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Auditory-Perceptual Voice Quality, Self-Perceived Voice Handicap and Vocal Fatigue in Street Vendors

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Abstract

Objective: In rural labour sectors, individuals who rely heavily on their voices—such as street vendors—are at increased risk of developing voice disorders due to prolonged voice use in noisy environments. Understanding their vocal health needs is essential for developing targeted voice therapy interventions within rural rehabilitation frameworks. This study investigates the auditory-perceptual voice quality, self-perceived voice handicap, and vocal fatigue among street vendors in the Cappadocia region, Türkiye.

Material and Methods: A descriptive, cross-sectional study was conducted with 30 street vendors. Data collection involved the GRBAS scale for perceptual voice evaluation, the Turkish versions of the Voice Handicap Index-10 (VHI-10-TR), and the Vocal Fatigue Index (VFI-TR). Non-parametric tests were used for the statistical analysis.

Results: Voice problems were reported by 40% of the participants. Significant differences were observed in the GRBAS scores, with higher impairments in grade, breathiness, asthenia, and strain among those with voice problems. Participants with voice issues also scored significantly higher on the VHI-10-TR and VFI-TR, indicating a greater voice-related handicap and vocal fatigue. A moderate positive correlation was found between the VHI-10-TR and VFI-TR scores.

Conclusion: Street vendors in Cappadocia face significant vocal challenges due to occupational voice use, with notable impacts on perceptual voice quality, vocal fatigue, and quality of life. Preventive measures, including vocal health education and workplace interventions, are essential for reducing these risks.

Keywords Voice disorders · Fatigue · Self-assessment · Occupational health · Vendors

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INTRODUCTION

Voice is a fundamental tool for communication in individuals' daily lives. However, in professions that require prolonged and loud speaking, excessive voice use can lead to vocal fatigue and voice disorders (1). Studies of occupational groups involving professional and occupational voice users, such as teachers, call centre operators, vendors, and singers, have shown that voice problems are common among these individuals (2-5). Occupational voice users are individuals whose job responsibilities depend heavily on their voice. Anyone whose livelihood is directly tied to vocal communication is classified as an occupational voice user (6).

Excessive or improper voice use is a leading cause of voice issues in occupations with high vocal demands. This may occur independently or in combination with biological and psychosomatic factors, potentially leading to acute or chronic symptoms of vocal strain. These symptoms may include vocal fatigue, hoarseness, throat discomfort or pain, and benign mucosal lesions, all of which reflect a gradual decline in vocal function and wear on the vocal mechanism (7). Voice disorders not only impact the quality of life but also contribute to increased healthcare costs. These disorders can impair job performance and often result in missed workdays (8). In professions with high vocal demands, voice disorders are recognised as a significant occupational concern (9).

Street vendors, identified as a group of occupational voice users, are individuals who offer goods or services in temporary setups on the streets or by carrying them directly (10). Street vendors, who rely heavily on their voices to sell their products, are particularly vulnerable to voice problems (11). The continuous and excessive use of their voices in noisy environments puts them at heightened risk of developing various voice-related issues (5). Boominathan et al. conducted a study in India across various occupational groups and found that vendors had low awareness of vocal hygiene (5). This group was observed to work and speak in more adverse and aggressive conditions compared with other professional and occupational voice users. The study reported that 74% of vendors experienced voice problems, yet they rarely sought treatment or took preventive measures. Additionally, the study highlighted that vendors lacked proper vocal hygiene practices and had not received training on voice use (5). Working in noisy environments and speaking loudly to promote products have been identified as potential causes of symptoms such as throat irritation, hoarseness, and vocal fatigue. In addition, a study conducted in India revealed that only 7.37% of street vendors were aware of vocal hygiene, indicating limited knowledge about vocal health and its associated risks (12). Furthermore, another study in India found that 44.3% of vendors were not aware of the term "vocal abuse" and 61% expressed negative attitudes towards vocal hygiene practices (13). Interestingly, only 15.1% of vendors in the study said that they prefer to consult an ear, nose and throat (ENT) specialist for voice-related problems (13). Similarly, a study on hawkers in Mumbai found a 31.6% prevalence of voice disorders (14). In a study in Palestine by Natour et al. comparing perceived voice handicap and acoustic voice characteristics between street vendors and control groups, street vendors were found to have significantly higher perceived voice handicap scores than controls (15). Interestingly, in the United States, vendors accounted for only 10% of voice clinic patients, which was the lowest rate reported by Titze et al. (16). These findings highlight the variability in voice-related problems among vendors across different countries. Even within different regions of India, variations in the prevalence and nature of voice problems among vendors have been observed.

In Türkiye, street markets are typically large, crowded, and noisy areas where street vendors set up their stalls side by side. Street vendors usually begin setting up their stalls at around 8:00 AM and finish by approximately 6:00 PM. They work on specific days of the week, setting up stalls in different locations. These working conditions often demand continuous voice use, which can lead to excessive vocal strain. To date, no studies in the literature have examined the perceptual voice characteristics or vocal fatigue among vendors. In this context, the aim of our study was to investigate the perceptual voice characteristics, self-perceived voice handicaps, and levels of vocal fatigue among vendors in the rural-touristic Cappadocia region of Türkiye.

The research questions of our study are as follows:

1. What are the perceptual voice characteristics of street vendors?
2. What is the level of vocal fatigue among street vendors?
3. What is the voice-related quality of life among street vendors?
4. Is there a statistically significant relationship between vocal fatigue and perceived voice handicap among street vendors?

MATERIAL AND METHODS

This research was conducted using a descriptive and cross-sectional design, which is a quantitative research method.

Participants

The study sample consisted of 30 street vendors aged 18 to 75 who worked at a neighbourhood marketplace in Ürgüp, located in the Nevşehir province of Türkiye (Cappadocia region). The Cappadocia region represents a distinctive combination of rural characteristics and intensive tourism, where labour practices such as street vending are widespread. A total of 59 vendors were approached face-to-face during the study, and those who met the inclusion criteria and provided consent to participate were included in the research. The inclusion criteria are outlined below.

Inclusion Criteria

- Having worked as a street vendor for at least one year

- Not having an acute upper respiratory infection or influenza at the time of the assessment
- No history of surgery related to the voice
- Not having undergone any voice therapy
- Absence of neurological disorders and hearing loss

Data collection tools

GRBAS scale

The GRBAS scale, developed by Hirano, was used for the perceptual evaluation of voice (17). This scale assesses five different parameters: G (Grade), R (Roughness), B (Breathiness), A (Asthenia), and S (Strain). Each parameter is rated on a scale from 0 to 3, where 0 indicates normal, 1 indicates mild, 2 indicates moderate, and 3 indicates severe (17).

Turkish Version of the Voice Handicap Index-10 (VHI-10-TR)

The Voice Handicap Index-10 (VHI-10), developed by Jacobson et al., is used to evaluate how voice disorders impact an individual's quality of life (18). The Turkish adaptation of this questionnaire was performed by Kılıç et al. (19). The VHI-10-TR consists of 10 items assessing the effects of voice problems on the functional, physical, and emotional domains. Each item is rated on a questionnaire from 0 (never) to 4 (always), with the total score reflecting the impact of voice problems on the individual's quality of life. The total score ranges from 0 to 40, with higher scores indicating more voice handicap.

Turkish Version of the Vocal Fatigue Index (VFI-TR)

The Vocal Fatigue Index (VFI), developed by Nanjundeswaran et al., is used to assess the levels of vocal fatigue (20). The Turkish adaptation of the questionnaire was performed by Şirin et al. (21). The VFI-TR consists of 19 items evaluating three dimensions: fatigue and avoidance (Factor 1), physical discomfort (Factor 2), and recovery with rest (Factor 3). Participants rate each item on the questionnaire from 0 (never) to 4 (always).

Data collection process

Data were collected between October 31, 2024, and December 1, 2024, at a neighbourhood marketplace in Ürgüp, located in the Nevşehir province. The data collection scheme is shown in Figure 1. Each participant was asked to perform sustained /a/ phonation, read the first sentence of the "Diet Passage" *("Dar kapısından başka aydınlık girecek hiçbir yeri olmayan dükkanında, tek başına, gece gündüz, kıvılcımlar saçarak çalışan Koca Ali, tıpkı kafese konmuş terbiyeli bir aslanı andırıyordu.")*, and engage in a brief conversation (22). These speech samples were recorded using an iPhone 11 Pro to evaluate perceptual voice characteristics using the GRBAS scale. Recent findings indicate that modern smartphones, including iPhone models, can produce voice recordings that are acoustically comparable to those obtained with professional-grade equipment (23). The audio recordings were made in a sound-isolated quiet room at Cappadocia University's Speech and Language Therapy Education, Practice, and Research Unit, located approximately 200 metres away from the marketplace. After completing these tasks, participants filled out the Turkish versions of the Voice Handicap Index-10 (VHI-10) and the Vocal Fatigue Index (VFI). GRBAS evaluations were conducted by a speech and language therapist with a doctoral degree and a doctoral student specialising in speech and language therapy. The evaluators listened to the participants' voice recordings together and scored them based on a consensus. The entire data collection process took approximately 20 minutes per participant.

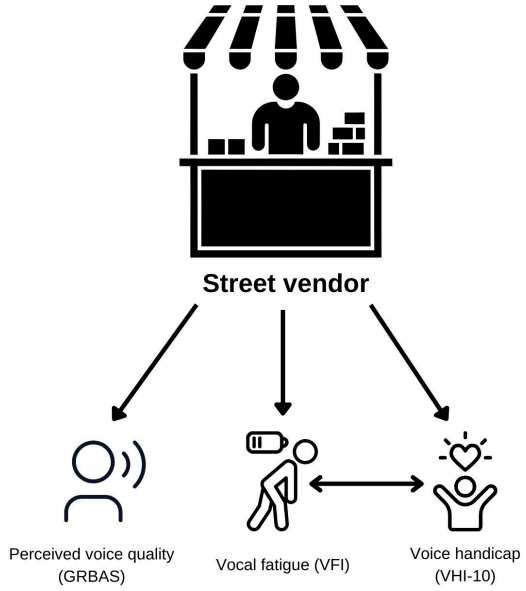

Figure 1. Data collection scheme

Data analysis

Data analysis was conducted using the Jamovi 2.6 software (24, 25). The normality of the data distribution was assessed using the Shapiro-Wilk test, skewness, and kurtosis. Because the data did not follow a normal distribution, non-parametric tests were employed for inferential statistics. Descriptive statistics are presented as mean, standard deviation, frequency, percentage, median, minimum, and maximum values. To compare the GRBAS, VHI-10-TR, and VFI-TR scores between street vendors with and without voice problems, the Mann–Whitney U test was used. The relationship between the VHI-10-TR and VFI-TR scores was examined using Spearman's correlation coefficient. In interpreting the correlation coefficients, Dancey and Reidy's classification was adopted: "weak" (0.1-0.39), "moderate" (0.4-0.69), "strong" (0.7-0.89), and "perfect" (0.9 and above) (26). A significance level of $p<0.05$ was considered statistically significant.

Table 1. Frequency and percentage distributions of GRBAS parameters among street vendors

GRBAS (N=30)	Normal (0)	Mild (1)	Moderate (2)	Severe (3)
G	16 (53.3%)	11 (36.7%)	2 (6.7%)	1 (3.3%)
R	19 (63.3%)	6 (20.0%)	4 (13.3%)	1 (3.3%)
B	25 (83.3%)	2 (6.7%)	2 (6.7%)	1 (3.3%)
A	21 (70.0%)	6 (20.0%)	2 (6.7%)	1 (3.3%)
S	17 (56.7%)	9 (30.0%)	2 (6.7%)	2 (6.7%)

GRBAS=G: Grade, R: Roughness, B: Breathiness, A: Asthenia, S: Strain, N: Number of participants

Ethical considerations

This study was conducted with the approval of the Cappadocia University Non-Interventional Clinical Research Ethics Committee (Date: 18.09.2024, No: 24.17). Written and verbal informed consent was obtained from all participants before the study began. The purpose, procedures, voluntary participation, and confidentiality principles of the research were explained to the participants. The identities of the participants were kept confidential, and the data collected were used solely for scientific purposes. Participants were given the right to withdraw from the study at any time. All protocols in this study were followed and conducted in accordance with the Helsinki Declaration.

RESULTS

In our study, the participants had a mean age of 44.1±13.8 years. Of the participants, 83.3% (n=25) were male and 16.7% (n=5) were female. The participants had an average of 21.8±14.4 years of work experience as street vendors (range: 1–50). Additionally, 40% (n=12) reported having voice problems, while 60% (n=18) reported no voice problems.

Table 1 shows the frequency and percentage distributions of the voice characteristics of the 30 street vendors participating in the study as assessed using the GRBAS scale (Grade - G, Roughness - R, Breathiness - B, Asthenia - A, and Strain - S). For the Grade (G) parameter, 53.3% (n=16) of the participants were evaluated as normal, 36.7% (n=11) as mild, 6.7% (n=2) as moderate, and 3.3% (n=1) as severe overall voice impairment. In the roughness parameter, 63.3% (n=19) of the participants were assessed as normal, while 20.0% (n=6) showed mild, 13.3% (n=4) moderate, and 3.3% (n=1) severe roughness. Regarding the breathiness parameter, 83.3% (n=25) of the participants were found to be normal, 6.7% (n=2) showed mild, 6.7% (n=2) moderate, and 3.3% (n=1) severe breathiness. For the Asthenia (A) parameter, 70.0% (n=21) of the participants were rated as normal, while 20.0% (n=6) exhibited mild, 6.7% (n=2) moderate, and 3.3% (n=1) severe asthenia. In the strain (S) parameter, 56.7% (n=17) of the participants were considered normal, while 30.0% (n=9) showed mild, 6.7% (n=2) moderate, and 6.7% (n=2) severe strain.

The comparison of the participants' GRBAS scores is presented in Table 2. Statistically significant differences were observed between the groups with and without reported voice problems in the analysis of the GRBAS scores. Participants who reported having voice problems scored significantly higher in the Grade (G), Breathiness (B), Asthenia (A), and Strain (S) subparameters ($p<0.05$). The mean Grade (G) score was 1.083 for those with voice problems, compared to 0.277 for those without ($p=0.006$). Similarly, for Breathiness (B), the scores were 0.666 and 0.055, respectively, with a significant difference between the groups ($p=0.043$). Significant differences in favour of the group with voice problems were also observed in the asthenia (A) and strain (S) parameters ($p=0.009$ and $p=0.029$, respectively). However, no significant difference was found between the two groups in the roughness (R) parameter ($p=0.200$).

The comparison of the VHI-10-TR and VFI-TR scores based on the presence or absence of voice problems is presented in Table 3. The findings indicate that street vendors with voice problems scored higher on both questionnaires than those without voice problems, and these differences were statistically significant ($p<0.05$).

The relationship between the participants' VFI sub-factor scores and total scores and their VHI sub-scores and total scores is presented in Table 4. A moderate positive correlation was found between the first factor of the VFI (F1) and the VHI total score ($r=0.565$, $p=0.001$). This relationship was stronger for the second factor (F2) ($r=0.708$, $p<0.001$). The third factor (F3) showed significant correlations only with certain subdimensions of the VHI (e.g., VHI-Physical subdimension: $r=0.369$, $p=0.045$). Overall, a moderate and significant positive correlation was observed between the VFI total score and the VHI total score ($r=0.662$, $p<0.001$).

DISCUSSION

This study examined the auditory-perceptual voice quality characteristics, self-perceived voice-related handicap, and levels of vocal fatigue among street vendors in the Cappadocia region, highlighting the impact of occupational voice use. When compared with the previous literature, various similarities and differences were observed (5, 14, 15). The findings demonstrate that voice problems are prevalent among street vendors working in this region and significantly affect perceptual voice quality, perceived voice handicap, and vocal fatigue.

In our study, 40% of participants reported having voice problems, a rate that falls between the findings from Mumbai (31.6%) and those reported by Boominathan et al. (74%) (5, 14). A recent national survey from the United States also reported that 12.6% of adults had a current voice disorder (27). These variations may be attributed to differences in regional working conditions (e.g., environmental conditions and sales methods), cultural perceptions of voice health, and awareness levels about vocal hygiene. The prolonged and intense voice use required by the street vendors' working conditions may increase the risk of voice problems. In particular, working in

Table 2. Comparison of VHI-10-TR and VFI-TR scores among vendors

	Presence of voice problems	N=30	Mean	SD	Median	Minimum	Maximum	*U*	p
VHI-E	No	18	2.05	3.40	0.00	0.00	12.00	53.5	**0.016***
	Yes	12	7.41	6.63	7.00	0.00	16.00		
	Total	30	4.20	5.53	1.50	0.00	16.00		
VHI-P	No	18	2.16	3.49	0.50	0.00	12.00	43.5	**0.005***
	Yes	12	8.00	5.77	7.50	0.00	16.00		
	Total	30	4.50	5.31	2.00	0.00	16.00		
VHI-F	No	18	0.94	2.04	0.00	0.00	8.00	55.0	**0.014***
	Yes	12	3.83	3.35	4.00	0.00	8.00		
	Total	30	2.10	2.96	0.00	0.00	8.00		
VHI-Total	No	18	5.16	8.15	2.00	0.00	32.00	48.0	**0.011***
	Yes	12	19.25	15.33	18.50	0.00	40.00		
	Total	30	10.80	13.32	4.50	0.00	40.00		
VFI-Factor 1	No	18	15.44	10.45	11.50	2.00	35.00	41.0	**0.005***
	Yes	12	29.50	13.48	33.50	9.00	44.00		
	Total	30	21.07	13.49	19.00	2.00	44.00		
VFI-Factor 2	No	18	4.44	4.76	3.00	0.00	12.00	43.0	**0.005***
	Yes	12	12.58	7.57	13.50	0.00	20.00		
	Total	30	7.70	7.17	7.50	0.00	20.00		
VFI-Factor 3	No	18	6.50	4.40	7.00	0.00	12.00	35.5	**0.001***
	Yes	12	11.33	1.30	12.00	8.00	12.00		
	Total	30	8.43	4.22	10.00	0.00	12.00		
VFI-Total	No	18	26.38	15.72	22.50	2.00	52.00	33.0	**0.002***
	Yes	12	53.41	20.13	61.00	22.00	75.00		
	Total	30	37.20	21.91	32.50	2.00	75.00		

*: p<0.05 was considered statistically significant, VFI-Factor 1: Tiredness of voice and voice avoidance, VFI-Factor 2: Physical discomfort, VFI-Factor 3: Improvement with rest, VFI-Total: Total VFI score, VHI-E: Emotional subscale, VHI-P: Physical subscale, VHI-F: Functional subscale, VHI-Total: Total VHI-10 score, N: Number of participants, r: Spearman's rank correlation coefficient

noisy environments and the necessity of speaking loudly to promote products create dual strain on the vocal system (28).

The GRBAS scale results in our study revealed notable impairments in the perceptual voice quality among street vendors. Parameters such as roughness and strain were particularly prominent, reflecting the physiological strain imposed by prolonged and loud voice use in noisy environments. These findings are consistent with those reported by previous studies on occupational voice users, where noisy and demanding work environments significantly contributed to the degradation of perceptual voice quality. For example, Boominathan et al. highlighted similar outcomes in vendors exposed to intense vocal demands (5). Our findings emphasise the importance of addressing environmental noise and implementing strategies to reduce vocal strain in this population.

The VHI-10-TR results indicated that street vendors in the Cappadocia region experience substantial voice-related handicaps, affecting their functional, physical, and emotional well-being. The mean VHI-10 scores in our study align with previous research, such as Natour et al., which documented higher perceived voice handicaps among street vendors compared to control groups (15). The elevated scores underline the need for targeted interventions to improve the awareness and management of voice disorders in this occupational group. These findings also highlight the potential long-term impact of untreated voice problems on the quality of life and occupational performance.

The VFI-TR findings demonstrated that vocal fatigue is a prevalent issue among street vendors, particularly in dimensions such as fatigue and avoidance and physical discomfort. These results are consistent with the literature indicating that excessive vocal use without adequate rest contributes to cumulative vocal fatigue. This aligns with studies by Boominathan and colleagues, who identified similar patterns among other professional voice users (5). The findings call for preventive measures such as structured rest periods

Table 3. Comparison of GRBAS scores among street vendors

	Presence of voice problems	N=30	Mean	SD	Median	Minimum	Maximum	*U*	p
G	No	18	0.277	0.461	0.000	0	1	49.5	**0.006***
	Yes	12	1.083	0.900	1.000	0	3		
	Total	30	0.600	0.770	0.000	0	3		
R	No	18	0.388	0.698	0.000	0	2	81.5	0.200
	Yes	12	0.833	1.030	0.500	0	3		
	Total	30	0.567	0.858	0.000	0	3		
B	No	18	0.055	0.236	0.000	0	1	76.5	**0.043***
	Yes	12	0.666	1.073	0.000	0	3		
	Total	30	0.300	0.750	0.000	0	3		
A	No	18	0.166	0.514	0.000	0	2	58.0	**0.009***
	Yes	12	0.833	0.937	1.000	0	3		
	Total	30	0.433	0.774	0.000	0	3		
S	No	18	0.333	0.594	0.000	0	2	61.5	**0.029***
	Yes	12	1.083	1.084	1.000	0	3		
	Total	30	0.633	0.890	0.000	0	3		

*: p<0.05 was considered statistically significant; GRBAS=G: grade, R: roughness, B: breathiness, A: asthenia, S: strain, N: number of participants, SD: standard deviation, U: Mann–Whitney U test statistic

Table 4. Spearman correlation coefficients between VFI-TR and VHI-10-TR scores among street vendors (n=30)

Scores	VHI-E	VHI-P	VHI-F	VHI-Total
VFI-Factor 1	ɾ=0.551	ɾ=0.609	ɾ=0.514	ɾ=0.565
	p=0.002*	**p<.001***	**p=0.004***	**p=0.001***
VFI-Factor 2	ɾ=0.671	ɾ=0.681	ɾ=0.725	ɾ=0.708
	p<.001*	**p<.001***	**p<.001***	**p<.001***
VFI-Factor 3	ɾ=0.251	ɾ=0.443	ɾ=0.369	ɾ=0.333
	p=0.181	**p=0.014***	**p=0.045***	p=0.072
VFI-Total	ɾ=0.625	ɾ=0.699	ɾ=0.632	ɾ=0.662
	p<.001*	**p<.001***	**p<.001***	**p<.001***

*: p<0.05 was considered statistically significant, Voice Avoidance, VFI-Factor 2=Physical Discomfort, VFI-Factor 3: Improvement with Rest, VFI-Total: Total VFI score, VHI-E: Emotional subscale, VHI-P: Physical subscale, VHI-F: Functional subscale, VHI-Total: Total VHI-10 score, N: number of participants, ɾ: Spearman's rank correlation coefficient

and vocal health education tailored to the unique needs of street vendors.

Our study revealed a significant relationship between the VHI-10-TR and VFI-TR scores, demonstrating that higher levels of vocal fatigue were associated with greater perceived voice handicap. This finding aligns with the conceptual understanding that vocal fatigue contributes to an individual's perception of functional, physical, and emotional impairments related to voice use. For instance, increased fatigue may intensify physical discomfort and avoidance behaviours, leading to a heightened sense of voice handicap as measured by the VHI-10-TR. This relationship underscores the interconnected nature of these constructs, suggesting that interventions aimed at reducing vocal fatigue could concurrently alleviate perceived voice handicaps. Furthermore, the correlation between these measures highlights the importance of a holistic approach to voice care that addresses both the physical and psychological aspects of vocal health. Such integrated strategies could include vocal hygiene education, workload management, and counselling to address the emotional impacts of voice disorders.

Moreover, the findings of this study should be interpreted within the broader context of rural health service accessibility. In regions such as Cappadocia, which exhibit both rural and touristic characteristics, access to specialised rehabilitation services such as voice therapy remains limited. Street vendors, who often work informally and outside the bounds of occupational health systems, may face structural barriers—including lack of awareness, limited service availability, transportation difficulties, and socioeconomic constraints—that hinder timely access to preventive and therapeutic

voice care. Addressing these access barriers is essential for the implementation of effective rural rehabilitation strategies tailored to the needs of vocally at-risk populations.

Limitations and recommendations

This study has several limitations. First, the sample size was limited to 30 street vendors, which restricted the generalizability of the findings. Additionally, the predominance of male participants hindered the evaluation of gender-related differences. The cross-sectional design of the study also made it challenging to interpret the findings in terms of cause-and-effect relationships. These limitations highlight the importance of conducting studies with larger populations and longitudinal designs. Another limitation of this study is the absence of acoustic analyses.

For future research, larger-scale studies encompassing different age groups and genders are recommended. Furthermore, comparisons with other occupational groups that also rely heavily on their voices, such as teachers or call centre employees, could provide a more comprehensive understanding of occupational risk factors. Intervention studies could be designed to evaluate the impact of voice hygiene education and therapy. Such research would be valuable for testing the effectiveness of strategies aimed at improving vocal health. Future studies could incorporate contemporary acoustic voice quality parameters, such as the Acoustic Voice Quality Index (AVQI) and Cepstral Peak Prominence (CPP), which provide detailed assessments of speech voice quality. Additionally, examining the economic impact of voice problems and their effects on work productivity could provide significant contributions to the literature.

CONCLUSION

This study provides valuable insights into the vocal health of vendors working in the Cappadocia region by examining their perceptual voice quality, self-perceived voice handicap, and vocal fatigue levels. The findings indicate that voice problems are common among street vendors, negatively affecting perceptual voice characteristics and reducing quality of life. Evaluations conducted using the VHI-10-TR and VFI-TR questionnaires revealed that street vendors reporting voice problems scored higher in both self-perceived voice handicap and vocal fatigue. Notably, significant differences were observed in the physical discomfort and recovery with rest dimensions of the VFI-TR. The results from the VHI-10-TR and VFI-TR assessments highlight a meaningful relationship between voice problems and individuals' quality of life. This connection, evaluated across both physical and psychological dimensions, underscores significant risk factors for individuals who rely heavily on their voices, such as street vendors.

The findings clearly demonstrate the importance of implementing preventive measures to promote vocal health among occupational groups that engage in intensive voice use, such as street vendors. The suggested measures include providing voice training, reducing noise levels in workplaces, and adopting appropriate voice usage strategies. In the context of rural regions such as Cappadocia, where access to specialised rehabilitation services such as voice therapy is often limited, the development of community-based health education and early screening initiatives is particularly crucial. Future studies with larger and more diverse samples could enhance the generalizability of these findings and support the creation of evidence-based voice health policies tailored to rural, vocally demanding professions. In addition, campaigns can be organised at local health centres to provide information about voice problems and encourage early treatment to help street vendors recognise and manage these issues more effectively. The outcomes of this study serve as a crucial foundation for raising awareness about vocal health in rural occupational settings and for informing strategies that bridge service gaps in voice care.

Ethics Committee Approval	Ethics committee approval was received for this study from the ethics committee of Cappadocia University Non-Interventional Clinical Research Ethics Committee (Date: 18.09.2024, No: 24.17).
Informed Consent	Written informed consent was obtained from all participants who participated in this study.
Author Contributions	Conception/Design of Study- N.Y.B.; Data Acquisition- N.Y.B., F.A., Z.T.; Data Analysis/Interpretation- N.Y.B., F.A., Z.T.; Drafting Manuscript- N.Y.B., F.A., Z.T.; Critical Revision of Manuscript- N.Y.B.; Final Approval and Accountability- N.Y.B., F.A., Z.T.
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REFERENCES

1 Titze IR. Principles of Voice Production. 2nd ed. Iowa, IA: National Center for Voice and Speech; 2000.

2 Roy N, Merrill RM, Thibeault S, Parsa RA, Gray SD, Smith EM. Prevalence of voice disorders in teachers and the general population. J Speech Lang Hear Res 2004;47(2):281-93.

3 Devadas U, Rajashekhar B. The prevalence and impact of voice problems in call center operators. J Laryngol Voice 2013;3(1):3-9.

4 Pestana PM, Vaz-Freitas S, Manso MC. Prevalence of voice disorders in singers: Systematic review and meta-analysis. J Voice 2017;31(6):722-7.

5 Boominathan P, Rajendran A, Nagarajan R, Seethapathy J, Gnanasekar M. Vocal abuse and vocal hygiene practices among different level professional voice users in India: A survey. Asia Pac J Speech Lang Hear 2008;11(1):47-53.

6 Cantor-Cutiva LC. Association between occupational voice use and occurrence of voice disorders: Voice disorders and work. Areté 2018;18(2):1-10.

7 Sapir S, Keidar A, Mathers-Schmidt B. Vocal attrition in teachers: survey findings. Eur J Disord Commun 1993;28(2):177-85.

8 Verdolini K, Ramig LO. Review: occupational risks for voice problems. Logoped Phoniatr Vocol 2001;26(1):37-46.

9 McDowell S, Morrison R, Mau T, Shembel AC. Clinical characteristics and effects of vocal demands in occupational voice users with and without primary muscle tension dysphonia. J Voice 2025;39(2):448-56.

10 Shaiara H, Shanjida Y, Shahidul I. Assessment of the socioeconomic aspects of street vendors in Dhaka City: Evidence from Bangladesh. Asian Soc Sci 2015;12(26):1-10.

11 Stemple JC, Roy N, Klaben B. Clinical voice pathology: theory and management. 6th ed. San Diego: Plural Publishing; 2020.

12 Paul A, Kumaraswamy S. Vocal hygiene awareness in street vendors. Int J Innov Res Technol 2022;9(3):190-4.

13 Upadhyay PK, Sharma V, Srinivasan S, Gupta MK, Goyal A. Knowledge, attitude and practice on vocal abuse and vocal hygiene among diverse occupational voice users in Jodhpur, Rajasthan. Indian J Otolaryngol Head Neck Surg 2024;76(4):3338-44.

14 Mund SP, Suvarna AP, Banik AA. Prevalence of voice problems among hawkers in Mumbai. J Otorhinolaryngol Allied Sci 2019;2(1):8-15.

15 Natour YS, Darawsheh WB, Bashiti S, Wari M, Taha J, Odeh T. A study of VHI scores and acoustic features in street vendors as occupational voice users. J Commun Disord 2018;71:11-21.

16 Titze IR, Lemke J, Montequin D. Populations in the U.S. workforce who rely on voice as a primary tool of trade: a preliminary report. J Voice 1997;11(3):254-9.

17 Hirano M. Clinical Examination of Voice. Vienna: Springer-Verlag; 1981. p. 81-4.

18 Jacobson BH, Johnson A, Grywalski C, Silbergleit A, Jacobson G, Benninger MS, et al. The voice handicap index (VHI): Development and validation. Am J Speech Lang Pathol. 1997;6(3):66-70.

19 Kılıç MA, Okur E, Yıldırım İ, Öğüt F, Denizoğlu İİ, Kızılay A, et al. Reliability and validity of the Turkish version of the Voice Handicap Index. The Turkish Journal of Ear Nose and Throat 2008;18(3):139-47.

20 Nanjundeswaran C, Jacobson BH, Gartner-Schmidt J, Verdolini Abbott K. vocal Fatigue Index (VFI): Development and validation. J Voice 2015;29(4):433-40.

21 Sirin S, Ogut MF, Bilgen C. Reliability and validity of the Turkish version of the Vocal Fatigue Index. Turk J Med Sci 2020;50(4):902-9.

22 Kılıç MA. Objektif Ses Analizi. In: Özüdoğru EN, editor. Ses Bozukluklarına Güncel Yaklaşım. 1st ed. Ankara: Türkiye Klinikleri; 2019. p. 33-9.

23 Awan SN, Shaikh MA, Awan JA, Abdalla I, Lim KO, Misono S. Smartphone recordings are comparable to "Gold Standard" recordings for acoustic measurements of voice. J Voice 2025;39(4):1019-32.

24 The jamovi project. Open statistical software for the desktop and cloud. jamovi (Version 2.6) 03/07/2025. https://www.jamovi.org.

25 R Core Team. The comprehensive R archive network R: A language and environment for statistical computing. Vienna: R foundation for statistical computing,2024. 03/07/2025 https://www.cran.r-project.org

26 Dancey CP, Reidy J. Statistics without maths for psychology. 4th ed. Harlow: Pearson Prentice Hall; 2007.

27 Huston MN, Puka I, Naunheim MR. Prevalence of Voice Disorders in the United States: A National Survey. Laryngoscope 2024;134(1):347-52.

28 Vilkman E. Occupational safety and health aspects of voice and speech professions. Folia Phoniatrica et Logopaedica 2004;56(4):220-53.