conditions in frequent manner?

participants' voice problems were the following: hoarseness, which was reported by 270 participants (68.35%); throat dryness, which was reported by 240 (60.76%); and sore throat, which was reported by 223 (56.46%). As for the voice problems' effects on the participants, 127 participants (32.15%) reported that they were affected by absenteeism from school because of vocal complaints, 69 (17.47%) reported that they considered quitting teaching because of vocal issues, 199 (50.38%) reported that they were affected in other ways, and only 24 (6.08%) reported that they were unaffected. Regarding the 127 participants who reported missing workdays because of voice problems, 69 (54.3%) reported missing one day, 47 (37%) reported missing less than 1 week, 7 (5.5%) reported missing a week, and 4 (3.1%) reported missing more than a week. 176 participants (44.6%) reported that their vocal symptoms imposed

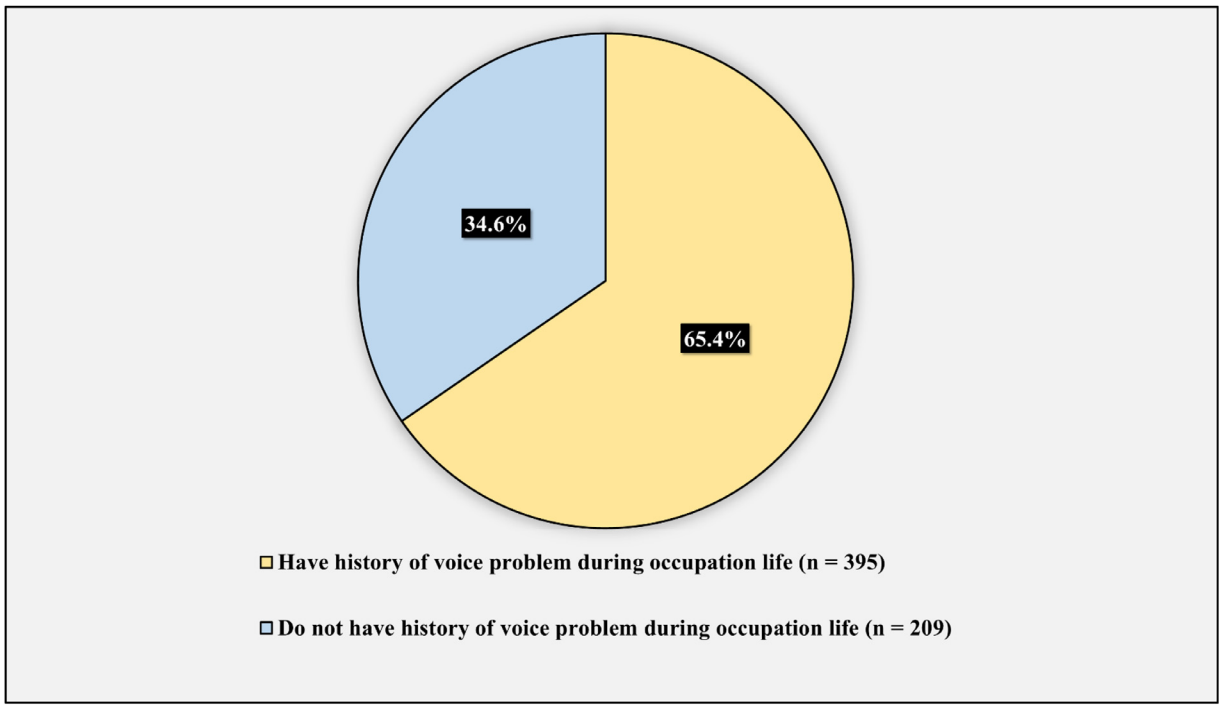


**FIGURE 3.** Occupation-Life-time prevalence of voice problems Among Teachers.

**TABLE 3.**
**Profile of Voice Problems Among Teachers**

| Question | n | % |
|---|---|---|
| Which of the following symptoms did you complain of when you had the voice problems? (More than one answer can be chosen) (n = 395) | | |
| Hoarseness | 270 | 68.35 |
| Throat dryness | 240 | 60.76 |
| Sore throat | 223 | 56.46 |
| Frequent throat clearing. | 175 | 44.30 |
| Difficulty breathing | 89 | 22.53 |
| Globus sensation | 86 | 21.77 |
| Difficult speaking | 73 | 18.48 |
| Difficulty swallowing | 73 | 18.48 |
| Sudden suffocation | 52 | 13.16 |
| How have your vocal symptoms affected your occupational life? (More than one answer can be chosen) (n = 395) | | |
| Absenteeism from school because of vocal complains | 127 | 32.15 |
| I Considered quitting teaching because of vocal issues | 69 | 17.47 |
| It had no effect on me | 24 | 6.08 |
| I was affected in ways other than the mentioned | 199 | 50.38 |
| If you ever missed workdays because of vocal complains, what is the approximate duration of that? (n = 127) | | |
| One day | 69 | 54.3 |
| Less than 1 week | 47 | 37 |
| One week | 7 | 5.5 |
| More than a week | 4 | 3.1 |
| Did your vocal symptoms impose restrictions by any mean on your daily life activities? (n = 395) | | |
| Yes | 176 | 44.6 |
| No | 219 | 55.4 |
| Have you ever sought medical help because of your vocal symptoms? (n = 395) | | |
| No, and my vocal symptoms have been deteriorating. | 143 | 36.2 |
| No, but my vocal symptoms have not been deteriorating. | 232 | 58.7 |
| Yes | 20 | 5.1 |
| If you did not seek medical help, what were the reasons? (n = 375) | | |
| I do not have enough time | 73 | 19.47 |
| I do not believe it is serious issue that requires medical attention | 174 | 46.40 |
| I do not know how and where to seek medical help | 22 | 5.87 |
| Others | 143 | 38.13 |
| Have you practiced any of the following methods for the purpose of taking care of your voice or in an attempt to relieve your vocal symptoms: (n = 395) | | |
| Increasing fluid intake | 285 | 72.2 |
| Avoidance of screaming/shouting as possible | 269 | 68.1 |
| Avoidance of talking in noisy environment | 118 | 29.9 |
| Use of voice amplifiers such as microphones | 76 | 19.2 |
| Overall Participants Willingness to Learn about Vocal Training and Care | | |
| If available, are you willing to attend educational courses about vocal training & vocal care for teachers during practicing teaching? (n = 609) | | |
| Yes | 421 | 69.7 |
| No | 183 | 30.3 |

restrictions on their daily life activities. As for medical-help-seeking behavior, 143 participants (36.2%) reported that they had not sought medical help, and their vocal symptoms had been deteriorating; 232 (58.7%) reported that they had not sought medical help, but their vocal symptoms had not been deteriorating; and only 20 (5.1%) reported seeking medical help.

When the 375 participants affected with voice problems were asked about the reasons behind not seeking medical help, 73 (19.47%) reported that they did not have enough time, 174 (46.4%) reported that they believed it was not a serious issue that needed medical attention, 22 (5.78%) reported that they did not know how or where to seek medical help, and 143 (38.13%) reported that they had other

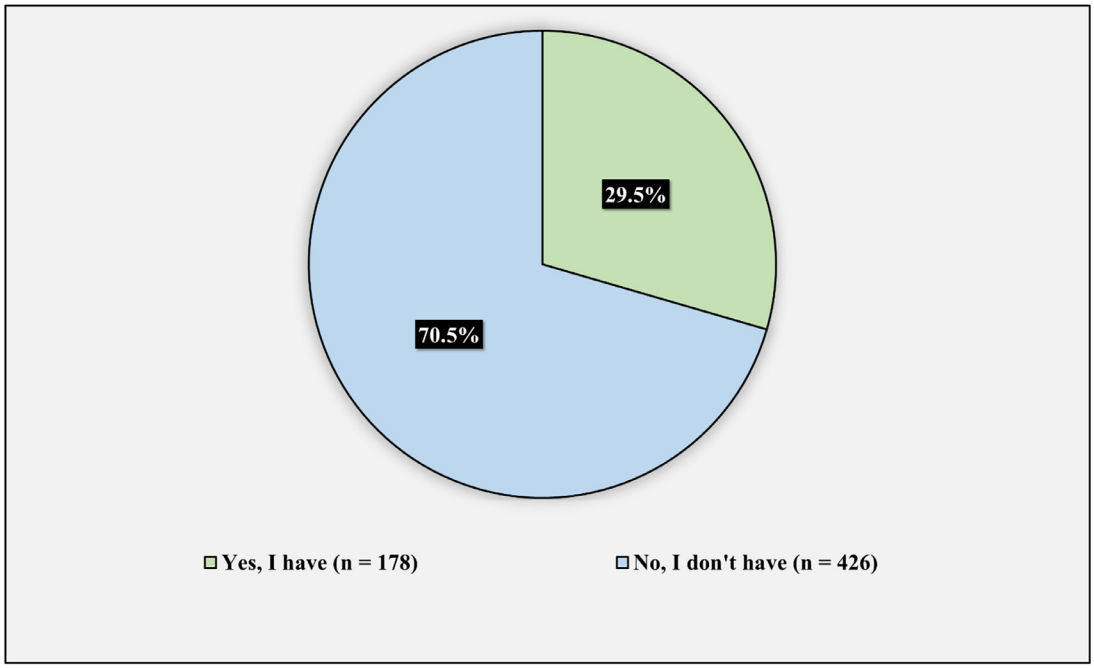


**FIGURE 4.** Have you ever received information in regard of vocal care?

reasons. As for the vocal care practices the participants had followed during their illnesses, 285 (72.2%) reported increasing fluid intake; 269 (68.1%) reported avoiding screaming and shouting when possible; 118 (29.9%) reported avoiding talking in noisy environments; and 76 (19.2%) reported using voice amplifiers, such as microphones. Regarding the participants' overall willingness to learn about the vocal training and care, 421 (69.7%) reported that they were willing to take a course about the vocal training and care.

Figure 4 presents the participants' awareness about the vocal care. Only 178 participants (29.5%) reported having previously received information about the vocal care.

Figure 5 presents the sources of information regarding vocal cord care among the participants who reported being previously aware of vocal care. The most commonly reported sources were the following: internet networks, reported by 119 participants (66.85%); family and friends, reported by 110 participants (61.8%); and doctors seen during previous visits for vocal cord issues, reported by 86 participants (48.31%).

Table 4A demonstrates the factors associated with occupation-lifetime prevalence of voice problems using chi-squared test. Gender was significantly associated with the occupation-lifetime prevalence of voice problems

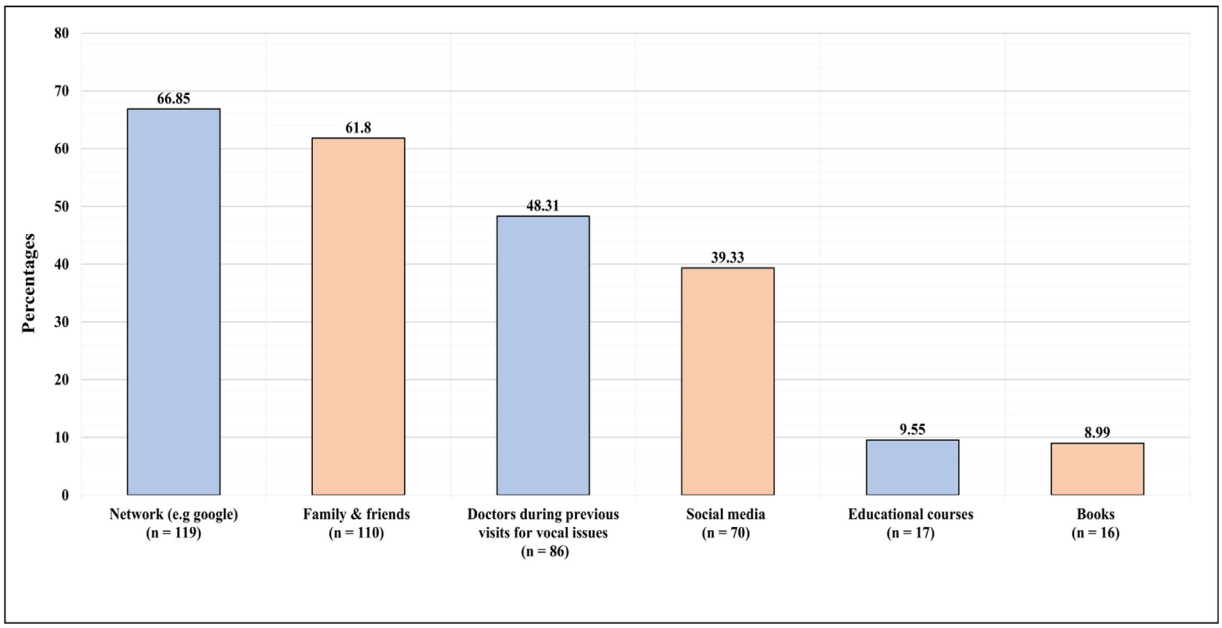


**FIGURE 5.** Participants' source of information towards vocal cord care.

**TABLE 4A.**
**Factors Associated with Occupation-Life-Time Prevalence of Voice Problems**

| Factor | Occupation-Life-Time Prevalence of Voice Problems Among Teachers | | *P*-Value |
|---|---|---|---|
| | Yes | No | |
| Age | | | 0.441 |
| 21–30 years | 16 (53.3%) | 14 (46.7%) | |
| 31–40 years | 110 (63.6%) | 63 (36.4%) | |
| 41–50 years | 225 (67%) | 111 (33%) | |
| 51–60 years | 44 (67.7%) | 21 (32.3%) | |
| Gender | | | < 0.001* |
| Male | 121 (52.8%) | 108 (47.2%) | |
| Female | 274 (73.1%) | 101 (26.9%) | |
| Marital status | | | 0.687 |
| Single | 30 (68.2%) | 14 (31.8%) | |
| Married | 365 (65.2%) | 195 (34.8%) | |
| Number of offspring | | | 0.995 |
| 0 | 55 (65.5%) | 29 (34.5%) | |
| 1–3 offspring | 128 (65.6%) | 67 (34.4%) | |
| More than 3 offspring | 212 (65.2%) | 113 (34.8%) | |
| Do you smoke? | | | < 0.001* |
| Yes | 18 (40.9%) | 26 (59.1%) | |
| No | 377 (67.3%) | 183 (32.7%) | |
| Do you often speak with loud voice in your work environment or during daily life activities? | | | < 0.001* |
| Yes | 241 (76.5%) | 74 (23.5%) | |
| No | 154 (53.3%) | 135 (46.7%) | |
| Have your parents or siblings ever had vocal complains/disorders before? | | | 0.001* |
| Yes | 106 (76.8%) | 32 (23.2%) | |
| No | 289 (62%) | 117 (38%) | |
| Beside teaching, do you practice activities that depends primarily on using your voice? | | | 0.119 |
| Yes | 112 (70.4%) | 47 (29.6%) | |
| No | 283 (63.6%) | 162 (36.4%) | |
| Years of experience as a teacher | | | 0.327 |
| Less than 10 years | 61 (60.4%) | 40 (39.6%) | |
| 10–20 years | 181 (68.3%) | 84 (31.7%) | |
| More than 20 years | 153 (64.3%) | 85 (35.7%) | |
| School Sector | | | 0.512 |
| Private | 371 (65.1%) | 199 (34.9%) | |
| Governmental | 24 (70.6%) | 10 (29.4%) | |
| Which school grade do you teach? | | | 0.407 |
| Primary | 190 (65.7%) | 99 (34.3%) | |
| Intermediate | 98 (69%) | 44 (31%) | |
| High school | 107 (61.8%) | 66 (38.2%) | |
| Number of students per class: | | | 0.678 |
| Less than 20 students | 40 (57.1%) | 30 (42.9%) | |
| 20–30 students | 167 (61.8%) | 104 (38.4%) | |
| More than 30 students | 188 (71.5%) | 75 (28.5%) | |
| Number of classes per week: | | | 0.001* |
| Less than 10 classes | 11 (39.3%) | 17 (60.7%) | |
| 10–20 classes | 186 (62%) | 114 (38%) | |
| More than 20 classes | 198 (71.1%) | 78 (28.3%) | |

*Notes:* The used test was chi-squared test.
* Significant at level 0.05.

($P < 0.001$), where it was observed that females had a notably higher rate of occupation-lifetime prevalence of voice problems than males (73.1% vs. 52.8%). Smoking was also significantly associated with occupation-lifetime prevalence of voice problems ($P < 0.001$), where it was observed that nonsmokers had a notably higher rate of occupation-lifetime prevalence of voice problems than smokers (67.3% vs. 40.9%). Speaking often with a loud voice was also significantly associated with the occupation-lifetime prevalence of voice problems ($P < 0.001$), where it was observed that

**TABLE 4B.**
**Teaching Subjects Associated with Occupation-Life-Time Prevalence of Voice Problems**

| Factor | Occupation-Life-Time Prevalence of Voice Problems Among Teachers | | P-Value |
|---|---|---|---|
| | Yes | No | |
| Arabic language | | | 0.678 |
| Yes | 122 (64.2%) | 68 (35.8%) | |
| No | 273 (65.9%) | 141 (34.1%) | |
| Islamic studies | | | 0.003* |
| Yes | 98 (76.6%) | 30 (23.4%) | |
| No | 297 (62.4%) | 179 (37.9%) | |
| Mathematics | | | 0.527 |
| Yes | 96 (67.6%) | 46 (32.4%) | |
| No | 299 (64.7%) | 163 (35.3%) | |
| Social science | | | 0.001* |
| Yes | 14 (40%) | 21 (60%) | |
| No | 381 (67%) | 188 (33%) | |
| Science | | | 0.034* |
| Yes | 102 (72.9%) | 38 (27.1%) | |
| No | 293 (63.1%) | 171 (36.9%) | |
| English language | | | 0.892 |
| Yes | 43 (66.2%) | 22 (33.8%) | |
| No | 352 (65.3%) | 187 (34.7%) | |
| Family life education | | | 0.704 |
| Yes | 45 (63.4%) | 26 (36.6%) | |
| No | 350 (65.7%) | 183 (34.3%) | |
| Art education | | | 0.843 |
| Yes | 61 (66.3%) | 31 (33.7%) | |
| No | 334 (65.2%) | 178 (34.8%) | |
| Physical education | | | 0.195 |
| Yes | 52 (72.2%) | 20 (27.8%) | |
| No | 343 (64.5%) | 189 (35.5%) | |
| Computer science & information technology | | | 0.347 |
| Yes | 16 (57.1%) | 12 (42.9%) | |
| No | 379 (65.8%) | 197 (34.2%) | |

*Notes:* The used test was chi-squared test.
* Significant at level 0.05.

those who reported speaking often with a loud voice had a notably higher rate of occupation-lifetime prevalence of voice problems than those who did not (76.5% vs. 53.3%). Family history of voice problems was also significantly associated with the occupation-lifetime prevalence of voice problems ($P = 0.001$), where it was observed that those who reported a positive family history had a notably higher rate of occupation-lifetime prevalence of voice problems than those who did not (76.8% vs. 62%). The number of classes per week was also significantly associated with the occupation-lifetime prevalence of voice problems ($P = 0.001$), where it was observed that the higher the number of classes, the higher the rate of occupation-lifetime prevalence of voice problems. Age, marital status, number of offspring, having other activities besides teaching that depend on voice, years of experience, school sector, school grade, and the number of students per class were not significantly associated with the occupation-lifetime prevalence of voice problems.

Table 4B illustrates the teaching subjects associated with occupation-lifetime prevalence of voice problems using chi-squared test. Teachers of the following subjects had a significantly higher rate of occupation-lifetime prevalence of voice problems than teachers of other subjects: Islamic studies ($P = 0.003$) and science ($P = 0.034$). Teachers of social science had a significantly lower rate of occupation-lifetime prevalence of voice problems than teachers of other subjects ($P = 0.001$).

## DISCUSSION

This study describes the attitudes of teachers regarding voice-related absenteeism, treatment-seeking behavior, and knowledge of vocal care. The purpose of this study was to analyze the vocal complaints of Saudi teachers in the eastern region, investigate their treatment-seeking behaviors, and assess their knowledge of vocal care. In many occupations, the voice is regarded as a high-level communication tool with the substantial value. Even though most research on professional voice users lists teachers as a high-risk occupational group for developing voice disorders, the incidence of voice problems among teachers remains variable. Teaching is an occupation that relies heavily on the voice as the primary means of communication. Any voice disorder has a variety of effects on a teacher's work. The extent of voice needs varies greatly within the profession.[9] In our study, which had a sample size of 604 participants, 395 (65%) reported having a history of voice problems during their occupational lives. Similar percentages were identified in the literature.[10–15] This relatively high prevalence of vocal complaints can be attributed to the facts that teachers go through intensive and prolonged occupational voice use, may need to speak in noisy background, and possibly have poor phonation skills, all of which predispose them to develop vocal edema, polyps, nodules, and even aphonia, eventually resulting in higher rates of vocal complaints compared to their counterparts with non-vocal occupations. Vocal dysfunction results in poor teaching quality, increased absenteeism from school, and substantial financial costs. Individual teachers may experience severe personal and emotional consequences because of their actions.[10,11,16,17]

In terms of gender differences, we found that females reported a significantly higher rate of occupational-lifetime prevalence of voice problems; 73.1 percent of the female participants but only 52.8 percent of the male participants had a history of voice problems. This finding matches that of Pekkarinen et al. and Smith et al., who reported a higher prevalence of voice disorders among female teachers.[16,18] Female hormonal influence on the vocal characteristics, female glottic structure encouraging glottic bowing, higher levels of hyaluronic acid in the superficial layers of the lamina propria, and the incidence of endocrinological illnesses

could all be factors contributing to the higher prevalence of vocal complaints among female teachers.[19–21] The finding of the study is contrary to that of the study of Malki et al., which involved more male participants; the results showed a higher prevalence of voice disorders among male teachers.[7] We believe that more research is needed to fully understand this gender disparity.

Vocal function may decline further as age progresses.[22,23] These effects were not apparent in our population, as there was no significant disparity between teachers with the positive voice complaints and teachers with the negative voice complaints by age group, irrespective of the fact that our sample size was adequate. These findings are consistent with those of Chen et al.[24] In contrast, Roy et al.,[14] Smith et al.,[11] and Russell et al.[10] observed a higher prevalence of voice problems in teachers aged 50 and older in their studies of American and Australian teachers. This suggests that more research is needed to determine the impact of age on teacher voice quality.

In our study, smoking was also found to be significantly associated with the occupation-lifetime prevalence of voice problems, with nonsmokers surprisingly reporting a significantly greater rate of f voice problems than smokers (67.3% and 40.9%, respectively). Considering the fact that smoking is prevalent among as high as 22.37% of the population of the Eastern region of Saudi Arabia,[25] this unexpected result might partly be explained by the smaller sample size of smokers compared to the sample size of nonsmokers (7.3% and 92.7%, respectively), which possibly have yielded a biased result. Additional possible reason behind vocal complaints being less prevalent among smokers is that smokers have their larynx chronically irritated, and therefore they may fail to adequately report their voice problems when asked.[26] Finally, according to Roy et al. and Miller et al., this finding could also be explained by the fact that teachers are assumed to smoke much less than the overall population, which minimize the negative impact of smoking on vocal cords.[27,28] Anyhow, this finding suggests the need of further study to determine the exact association between smoking and the occurrence of voice disorders.

A total of 315 teachers said they used loud voices at work or in their daily lives, with 76.5 percent of them saying they had voice problems. Of the 138 teachers who had a family member with the voice problems, 76.8 reported similar complaints, indicating a familial tendency. According to the present study's findings, teachers with a family history of voice difficulties are more likely to acquire vocal abnormalities. This finding is consistent with the results of studies that support the presence of a higher risk of developing voice problems in teachers with a positive family history. It is indeed probable that genetics generally leads to vocal fold cellular injury, which can manifest as voice problems if associated with a vocally demanding occupation; a study by Roy et al.12 revealed similar findings. Nonetheless, it is unclear if and to what extent one factor has a greater influence than the others.

Although years of teaching experience has been traditionally considered to have a role in causing voice dysfunction, it was not shown to have a role in our study. Several studies have suggested that the more years of experience in teaching, the more cellular damage, according to Sapir et al. and Smith et al.[17,29] On the other hand, a study done by Mjaavatn et al. reported that younger teachers with fewer years of experience are more prone to voice problems due to the lack of proper knowledge of hygiene and prolonged working hours.[30]

The number of classes per week was also linked to the occupation-lifetime prevalence of voice problems, with the higher the number of classes, the higher the incidence of such voice problems. A similar finding was observed in a study done in Riyadh City by Malki et al.[7] Another study found that a high number of overcrowded classrooms and the excessive noise, with loudness settings ranging from 58 to 90.5 decibels, are unquestionably risk factors for the development of dysphonia in teachers.[31] In such conditions, it is recommended that teachers utilize voice amplifiers to boost their voice intensity, as suggested in a prior study.[32]

In our study, the most common vocal complaints reported by participants were hoarseness, throat dryness, and sore throats. These findings are in consistency with the study of Nerrière et al. who found similar findings.[33] In term of how vocal complaints influenced our participants, about one third (32.15%) said they got affected by having to stay home and miss workdays. Such results are in agreement with the studies of Russell et al., Sapir et al., and Smith et al. who reported findings similar to ours.[7,10,11] This is indeed a concrete example of to what extent voice problems can influence teachers.

In terms of medical-help-seeking behavior, only 5.1% of participants said they had sought medical treatment. This supports the hypothesis of Roy et al. who stated that teachers were hesitant to take time off from the work for medical appointments because they were afraid of their physicians advising them to either minimize using their voices or to change careers.[14] However, our findings are inconsistent with the study of Houtte et al. who found that more than half of Belgian teachers with voice problems had sought medical consultation. This was attributed to the increased awareness of voice care among Belgian teachers & the organization of healthcare system in Belgium.[34]

Given the results of this study, we highly recommend initiating prompt actions against the factors significantly associated with the vocal complaints in an attempt to minimize their effect. Changes in school type, years of teaching, and other variables are difficult, if not impossible, to implement. Therefore, implementation of educational programs that aim to increase the awareness of vocal care and proper vocal methods, as well as structured approach that focuses on early detection and appropriate treatment of voice disorders should be considered instead.[5,28,35]

## LIMITATIONS

There are limitations in our study that can be avoided in future research. Firstly, the data collection was done using a

self-administered survey disseminated through the different platforms of social media to reach a larger sample size. This might have yielded less accurate results as respondents asked to fill the survey electronically usually fill it in hurry and do not take it seriously in comparison to when asked in person. Secondly, the survey had to be translated to Arabic for data collection. This might have led to a communication gap.

## CONCLUSION

In our study, the prevalence of voice problems among teachers in Al-Ahsaa City was found to be 65%. Many factors were found to be significantly associated with the voice complaints including being female, having positive family history of vocal disorders, speaking with a loud voice, being nonsmoker, and having high number of classes per weak. On the contrary, age, marital status, the number of offspring, having other activities besides teaching that depend heavily on voice, years of experience, school sector, school grade, and the number of students per class were not observed to be significantly associated with the vocal complaints.

Given the fact that only a minority of teachers were found to have asked for medical help or have received information about vocal care (5.1% & 29.5% respectively), we highly recommend implementing educational programs aiming to increase the awareness of vocal care & proper vocal methods among teachers, and structured approaches focusing on early detection and treatment of vocal disorders in Al-Ahsaa city of Saudi Arabia.

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## ETHICAL CONSIDERATION

The study was approved by the institutional review board of King Faisal University, Al Ahsa, Saudi Arabia. All participants were volunteers and asked to do their best. All data were kept confidential and used only for research purposes.

## DATA AVAILABILITY STATEMENT

The study data is available from the corresponding author on reasonable request.

## DECLARATION OF COMPETING INTEREST

The authors declare that they have no conflict of interest.

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Dr. Abdullah AlArfaj and Dr. Khalid Alyahya conceptualized and designed the study, critically revised the manuscript for key intellectual content, and approved the final version to be submitted. Bayan Alshuhayb carried out the literature review, proposal writing, contributed to the study design and methodology, drafted the manuscript, and handled the manuscript publication. Fatimah Alkhars conducted the literature review and wrote the introduction. Zainab Alamer was responsible for the study design, methodology, and literature review. Abdullah Alkhars performed the data acquisition, analysis, and interpretation. Maitha Almaghlouth carried out the literature review and wrote the discussion. All authors were responsible for data collection as well as for criticizing and reviewing the article.

## SUPPLEMENTARY DATA

Supplementary data related to this article can be found online at doi:10.1016/j.jvoice.2022.07.001.

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