

The effect of voice hygiene advices on Imams' voice during Ramadan

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Background

Professional voice users are a group of people using their voice for earning of their income. One such important profession is that of the Imams of mosques who excessively recite Quran, especially during Ramadan. This excessive reciting during Ramadan puts them in a great risk for vocal problems. The Imams need an assessment and management for their voice to protect them from the expected voice disorders.

Aim

The aim of this study was to assess the voice of Imams before and after Ramadan and to study the effect of following the voice hygiene advices during Ramadan on their voice.

Study design

This was a cross-sectional study conducted to assess the voice of Imams before and after Ramadan.

Patients and methods

The study included 34 Imams. They were divided into two groups: the first group included 17 Imams who received voice hygiene advices before Ramadan, and the second group included 17 Imams who did not receive voice hygiene advices (the control group). All candidates were subjected to two types of assessment: examination using the VHI (the Arabic modification of voice handicapped index) and multidimensional voice program.

Results

The group that received voice hygiene advices showed better scores of multidimensional voice program and VHI compared with the control group voice parameters, and some parameters were significantly better or toward normal in post-Ramadan compared with pre-Ramadan assessment.

Conclusion and recommendation

Voice hygiene advices should be given to a wide scale of Imams as a protective tool for their voices. Voice hygiene advices should be included in any program of voice therapy.

Keywords:

Imams, multidimensional voice program, VHI, voice hygiene advices

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Introduction

A professional voice user is anyone who requires a certain voice quality to have an effect on others and includes public speakers, actors, singers, and Imams of mosques. If the voice is damaged in these professionals, it can be detrimental to their careers and how they are perceived by those around them [1]. Professional speaking voice falls into two categories:

- (1) *Normative*: Individuals in this category are more likely to have problems related to abuse from overuse and includes telephone operators, telemarketers, TV and radio broadcasters, executives, and teachers.
- (2) *Emotive*: Individuals in this category often use their voices to motivate or encourage others to engage in some kind of activity and includes conductors, actors, ministers, politicians, aerobics instructors, drill instructors, and athletic coaches [2].

Imams of mosques are a group of professional voice users who are leaders of mosques and Sunni Muslim community. Imams may lead Islamic worship services, serve as community leaders, and provide religious guidance as in everyday terms. The Imam for Sunni Muslims is the one who leads Islamic formal (Fard) prayers, even in locations besides the mosque, whenever prayers are performed in a group of two or more with one person leading (Imam) and the others following by copying his ritual actions of worship. Friday sermon is most often given by an appointed Imam. All mosques have an Imam to lead the (congregational) prayers, even though it may

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sometimes just be a member from the gathered congregation rather than an officially appointed salaried person. Women Imams may only lead among female-only congregations. The person who should be chosen according to Hadith is the one who has most knowledge of the Qu'ran and Sunnah (prophetic tradition) and of a good character [3].

Imams suffer from different and multiple vocal problems, especially after Ramadan, as they, during the sacred month (Ramadan), read with a loud authorized voice and sometimes read long parts of Quran in each prayer. They put extreme demands on their voices, little tolerance for illnesses, and have unrealistic expectations: 'the performance must go on with the same force'. Many have inadequate and inappropriate training. They may have two jobs, which leads to excessive vocalization [4].

Imams are a group of professional voice users rarely being looked after or laid in the scope of research for keeping their voice or improving their performance, especially in overload periods like Ramadan. Therefore, we must study the vocal problems that Imams face during and after Ramadan and how to overcome them.

Aim

The aim of this work was to assess the voice of Imams before and after Ramadan and to study the effect of following the voice hygiene advices during Ramadan on their voice.

Patients and methods

After obtaining consent from imams and ethics committee permission. This cross-sectional study was conducted to assess the voice of Imams before and after Ramadan. The study included 34 Imams from the Eastern region in the Kingdom of Saudi Arabia and the assessment was carried out in the Unit of Phoniatics, King Fahd University Hospital in Al-Khobar (University of Dammam). They were divided into two groups: the first group included 17 Imams who received voice hygiene advices (Appendix A1) [5] before Ramadan, and the second group included 17 Imams who did not receive voice hygiene advices (the control group). The mean age in years for first group was 41.47 ± 36.25 , and the mean age in years for the control group was 42.08 ± 35.61 . All candidates were recruited from the Eastern region in Kingdom of Saudi Arabia to the Unit of Phoniatics, King Fahd University Hospital in Al-Khobar (University of Dammam) before and after Ramadan

2015, after obtaining consent from Imams. All candidates were subjected to two types of assessment:

- (1) Assessment using the VHI (the Arabic modification of voice handicapped index) [6], which consists of 30 items. These items are equally distributed over three domains: functional, physical, and emotional aspects of voice disorders. The functional domain includes statements that describe the 'impact of a person's voice disorders on his or her daily activities'. The emotional domain indicates the patient's 'affective responses to a voice disorder'. Items comprising the physical domain are statements representing self-perceptions of laryngeal discomfort and voice output characteristics. Patients rated their voice problem as being mild (0–30), moderate (31–60), and severe (61–120) (Appendix A2).
- (2) Examination using the multidimensional voice program (MDVP) with Visi-Pitch IV Multi-Dimensional Voice Program, Model 3950B, Version 3.4.1, Serial Number CD341–062–1125–KAY (Kay Pentax, Montvale, NJ, USA), which assesses five quantitative parameters. These parameters include F0 (average fundamental frequency for all extracted pitch periods), relative average perturbation (RAP), Shim (shimmer), noise-to-harmonic ratio (NHR), and voice turbulence index (VTI). Each of these parameters is plotted against a green circle. The green circle represents the threshold normative values (boundaries) for adults. Parameters plotted in dark green (within the light green circle) are within (below) normative threshold values, whereas parameters plotted in red (outside the green circle) are above these values (Appendix A3).

Score calculation

Data were nonparametric. The medians of results of each group are compared to the corresponding medians in the other group using the Wilcoxon rank test. Items in addition to (x -diff), this is simply the difference between post and pre, which in turn, compared between two groups to evaluate which groups having the more decrease or increase. Moreover, the pre-Ramadan and post-Ramadan assessment results were compared in each group using the Wilcoxon signed-rank test.

Results

Group 1 and group 2 (controls) were matched as regards sex (both groups comprised male participants) and age

($P=0.37$). There was no significant difference between cases and controls as regards sex and age (Table 1).

On correlating the median of age in years between the first group ($n=38$) and controls (second group) ($n=39$) no significant difference was found.

There was no significant difference between the first group and controls for all parameters of the MDVP in pre-Ramadan assessment (Table 2).

The results indicated no significant difference between the two groups for parameters of MDVP before Ramadan.

There was no significant difference between the first group and controls for all parameters of VHI in pre-Ramadan assessment (Table 3).

The results indicated no significant difference between the two groups for parameters of VHI before Ramadan.

There was a highly significant difference as regards RAP and a significant difference between the first group and controls for shimmer and VTI parameters of the MDVP in post-Ramadan assessment (Table 4).

Table 1 Comparison between the first group (those who received voice hygiene advices) and the control group according to the median age

Groups	Median of age (by years)	<i>P</i> value	Significance
1st group	38	0.37	NS
2nd group (control)	39		

The Wilcoxon rank-sum test was used.

Table 2 Comparison between the results of the first group (those who received voice hygiene advices with) and the control group according to the multidimensional voice program parameters in pre-Ramadan assessment

Parameters of MDVP	Group of Imams	Median	<i>P</i> value	Significance
F0	Without	132.871	0.37	NS
	With	124.493		
RAP	Without	0.534	0.191	NS
	With	0.38		
Shimmer	Without	4.235	0.491	NS
	With	3.435		
NHR	Without	0.157	0.642	NS
	With	0.158		
VTI	Without	0.052	0.343	NS
	With	0.055		

The Wilcoxon rank-sum test was used. MDVP, multidimensional voice program; NHR, noise-to-harmonic ratio; RAP, relative average perturbation.

Table 3 Comparison between the results of the first group that received voice hygiene advices and the control group according to the VHI questions in pre-Ramadan assessment

Questions of MDVP	Group of Imams	Median	<i>P</i> value	Significance
1	Without	0	0.556	NS
	With	0		
2	Without	1	0.499	NS
	With	0		
3	Without	0	0.279	NS
	With	0		
4	Without	0	0.228	NS
	With	0		
5	Without	0	0.317	NS
	With	0		
6	Without	0	0.75	NS
	With	0		
7	Without	0	0.196	NS
	With	0		
8	Without	0	0.529	NS
	With	0		
9	Without	0	0.966	NS
	With	0		
10	Without	0	1	NS
	With	0		
11	Without	1	0.715	NS
	With	1		
12	Without	1	0.717	NS
	With	0		
13	Without	0	0.46	NS
	With	0		
14	Without	0	0.938	NS
	With	0		
15	Without	0	0.839	NS
	With	0		
16	Without	1	0.37	NS
	With	1		
17	Without	0	0.388	NS
	With	1		
18	Without	0	0.64	NS
	With	0		
19	Without	0	0.786	NS
	With	0		
20	Without	0	0.251	NS
	With	0		
21	Without	0	0.951	NS
	With	0		
22	Without	0	0.36	S
	With	0		
23	Without	0	0.53	NS
	With	0		
24	Without	0	0.378	NS
	With	0		
25	Without	0	0.317	NS
	With	0		
26	Without	0	0.695	NS
	With	0		
27	Without	0	0.247	NS
	With	0		

(Continued)

Table 3 (Continued)

Questions of MDVP	Group of Imams	Median	<i>P</i> value	Significance
28	Without	0	0.322	NS
	With	0		
29	Without	0	0.695	NS
	With	0		
30	Without	0	0.164	NS
	With	0		
Total	Without	8	0.629	NS
	With	13		

The Wilcoxon rank-sum test was used. MDVP, multidimensional voice program.

Table 4 Comparison between the results of the first group and the control group according to the multidimensional voice program parameters in post-Ramadan assessment

Parameters of MDVP	Group of Imams	Median	<i>P</i> value	Significance
F0	Without	134.66	0.352	NS
	With	131.875		
RAP	Without	0.694	0.004	HS
	With	0.324		
Shimmer	Without	4.421	0.01	S
	With	3.31		
NHR	Without	0.161	0.278	NS
	With	0.147		
VTI	Without	0.061	0.021	S
	With	0.05		

The Wilcoxon rank-sum test was used. MDVP, multidimensional voice program; NHR, noise-to-harmonic ratio; RAP, relative average perturbation.

The results indicated that there was a difference between the two groups for some parameters of MDVP after Ramadan.

There was a highly significant difference between the first group and controls for Q9, Q14, Q22, and Q24 and a significant difference for Q7, Q8, Q10, and Q11 parameters of VHI in post-Ramadan assessment (Table 5).

The results indicated that there was a significant difference between the two groups for some parameters of VHI after Ramadan.

There was no significant difference for the results of MDVP parameters except VTI in pre-Ramadan and post-Ramadan assessments for the control group (Table 6).

The results indicated that there was no significant difference between pre-Ramadan and post-Ramadan assessments for parameters of MDVP in the control group except VTI ($P=0.009$), which showed a highly significant difference.

Table 5 Comparison between the results of the first group and the control group according to the VHI questions in post-Ramadan assessment

Questions of MDVP	Group of Imams	Median	<i>P</i> value	Significance
1	Without	0	0.466	NS
	With	0		
2	Without	1	0.427	NS
	With	1		
3	Without	0	0.458	NS
	With	0		
4	Without	0	0.339	NS
	With	0		
5	Without	0	0.213	NS
	With	0		
6	Without	0	0.196	NS
	With	0		
7	Without	1	0.034	S
	With	0		
8	Without	0	0.033	S
	With	0		
9	Without	0	0.006	HS
	With	0		
10	Without	0	0.032	S
	With	0		
11	Without	1	0.046	S
	With	0		
12	Without	1	0.297	NS
	With	0		
13	Without	0	0.934	NS
	With	0		
14	Without	1	0.003	HS
	With	0		
15	Without	1	0.367	NS
	With	0		
16	Without	1	0.785	NS
	With	1		
17	Without	2	0.063	NS
	With	0		
18	Without	0	0.655	NS
	With	0		
19	Without	0	0.324	NS
	With	0		
20	Without	0	0.194	NS
	With	0		
21	Without	0	0.17	NS
	With	0		
22	Without	1	0.003	HS
	With	0		
23	Without	0	0.938	NS
	With	0		
24	Without	0	0.008	HS
	With	0		
25	Without	0	0.317	NS
	With	0		
26	Without	0	0.194	NS
	With	0		
27	Without	0	0.578	NS
	With	0		

(Continued)

Table 5 (Continued)

Questions of MDVP	Group of Imams	Median	P value	Significance
28	Without	0	0.643	NS
	With	0		
29	Without	0	0.3	NS
	With	0		
30	Without	0	0.313	NS
	With	0		
Total	Without	19	0.027	S
	With	7		

The Wilcoxon rank-sum test was used. MDVP, multidimensional voice program.

Table 6 Comparison between the results of multidimensional voice program parameters pre-Ramadan and post-Ramadan assessments for the control group

Parameters of MDVP	Time of assessment	Median	P value	Significance
F0	Pre-Ramadan	132.871	0.05	NS
	Post-Ramadan	134.66		
RAP	Pre-Ramadan	0.534	0.05	NS
	Post-Ramadan	0.694		
Shimmer	Pre-Ramadan	4.235	0.182	NS
	Post-Ramadan	4.421		
NHR	Pre-Ramadan	0.157	0.117	NS
	Post-Ramadan	0.161		
VTI	Pre-Ramadan	0.052	0.009	HS
	Post-Ramadan	0.061		

The Wilcoxon signed-rank test was used. MDVP, multidimensional voice program; NHR, noise-to-harmonic ratio; RAP, relative average perturbation.

Table 7 Comparison between the results of multidimensional voice program parameters pre-Ramadan and post-Ramadan assessments for the group that received voice hygiene advices

Parameters of MDVP	Time of assessment	Median	P value	Significance
F0	Pre-Ramadan	124.493	0.345	NS
	Post-Ramadan	131.875		
RAP	Pre-Ramadan	0.38	0.05	NS
	Post-Ramadan	0.324		
Shimmer	Pre-Ramadan	3.435	0.239	NS
	Post-Ramadan	3.31		
NHR	Pre-Ramadan	0.158	0.031	S
	Post-Ramadan	0.147		
VTI	Pre-Ramadan	0.055	0.012	S
	Post-Ramadan	0.05		

The Wilcoxon signed-rank test was used. MDVP, multidimensional voice program; NHR, noise-to-harmonic ratio; RAP, relative average perturbation.

There was no significant difference as regards the results of MDVP parameters, except for NHR and VTI, in pre-Ramadan and post-Ramadan assessments in the group that received voice hygiene advices (Table 7).

The results indicated that there was no significant difference between pre-Ramadan and post-Ramadan

Table 8 Comparison between the results of pre-Ramadan and post-Ramadan assessments for VHI parameters in the control group

Questions of MDVP	Group of Imams	Median	P value	Significance
1	Pre-Ramadan	0	0.084	NS
	Post-Ramadan	0		
2	Pre-Ramadan	1	0.713	NS
	Post-Ramadan	1		
3	Pre-Ramadan	0	0.096	NS
	Post-Ramadan	0		
4	Pre-Ramadan	0	0.271	NS
	Post-Ramadan	0		
5	Pre-Ramadan	0	0.039	S
	Post-Ramadan	0		
6	Pre-Ramadan	0	0.129	NS
	Post-Ramadan	0		
7	Pre-Ramadan	0	0.041	S
	Post-Ramadan	1		
8	Pre-Ramadan	0	0.02	S
	Post-Ramadan	0		
9	Pre-Ramadan	0	0.017	S
	Post-Ramadan	0		
10	Pre-Ramadan	0	0.026	S
	Post-Ramadan	0		
11	Pre-Ramadan	1	0.739	NS
	Post-Ramadan	1		
12	Pre-Ramadan	1	0.71	NS
	Post-Ramadan	1		
13	Pre-Ramadan	0	0.887	NS
	Post-Ramadan	1		
14	Pre-Ramadan	0	0.157	NS
	Post-Ramadan	1		
15	Pre-Ramadan	0	0.462	NS
	Post-Ramadan	1		
16	Pre-Ramadan	1	0.951	NS
	Post-Ramadan	1		
17	Pre-Ramadan	0	0.041	S
	Post-Ramadan	2		
18	Pre-Ramadan	0	0.096	NS
	Post-Ramadan	0		
19	Pre-Ramadan	0	0.49	NS
	Post-Ramadan	0		
20	Pre-Ramadan	0	0.121	NS
	Post-Ramadan	0		
21	Pre-Ramadan	0	0.334	NS
	Post-Ramadan	0		
22	Pre-Ramadan	0	0.004	HS
	Post-Ramadan	1		
23	Pre-Ramadan	0	0.257	NS
	Post-Ramadan	0		
24	Pre-Ramadan	0	0.132	NS
	Post-Ramadan	0		
25	Pre-Ramadan	0	0.317	NS
	Post-Ramadan	0		
26	Pre-Ramadan	0	0.336	NS
	Post-Ramadan	0		
27	Pre-Ramadan	0	0.578	NS
	Post-Ramadan	0		

(Continued)

Table 8 (Continued)

Questions of MDVP	Group of Imams	Median	P value	Significance
28	Pre-Ramadan	0	0.48	NS
	Post-Ramadan	0		
29	Pre-Ramadan	0	0.131	NS
	Post-Ramadan	0		
30	Pre-Ramadan	0	0.046	S
	Post-Ramadan	0		
Total	Pre-Ramadan	8	0	HS
	Post-Ramadan	19		

The Wilcoxon rank-sum test was used. MDVP, multidimensional voice program.

assessments for parameters of MDVP in the voice hygiene advice group, except NHR and VTI, both of which showed a significant difference ($P=0.031$ and 0.012 , respectively).

The results of pre-Ramadan and post-Ramadan assessments for VHI parameters in the control group showed a highly significant difference for Q22 and the total score and a significant difference for Q5, Q7, Q8, Q9, Q10, Q17, and Q30 (Table 8).

The results indicated that there was a significant difference between pre-Ramadan and post-Ramadan assessments for some parameters of VHI in the control group.

The results of pre-Ramadan and post-Ramadan assessments for VHI parameters in the group that received voice hygiene advices showed a highly significant difference for the total score and a significant difference for Q14 and Q24 (Table 9).

The results indicated that there was a significant difference between pre-Ramadan and post-Ramadan assessments for some parameters of VHI in the group that received voice hygiene advices.

Statistical methods

IBM SPSS statistics (V. 23.0, 2015; IBM Corp., Armonk, New York, USA) was used for data analysis. Data were expressed as median and percentiles for quantitative nonparametric measures in addition to both number and percentage for categorized data.

The following tests were carried out:

- (1) The Wilcoxon rank-sum test to compare two independent groups for nonparametric data.
- (2) The Wilcoxon signed-rank test to compare two dependent groups for nonparametric data.

Table 9 Comparison between the results of pre-Ramadan and post-Ramadan assessments for VHI parameters in the group that received the voice hygiene advices

Questions of MDVP	Group of Imams	Median	P value	Significance
1	Pre-Ramadan	0	0.414	NS
	Post-Ramadan	0		
2	Pre-Ramadan	0	0.903	NS
	Post-Ramadan	1		
3	Pre-Ramadan	0	0.279	NS
	Post-Ramadan	0		
4	Pre-Ramadan	0	0.458	NS
	Post-Ramadan	0		
5	Pre-Ramadan	0	1	NS
	Post-Ramadan	0		
6	Pre-Ramadan	0	0.783	NS
	Post-Ramadan	0		
7	Pre-Ramadan	0	0.408	NS
	Post-Ramadan	0		
8	Pre-Ramadan	0	0.317	NS
	Post-Ramadan	0		
9	Pre-Ramadan	0	1	NS
	Post-Ramadan	0		
10	Pre-Ramadan	0	0.317	NS
	Post-Ramadan	0		
11	Pre-Ramadan	1	0.102	NS
	Post-Ramadan	0		
12	Pre-Ramadan	0	0.167	NS
	Post-Ramadan	0		
13	Pre-Ramadan	0	1	NS
	Post-Ramadan	0		
14	Pre-Ramadan	0	0.025	S
	Post-Ramadan	0		
15	Pre-Ramadan	0	1	NS
	Post-Ramadan	0		
16	Pre-Ramadan	1	0.059	NS
	Post-Ramadan	1		
17	Pre-Ramadan	1	0.098	NS
	Post-Ramadan	0		
18	Pre-Ramadan	0	0.317	NS
	Post-Ramadan	0		
19	Pre-Ramadan	0	0.257	NS
	Post-Ramadan	0		
20	Pre-Ramadan	0	0.18	NS
	Post-Ramadan	0		
21	Pre-Ramadan	0	1	NS
	Post-Ramadan	0		
22	Pre-Ramadan	0	0.257	NS
	Post-Ramadan	0		
23	Pre-Ramadan	0	0.705	NS
	Post-Ramadan	0		
24	Pre-Ramadan	0	0.038	S
	Post-Ramadan	0		
25	Pre-Ramadan	0	0.317	NS
	Post-Ramadan	0		
26	Pre-Ramadan	0	0.564	NS
	Post-Ramadan	0		
27	Pre-Ramadan	0	0.083	NS
	Post-Ramadan	0		

(Continued)

Table 9 (Continued)

Questions of MDVP	Group of Imams	Median	P value	Significance
28	Pre-Ramadan	0	0.109	NS
	Post-Ramadan	0		
29	Pre-Ramadan	0	0.705	NS
	Post-Ramadan	0		
30	Pre-Ramadan	0	0.102	NS
	Post-Ramadan	0		
Total	Pre-Ramadan	13	0.007	HS
	Post-Ramadan	7		

The Wilcoxon rank-sum test was used. MDVP, multidimensional voice program.

- (3) The probability of error at 0.05 was considered significant, whereas at 0.01 and 0.001 it was considered highly significant.

Discussion

The term 'professional voice users' was defined in the Brazilian Consensus of Professional Voice in 2004 as the oral communication used by people who depend on their voice to perform their working activities [7]. In the literature, there are many studies on care of professional voice users and investigating the problems of their voice and how to overcome them. They are very important group of people as they are at risk for voice disorders.

The need to rely on the voice as a professional tool is important and may affect an individual's social, emotional, and vocational well-being [8,9].

Some professional voice users are appraised for having optimal voice quality. They seek medical treatment for functional voice problems more often compared with individuals with a vocally less demanding lifestyle [10].

The slightest alteration in voice quality might have a negative influence on future job prospects [7].

In this study, we focused on the care of Imams' voice as a unique work. The study included 34 male Imams from the Eastern region in Kingdom of Saudi Arabia and the assessment was carried out in the Unit of Phoniatrics, King Fahd University Hospital in Al-Khobar (University of Dammam).

We divided them equally into two groups: one group received voice hygiene advices and the other group did not receive these advices (the control group) before Ramadan. Ramadan is a sacred fasting month for Muslims. Imams fast as do all Muslims from dawn

to sunset for about 12–16 h/day. Imams use their voices excessively during this month in Quran reading and reciting for many hours, with poor knowledge on how they can protect their voice. Thus, they are at high risk for voice disorders.

The results showed the following:

- (1) There was no significant difference between the two groups before Ramadan as regards sex (all were male), age ($P=0.37$), the voice parameters of the MDVP, and the questions of VHI. Thus, both groups were matched according to these factors.
 - (2) There was a significant difference between the two groups after Ramadan for the parameters of MDVP (highly significant difference for RAP and significant difference for shimmer and VTI). This difference indicates the effect of voice hygiene advices for decreasing the high values and preventing the risk for voice disorders.
 - (3) There was also a significant difference between the two groups after Ramadan for the questions of the VHI (a highly significant difference between the first group and controls for Q9, Q14, Q22, and Q24 and a significant difference for Q7, Q8, Q10, and Q11). There was a significant difference between the two groups for the mean of the total score of all questions with lower scores for the group that received voice hygiene advices, indicating the effect of voice hygiene advices in improving the symptoms of voice handicap perceived by Imams.
- On comparing the assessments for each group before and after Ramadan, the following were revealed:
- (4) In the control group, there was a highly significant difference for the parameter of MDVP (VTI) and VHI questions (a highly significant difference for Q22 and the mean of the total score, and a significant difference for Q5, Q7, Q8, Q9, Q10, Q17, and Q30) between pre-Ramadan and post-Ramadan assessments, with the tendency toward higher values in post-Ramadan scores for both assessments, indicating deteriorations of voice subjectively and objectively. This is in agreement with the findings of Couch *et al.* (2015) [11], who found that vocal abuse could reduce vocal effectiveness.
 - (5) In the group using the voice hygiene advices, there was a significant difference for the parameters of MDVP (NHR and VTI) and VHI (a highly

significant difference for the total score and a significant difference for Q14 and Q24) questions between the pre-Ramadan and post-Ramadan assessments, with a tendency of achieving lower values in post-Ramadan scores. This indicates the effect of voice hygiene advices in improving the voice or preventing its deterioration in this group subjectively and objectively. This is in agreement with the findings of Eastwood *et al.* (2015) [12], who found that voice hygiene advices as a part of the behavior readjustment therapy are associated with improvement of the voice parameters outcomes.

Conclusion and recommendations

Voice hygiene advices are a necessary tool that must be provided to Imams for better performance and protection of their voices before exhausting them, especially in certain periods of the year like Ramadan. The group of Imams should be looked after more seriously as an important group of professional voice users. This study should be generalized on a larger numbers of Imams in other regions and countries. Some Imams need to follow further voice therapy programs according to their conditions. We found deterioration in the subjective and objective parameters in the control group, which did not receive any supportive measure such as the voice hygiene advices. They should follow voice hygiene advices before Ramadan and after Ramadan; individuals who suffer any dysphonia should be examined to exclude and treat any voice problems.

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Conflicts of interest

There is no conflict of interest disclosure.

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Appendix

Appendix A1 Comparing the median age of both groups revealed that there is no significant difference between both groups according to the age

Voice hygiene advice

(A) 'Do/Do Not Do' category:

Avoidance of the 3 'S': Spirits, Smoking (active and passive), Screaming (conscious and unconscious).

(B) 'Try to' category:

Try to drink more fluids.

Try to avoid clearing of the throat.

Try to avoid dry dusty places.

Appendix A2 The Arabic voice handicapped index (VHI)

مؤشر الإعاقة الصوتية

الاسم:

العمر: رقم الملف:

المهنة: مدة العمل:

رقم الجوال: تاريخ الفحص:

نوع الفحص: قبل / بعد العلاج الطبيب الفاحص:

اختر أحد الأرقام المعقولة لكل سؤال والذي يصف شدة المشكلة لديك: صفر = أبداً 1 = نادراً 2 = أحياناً 3 = غالباً 4 = دائماً

الجزء الأول					
4	3	2	1	صفر	1 صوتي يصعب على الآخرين سماعه
4	3	2	1	صفر	2 يجد الناس صعوبة في فهمي (سماع صوتي) عندما أتحدث في غرفة كثيرة الضوضاء
4	3	2	1	صفر	3 تجد عائلتي صعوبة في سماع صوتي عندما أتدبر في المنزل
4	3	2	1	صفر	4 صوتي يجعلني أستمع الهاتف بشكل أقل مما أحب
4	3	2	1	صفر	5 أميل إلى تجنب الإجتماع بالناس بسبب صوتي
4	3	2	1	صفر	6 صوتي يجعلني أتحدث مع الأصدقاء والمعارف بشكل أقل مما أحب
4	3	2	1	صفر	7 الناس تطلب مني أن أكرر ما أقول عندما أتحدث إليهم وجها لوجه
4	3	2	1	صفر	8 مشاكل الصوت لدي أثرت سلباً على حياتي الشخصية والاجتماعية
4	3	2	1	صفر	9 أحس بأنه يتم إهمالي في المناقشات (السوالف) بسبب صوتي
4	3	2	1	صفر	10 مشكلة الصوت لدي تسببت في تقليل دخلي المادي
المجموع					
الجزء الثاني					
4	3	2	1	صفر	1 أفقد الكثير من هواء التنفس عندما أتحدث
4	3	2	1	صفر	2 صوتي يتغير خلال اليوم
4	3	2	1	صفر	3 يسألني الناس دائماً " ماذا حدث لصوتك؟ "
4	3	2	1	صفر	4 صوتي نائف وله صرير (خشن)
4	3	2	1	صفر	5 أحس أنه علي أن أضغط على حنجرتي (أجهدها) لإخراج صوتي
4	3	2	1	صفر	6 صفاء صوتي لا يمكن التنبؤ به
4	3	2	1	صفر	7 أحاول أن أغير صوتي ليبدو مختلفاً (أفضل)
4	3	2	1	صفر	8 أقوم بكثير من الجهد لأتحدث
4	3	2	1	صفر	9 صوتي أسوأ في المساء
4	3	2	1	صفر	10 ينقطع صوتي أثناء الحديث
المجموع					
الجزء الثالث					
4	3	2	1	صفر	1 أكون متوتراً عندما أتحدث مع الآخرين بسبب صوتي
4	3	2	1	صفر	2 يزعج الناس بسبب صوتي
4	3	2	1	صفر	3 أجد أن بعض الناس لا تفهم طبيعة مشكلة صوتي
4	3	2	1	صفر	4 مشكلة صوتي تحزنني
4	3	2	1	صفر	5 أقل الخروج من البيت بسبب مشكلة صوتي
4	3	2	1	صفر	6 صوتي يجعلني أحس بأنني عاجز
4	3	2	1	صفر	7 أشعر بالإحراج عندما يطلب مني الآخرون أن أكرر ما قلته
4	3	2	1	صفر	8 أشعر بالإحراج عندما يطلب مني الآخرون أن أكرر ما قلته
4	3	2	1	صفر	9 صوتي يجعلني أحس بأنني غير مؤهل
4	3	2	1	صفر	10 أشعر بالخجل من مشكلة صوتي
المجموع					

Appendix A3 Normative data for multidimensional voice program parameters

Measure	Average fundamental frequency (F0)	Relative average perturbation (RAP)%	Shimmer percent (Shim)%	Noise to harmonic ratio (NHR)	Voice turbulence index (VTI)
Norm	145.223 Hz	0.345	2.252	0.122	0.052
STD	23.406	0.333	0.997	0.014	0.016
Threshold		0.68	3.81	0.19	0.061