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# Knowledge of Egyptian faculty members about voice care: a national cross-sectional study

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## Abstract

**Background:** The university teaching faculty members are one of the occupational fields in education that are more exposed to voice disorders. The current study aimed to examine the association among vocal symptoms reported by faculty teaching professionals, impact of voice problems on daily activities, their vocal habits, and knowledge on vocal hygiene in relation to specialist consultation and to identify which of the assessed factors triggered the most for medical consultation. An online questionnaire was completed by 420 faculty teaching professionals from 7 universities in Egypt between November 2019 and December 2019.

**Results:** All assessed vocal symptoms were significantly associated with specialist consultation ( $p$ -value  $< 0.01$ ). Most common bad vocal habits included increased voice loudness (71.2%), talking for long time (69.3%), and frequent throat clearance (54.0%). The most commonly reported preventive measures included avoid screaming (88.3%), stop smoking (87.1%), and taking periods of voice rest (86.4%). The strongest predictor of having specialist consultation was frequent throat clearance, recording an odds ratio of 23.809.

**Conclusion:** Based on information obtained from the current study, ideas are suggested for setting up vocal hygiene programs throughout a professional voice career for keeping a healthy voice. Avoid passive smoking and using microphones are considered remarkable adequate methods for healthy voice.

**Keywords:** Voice, Vocal symptoms, Professionals voice careers, Voice hygiene

## Background

Many studies have focused on voice disorders in certain occupational fields that are characterized by higher prevalence of voice problems than others. Among these populations were the teachers, faculty members, professional singers, counselors, lawyers, and others [1, 2].

Teaching professionals are the most affected occupation by voice disorders with an annual incidence rate of 3.87 new cases out of 1000 teachers [3]. This high incidence of voice disorders among teachers is linked to a

variety of factors including unfavorable work conditions (e.g., speaking in a noisy environment, and inefficient phonation techniques), as well as individual factors (such as sex, age, intense and prolonged voice use) [4–6]. They may be manifested with vocal symptoms such as pain while talking, burning throat sensation, throat clearing, hoarseness, aphonia, and vocal fatigue [7–10] which may be increased over time. Intervention and specialist consultation sometimes is very crucial for symptoms reduction and complication prevention.

Numerous literatures examined risk factors for voice disorders (VD) in teachers [4, 11–14], whereas little attention has been paid to faculty members worldwide [15, 16], a high-risk group of voice professionals who may teach under similar conditions (e.g., talking for long periods of time, and unsuitable teaching environment which

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has background noise which subsequently will lead to higher frequency in increasing their volume) in addition to other vocal loading conditions (e.g., teaching in large rooms and teaching to large number of students) than teachers.

Moreover, some literature reported significant limitations in daily voice activities among faculty members with voice complaints including daily communication, social communication, and occupational performance [17]. Adequacy of teaching performance is directly depended on the effectiveness of communication vocal resources which include appropriate voice-use adjustments such as adequate pitch for age and sex, adequate speaking rate, speaking rhythm, and intensity, as well as the use of pauses [18–21].

Taking into consideration the minimum existing data regarding voice disorders prevalence among Egyptian faculty members, the impact of vocal symptoms on their daily activities, and their knowledge on faulty vocal behaviors and voice care, this study aimed at describing in-depth voice problems among faculty members in the Egyptian universities who had never received any vocal training, regarding different aspects; the impact of these voice problems on their daily lives, associated vocal habits, and their knowledge of vocal hygiene and to identify which of the assessed factors triggered at most the need of specialist consultation. This will be beneficial for future implementation of voice hygiene programs to prevent, early detect voice disorders, and so improve their teaching performance and their quality of life.

## Methods

### Participants

An email with a link to an online Arabic questionnaire through free-access Google Forms was sent to about 1000 faculty members in 7 universities in Egypt in the period between November 2019 and December 2019. Four hundred and twenty questionnaires were completed, yielding about a 42% response rate. The questionnaire was set up to not allow multiple completions from the same participant and all questions had to be answered. Respondent's anonymity and confidentiality were ensured. The submission of the answered survey was considered as consent to participate in the study. All participants were Arabic natives and were above 24 years old. The sample included 258 females and 162 males.

### Design of the questionnaire

For the current study, we developed an Arabic questionnaire based on previous studies on voice problems and their effects on daily life experienced by professional voice users [22, 23], which were modified to fit our study [22]. Questions related to impact of life were the existing

questions used in the Arabic-Voice Handicap Index-10 (A-VHI 10) which is a reliable tool that describes the participant's perception of the severity of his or her voice problem as it relates to his or her quality of life [23].

The questionnaire [22] was translated into Arabic by expert translators then sent to researchers and professionals from medical backgrounds (physicians and academia) to give their expert opinion with respect to its simplicity. Then, a pilot study was conducted by asking the questions to 15 of faculty members ( $N=15$ ) measuring their understanding in order to make the questionnaire simpler and easily understood regarding their response as well as to examine the time needed for answering the questionnaire (approximately 10 min to complete). We collected the final corrections of the questionnaire made by researchers and professionals in one model that was administered to the faculty members. Reliability was calculated using SPSS Version 25 (IBM Corp., Armonk, NY, USA), and Cronbach's alpha was 0.87 for the total score. The data from the pilot study was not used in the final analysis.

Initially, we collected demographic data regarding age, gender, years of teaching, hours of teaching per week, and type of college.

The questionnaire consisted of 4 sections. The first section included self-reporting of voice symptoms over the last 6 months prior to the survey (yes or no questions) and consisted of a list of 7 symptoms related to the vocal and throat complaint(s) (such as dry throat, hoarseness of voice, pain, and so on), symptoms duration, and consulting either otolaryngologist or phoniatician for the treatment of vocal problems.

The second section entailed five questions about the participants' perception of the impact of these voice disorders on their lives (daily communication, social life, self, and job performance). These items were measured on a 3-point scale, and the response options with scores were as follows: (0) for no impact, (1) sometimes, and (2) almost for severe impact.

Section 3 consisted of 2 parts (yes or no questions). One part assessed vocal habits (9 vocal behaviors) in faculty members and the other explored their knowledge on vocal hygiene (5 knowledge items).

Finally, the fourth section included 2 questions. The first question that requested participants to respond to a list of 14 preventive measures taken by the faculty members to avoid voice problems (yes or no questions), and the final question (added to the baseline characters after data analysis) explored what preferable prophylaxis programs for voice problems should be targeted, direct training related to control posture, and using best breathing and vocalization patterns and medical consultation, or indirect training, such as provision of information on

avoiding abusive behaviors, modifying lifestyle practices, and hydration or both.

**Statistical analysis**

Collected data have been coded, analyzed by the Statistical Package for Social Science, (SPSS) version 25, processed and tabulated. Frequency distribution, percentage, and descriptive statistics including mean ± SD were calculated. McNemar’s test is used to assess if there are variations on a dichotomous dependent variable; Student’s *t*-test has been used to compare between two groups of numerical data. The correlation coefficient was used to evaluate the relationship between the various variables. *P* values of ≤ 0.05 were considered significant.

Power of sample size was estimated using g\*power software based on effect size of 0.5 and overall type I error rate ( $\alpha$ ) ≤ 0.05; a total of 420 subjects are expected to achieve a power of more than 80%.

**Results**

**Profile of the participants**

A total of 420 University staff members completed the survey, most of them being females (61.4%), with 38.6% being males. Their age was more than 24 years old with highly often participated age group which ranged from 36 to 45 (45.5%). Regarding teaching years’ experience, the most

frequent participated group had more than 10 years teaching experience and less than 20 years (*n*: 160, 38.1%). Our findings revealed that the highly frequently hours of teaching per week were 5 h (*n*: 220, 52.4%). More than half of the participants were working at practical medical and para medical collages (Table 1).

It was shown that 3.1% of the participants recommended an awareness program only, 27.9% recommended specialist consultation, and 69% recommended both.

**Voice-related symptoms**

The results revealed that 27.9% of the participants did not develop any voice symptoms 6 months prior to the survey, with the feeling of a dry throat (71.2%), shortness of breath (59.3%), and change of voice (54.2%) being the most commonly reported symptoms, in addition to frequent throat clearing (52.9%), globus sensation (40.7%), pain in the throat (39.5%), and voice loss (18.1%).

Symptoms were co-presented in the sample; 11.4% of the sample reported at least 2 of the 7 symptoms listed in the questionnaire. All 7 assessed symptoms were co-present in 8.3% of the sample (data not shown).

Although all symptoms that included in the questionnaire were significantly associated with specialist consultation (*p*-value <0.01), data showed that 76.9% of the staff

**Table 1** Baseline characteristics in total sample

		Count	Column N %
Sex	Male	162	38.6%
	Female	258	61.4%
Age	24–35 years	116	27.6%
	36–45 years	191	45.5%
	46–55 years	56	13.3%
	56–65 years	36	8.6%
	> 65 years	21	5.0%
Years of teaching	< 5	73	17.4%
	5–9	83	19.8%
	10–19	161	38.3%
	> 20	103	24.5%
Hours of teaching per week	5 h weekly	220	52.4%
	10 h weekly	110	26.2%
	> 10 h weekly	90	21.4%
Collage	Practical medical and para medical	214	51.0%
	Practical non-medical	77	18.3%
	Theoretical	129	30.7%
Consultation of ear nose and throat consultant	Yes	97	23.1%
	No	323	76.9%
What is your suggestions for voice problems in professional voice users	Awareness program	13	3.1%
	Specialist consultation	117	27.9%
	Both	290	69.0%

members had never consulted a throat specialist about a voice problem.

Findings revealed a significant relationship between chronicity of symptom and probability of specialist consultation (*p*-value <0.01) (Table 2).

**Impact on life**

As shown in Table 3, the percentage of adverse effect (sometimes and almost) of voice complaints that affected different domains (daily communication, social life, self, and work) in the staff members such as were 29.4%, 26.3%, 26.9%, and 9.3%, respectively. All domains considered, significantly related to specialist consultation (*p*-value <0.01).

**Vocal habits, voice care knowledge, and preventive measures taken to reduce vocal problems**

Concerning vocal habits, 11% of all the participants reported engaging in one vocal habit out of 9 assessed habits listed in the questionnaire and 15% engaged in 2 habits and 0.5 subjects in total habits. On the other hand, 5.5% of all the study subjects reported not engaging in any vocal habits. The most common bad vocal habits included increased voice loudness (71.2%), talking for long time (69.3%), and frequent throat clearance (54.0%) (data not shown).

About knowledge on voice care, for example, 87.3%, 87%, and 82.4% were conscious that smoking, eating at late night, and eating spicy food respectively are bad for the voice, but only 22.6% recognized that excessive drinking jensville and cinnamon drinks during voice problems can adversely affect the voice.

The most reported preventive measures included avoid screaming (88.3%), stop smoking (87.1%), and taking periods of voice rest (86.4%).

**Analysis of vocal habits, voice care knowledge, and preventive measures by consulting a specialist**

In further analysis to those who consult a specialist (23.1% of the total sample), 71.1% of them had experienced 4 or more vocal habits (i.e., a greater number of vocal habits), 91.8% of them had less than 3 of the assessed knowledge about vocal care (i.e., less knowledgeable regarding vocal care), and 82.5% of them performed more than 7 measures of preventive measures (i.e., had more positive action to improve voice performance) (Table 4).

Regarding the comparison between who consult and who did not consult a specialist, significance was considered in bad vocal habits and duration of symptoms. Otherwise, either total knowledge or total preventive measures did not show any significance.

**Table 2** Distribution of voice symptoms in total sample by specialist consultation

		Specialist consultant				P value
		Yes		No		
		Count	%	Count	%	
symp_1-dry throat	Yes	84	86.6%	215	66.6%	< 0.001
	No	13	13.4%	108	33.4%	
symp_2-voice loss	Yes	40	41.2%	36	11.1%	< 0.001
	No	57	58.8%	287	88.9%	
symp_3-change of the habitual voice	Yes	84	86.6%	143	44.4%	< 0.001
	No	13	13.4%	179	55.6%	
symp_4-pain during speech	Yes	70	72.2%	96	29.7%	< 0.001
	No	27	27.8%	227	70.3%	
symp_5-Globus sensation	Yes	72	74.2%	99	30.7%	< 0.001
	No	25	25.8%	224	69.3%	
sympt_6-shortness of breath	Yes	76	78.4%	173	53.6%	< 0.001
	No	21	21.6%	150	46.4%	
symp_7-frequent throat clearance	Yes	75	77.3%	147	45.5%	< 0.001
	No	22	22.7%	176	54.5%	
Duration of symptoms	No symptoms	3	3.1%	114	35.3%	< 0.001
	< 1 month	17	17.5%	79	24.5%	
	1 month–3 months	21	21.6%	34	10.5%	
	3 months–6 months	12	12.4%	22	6.8%	
	> 6 months	44	45.4%	74	22.9%	

**Table 3** Impact of voice symptoms on life in total sample and by specialist consultation

		Specialist consultant				P value
		Yes		No		
		Count	%	Count	%	
<b>Daily communication</b> impact_1-Difficulty for people to understand message	No	53	54.6%	245	75.9%	< 0.001
	Sometimes	31	32.0%	74	22.9%	
	Always	13	13.4%	4	1.2%	
<b>Daily communication</b> impact_2-Request from others to repeat message	No	40	41.2%	211	65.3%	< 0.001
	Sometimes	45	46.4%	108	33.4%	
	Always	12	12.4%	4	1.2%	
<b>Social life</b> impact_3-Effect on social outings	No	30	30.9%	238	73.7%	< 0.001
	Sometimes	35	36.1%	66	20.4%	
	Always	32	33.0%	19	5.9%	
<b>Self</b> impact_4-do you feel embarrassed due to your voice problem	No	29	29.9%	236	73.1%	< 0.001
	Sometimes	40	41.2%	74	22.9%	
	Always	28	28.9%	13	4.0%	
<b>Work</b> impact_5-does your voice problem forced you to sick leave	No	48	49.5%	293	90.7%	< 0.001
	Sometimes	39	40.2%	28	8.7%	
	Always	10	10.3%	2	0.6%	

**Table 4** Relationship of vocal habits, baseline knowledge, and preventive measures to by consulting a specialist

		Specialist consultant				P value
		Yes		No		
		N	%	N	%	
Vocal habits categories	< 4 habits	28	28.9%	187	57.9%	<0.001
	≥ 4 habits	69	71.1%	136	42.1%	
Total knowledge category	< 3	89	91.8%	276	85.4%	0.107
	≥ 3	8	8.2%	47	14.6%	
Total preventive measures category	≤ 7	17	17.5%	53	16.4%	0.796
	> 7	80	82.5%	270	83.6%	
Duration	Less or equal 6 months	53	54.6%	249	77.1%	<0.001
	More than 6 months	44	45.4%	74	22.9%	

Furthermore, the duration between the onset of vocal symptoms and the specialist’s consultation was significant.

**Logistic regression analysis for independent predictors of a specialist consultation**

Finally, direct logistic regression was done to delineate which of the following factors predict the probability that participants would have a specialist consultation (Table 5). The model contained 32 independent variables (age, years of teaching, collage, symp\_1 dry throat, symp\_2 voice loss, symp\_3 change of the habitual voice, symp\_4 pain during speech, symp\_5 Globus sensation, symp\_6 shortness of breath, symp\_7 frequent throat

clearance, Total number of symptoms, duration of symptoms, impact\_1 Difficulty for people to understand message, impact\_2 Request from other store peat message, impact\_3 Effect on social outings, impact\_4 do you feel embarrassed due to your voice problem, impact\_5 do your voice problem forced you to take make a work abs, habit\_3 frequent throat clearance, habit\_4 talking for long time, habit\_5 increase voice loudness, habit\_6 screaming, habit\_8 coughing vigorously, Total number of vocal habits, Vocal habits categories, know\_1 effect of passive smoking, know\_4 spicy food, know\_5 late night eating, Total knowledge, preventive measure\_5 avoid increase loudness of voice, preventive measure\_7 avoid whispering, Total preventive measure, duration). The full model

**Table 5** Logistic regression analysis for independent predictors of a specialist consultation

	OR	95% C.I. for EXP(B)	
		Lower	Upper
Age			
Years of teaching			
Years of teaching(1)	19.021	1.437	251.787
Years of teaching(2)	16.218	1.378	190.944
Years of teaching(3)	2.576	.424	15.671
Collage			
Total number of symptoms			
Duration of symptoms			
Total impact			
habit_3 frequent throat clearance	23.809	3.067	200
Total number of vocal habits			
know_1 effect of passive smoking	23.385	1.013	539.916
Total knowledge			
Total preventive measures			
Total preventive measures(3)	20.0	.000	.516
Total preventive measure(14)	7.552	1.052	54.190

having all predictors was statistically significant,  $X^2(75, 420) = 270.265$ ,  $P$ -value  $< 0.001$ , showing that the model was able to distinguish between participants who had or did not have specialist consultation. The model as a whole explained between 47.5% (Cox and Snell R square) and 71.8% (Nagelkerke R squared) of the variance in consultation status and correctly classified 76.9% of cases. As shown in the table below, only 6 of the independent variables made a unique statistically significant contribution to the model (years of teaching “24-35 & 36-45”, habit\_3 frequent throat clearance, know\_1 effect of passive smoking, Total preventive measures\_3 stop passive smoking & 14\_use microphone).

**Discussion**

In this study, 420 faculty members from across Egypt completed the questionnaire. Self-reporting information on how vocal symptoms are perceived, the need for medical advice, the impact of these voice problems on their lives, and, finally, what measures faculty members believe should be taken to eliminate causes of dysphonia. Several factors indicate how our sample was representative: the broader population of professionally-experienced faculty members: the uniquely large sample size, female distribution more than males [24, 25], long teaching years’ experience (most frequent participated group had between 10 to 20 years teaching experience  $n$ : 160, 38.1%), the duration of weekly teaching (highly frequent 5 h ( $n$ : 220, 52.4%), adopting different vocal symptoms,

and the method of recruitment and the use of self-perception reports which are helpful in understanding how the participant perceived himself [26].

**The prevalence of voice-related symptoms**

Looking at the details of the assessed vocal symptoms, the results showed that a 72.1% of participants perceived at least a voice symptom 6 months prior to the questionnaire, with the feeling of a dry throat (71.2%) as the most commonly reported symptom, followed by shortness of breath (59.3%) and change of voice (54.2%). In a similar study by Hamdan et al. [12], 46% of teachers described their voice as being fair, bad, or very bad over the last 6 months, and the most common symptom reported was dry throat followed by vocal fatigue. Also, Simberg et al. [13] reported that the most often symptoms were voice fatigue and hoarseness. In our study, hoarseness came as the third frequent symptom. Despite the coexistence of several symptoms in most staff members, the chronicity of their vocal complaints, and the significant negative impact on their daily activities, only 23.1% of the surveyed population had a specialist consultation.

This is not matched with Remacle et al. [27] results who reported that professional voice users accounted for 41% of the patients seeking medical consultation for their voice. Van Houtte et al. [24] reported the same. Our results may be attributed to the lack of voice care preventive programs to be enrolled in, indicating alertness to this issue and the desire for a scientific explanation.

**Impact on life**

The gathered information from the survey reflects the impairment of daily communication, social life, self, and work activity experienced by the affected persons who were affected in the same extent except work domain (the least affected). This to some extent may explain that the low percentage for seeking a specialist’s consultation as the work limitation, although significant, is the most warranted issue for medical advice in staff members believes.

Previous study [24] reported a strong relation between voice disorders and absenteeism, in which 20.6% of the teachers had missed at least 1 day or more per work, because of voice-related problems. The significant impairment of voice problems on impact of life calls for future psychological support for teaching professionals.

**Faulty vocal habits, voice care knowledge, and preventive measures taken to reduce vocal problems**

In the current study, the most common bad vocal habits included increased voice loudness (71.2%), talking for long time (69.3%), followed by frequent throat clearance (54.0%). This is by earlier study which reported that the most significant work-related risk factors are elevated

levels of noise in classrooms and habitual use of a loud speaking voice [6]. Furthermore, Vilkman [28] defined the prolonged voice use combined with unfavorable work conditions as “vocal loading.”

About knowledge of voice care, examining the role of dietary habits on voice [29, 30], for example, 15.5% and 11.2% did not avoid eating spicy food and eat at late night respectively. Only 22.6% recognized that excessive drinking ginger and cinnamon drinks during voice problems can adversely affect the voice. This may be explained by the faulty historical knowledge among Egyptian population about drinking ginger and cinnamon and their benefits for throat clearance.

In a similar study, 20% of participants did not know that gastroesophageal reflux can affect their voice, and 38% did not avoid eating spicy food [12].

Concerning our findings, the most reported actions to improve voice included avoiding screaming (88.3%), stopping smoking (87.1%), and taking periods of voice rest (86.4%). Unfortunately, increase water consumption came at the seventh rank out of 14 parameters of action taken. Although hydration [31, 32] is the most widely used technique for preventive and therapeutic application to reduce effort during phonation, our findings do not agree with that. This reflects the need of faculty members to be more aware about benefit of proper hydration.

A recent study on professional singers, as professional voice users, reported that the most significant factors for healthier lifestyle among singers were less risky alcohol consumption and smoking. This may be due to greater awareness of these voice-damaging factors [33].

#### **Assessing the factors on the likelihood that participants would have a specialist consultation**

As seen in the results of the multivariate logistic regression with consulting a specialist, the strongest predictor of having specialist consultation was habit\_3 frequent throat clearance, recording an odds ratio of 23.809. This indicated that participants who performed frequent throat clearance were over 23 times more likely to have specialist consultation than those who did not.

A similar study studied the predictor of specialist consultation among teachers, the vocal symptoms (vocal fatigue, hoarseness), duration of the voice complaint, and the impact of voice disorders on various life domains were significantly associated to consult a specialist [12]. The same study reported that duration of symptoms exceeding 6 months increased the probability of specialist consultation. This gives crucial attention to the role of early diagnosis in management of laryngeal disorders laryngeal cancer [34].

Different studies pointed out that the excess of noise is related to the incidence of voice symptoms such as sore throat [18, 35, 36]. Furthermore, it affects the teaching process [36].

Our results showed the importance of using microphones, especially if number of students is large. The considerable number of students in the classroom requires teaching professionals to increase their voice intensity causing [37] overloading of the muscles of the vocal folds. Thus, amplification devices should be adopted as protective measure to allow teaching professionals to make less effort during vocal emission [6, 38–40]. Also, years of teaching have been identified as a risk factor. This may be attributed to cumulative voice use [41, 42].

In our opinion, from the previously mentioned results regarding self-reporting vocal symptoms, impact on life, faulty vocal habits, voice hygiene knowledge, and specialist consultation experienced by faculty members, this indicate the need for increase the awareness of vocal hygiene to eliminate abusive vocal behaviors and promote healthy voice production by phoniatic specialist who can clarify the vocal symptoms, voice-related risk factors, the importance of breathing exercises for voice, and the possible preventive measures.

Limitations of the current study should be considered. Issues related to the anatomy and physiology of the voice, reflux, medical conditions (e.g., respiratory infections, medications) need to be addressed. A follow-up study is recommended to investigate the usefulness of preventive measures.

#### **Conclusions**

Such an assessment to check and maintain a healthy voice for faculty members who are considered as professional voice users is very crucial for their job productivity. Our results reinforce the importance of adopting these professionals by awareness programs about faulty vocal behaviors and voice-related risk factors, as well as knowledge about voice hygiene. Avoiding passive smoking and using microphones are ones of adequate and easily applicable methods for planning for occupational hazards awareness programs.

#### **Supplementary Information**

The online version contains supplementary material available at <https://doi.org/10.1186/s43163-022-00247-5>.

**Additional file 1.**

**Additional file 2.**

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**Authors' contributions**

NFM provided the concept, design, manuscript preparation, and manuscript editing. NFM and HOM performed the research methodology, data collection, and data analysis. DMFK contributed to the supervision and study design. NFM and DMFK contributed to the supervision and methodology. DMFK contributed to the interpretation of the results. HOM contributed to the supervision, study design, and methodology. All authors discussed the results and contributed to the writing and revising of the manuscript. All authors have approved the manuscript.

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**Availability of data and materials**

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

**Declarations****Ethics approval and consent to participate**

The study was approved by the Ethics Committee of Beni-Suef University (Beni-Suef, Egypt) No: (FMBSUREC/03112019/ Mahmoud). Respondent's anonymity and confidentiality were ensured. The submission of the answered survey was considered as consent to participate in the study.

**Consent for publication**

Not applicable

**Competing interests**

The authors declare that they have no competing interests.

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