

# Service Implementation by Phoniaticians during a Pandemic Emergency: A Questionnaire-based Survey

## Original Article

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## ABSTRACT

**Objective:** Providing a risk-assessment framework that guides Phoniatic clinical services delivery and also identify patients for whom these services should be prioritized during pandemics.

**Design:** Cross-sectional study.

**Settings:** A questionnaire-based survey was designed and directed to the phoniaticians based on their professional experience, work environment, and institutional resources. It was distributed online through various Phoniatic societies during the first wave of the COVID-19 pandemic. The questionnaire included grading of Phoniatic clinical services, methods of service delivery, triaging of patients/complaints according to morbidity, and demographic characteristics.

**Main outcome measures:** Recognition of the high acuity Phoniatic clinical services that should be delivered during pandemics as well as triaging the patient/complaint according to morbidity.

**Results:** The majority of Phoniatic clinical services are considered low acuity services except for the voice and swallowing disorders diagnostics. High acuity services include newborn hearing screening and rehabilitative services of swallowing disorders.

**Conclusion:** Most phoniatic services can be safely postponed during pandemics except for voice and swallowing disorders diagnostics and treatments. Consideration of tele-practice during pandemics.

**Key Words:** COVID-19, implemented services, phoniaticians, infective outbreak, pandemic survey.

**Received:** 22 June 2021, **Accepted:** 19 August 2021

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**ISSN:** 2090-0740, 2021

## KEY POINTS OF THE STUDY

1. Statements addressing Phoniatics service delivery guidelines and recommendations during the COVID-19 pandemic are limited and based on experts' opinions.

2. This study aims to provide a risk-assessment framework that guides phoniatic clinical services delivery and also to identify critical patients during infection outbreaks using a questionnaire-based survey directed to the phoniaticians in multiple areas of the world.

3. Most Phoniatics services can be safely postponed during pandemics except for voice and swallowing disorders diagnostics and treatments.

4. Dysphonic patients with airway compromise and patients with swallowing and feeding difficulties are considered urgent patients.

5. Tele-practice should be considered as an alternative route for delivering the services.

## INTRODUCTION

Phoniatics is the medical field for communication and swallowing disorders, concerned with functions and diseases of voice, speech, language, hearing, and swallowing. The "Coronavirus disease 2019" was first reported in Wuhan, Hubei province, China, and has spread exponentially, resulting in a worldwide outbreak and a significant burden on the finite resources of many healthcare systems<sup>[1]</sup>. Reports from several scientific institutions stated that ENT specialists/Phoniaticians are at an increased risk of contracting the coronavirus/SARS-CoV2 infection due to the presence of the virus extensively in the nasal and pharyngeal cavities of infected individuals<sup>[2, 3]</sup>. The infection might be transmitted via procedures like nasoendoscopies or laryngoscopies that carry the risk of disseminating the virus through aerosol particles loaded with the virus hence, the nomenclature aerosol-generating procedures (AGPs) or by direct contact with contaminated surfaces during the patient

confrontation<sup>[3]</sup>. Accordingly, several phoniatic outpatient clinics deferred offering their patients the required clinical services to preserve their health resources or protect themselves from being infected. The only available formal guideline related to Phoniatic practice during the COVID-19 pandemic has been presented by the Union of European Phoniaticians (UEP) and included the opinions of a small number of experts Phoniaticians. Therefore, this questionnaire-based survey's main aim was to gather Phoniaticians' perspectives on implementing Phoniatic services during the pandemic in a large cohort. This is to provide evidence-based guidelines to guide the provision of clinical Phoniatic services during the current outbreak or any future infectious outbreak.

## **PATIENTS AND METHODS**

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### **2.1. Design:**

Cross-sectional study

### **2.2. Settings:**

The authors reviewed the available guidelines and recommendations related to Phoniatic and ENT practices during the COVID-19 pandemic to guide the survey development. The authors designed a questionnaire-based survey directed to the phoniaticians to inspect their clinical service applications during the pandemic. The questionnaire was distributed through the web on Google Forms to various Phoniatic societies and was available for answers from the 25<sup>th</sup> of June till the 10<sup>th</sup> of July, 2020. Participation in the questionnaire was entirely voluntarily and self-administered. Both purposes and components of the questionnaire were illustrated before hand, and data of the respondents were kept anonymous.

The questionnaire was composed of four sections; Section I included grading of all domains implied in Phoniatic practice based on their acuity. Each domain consisted of three parts; non-interventional, interventional diagnostic, and treatment/rehabilitative services. Section II included service delivery. Section III included classification of patients according to morbidity into elective, semi-elective, semi-urgent, or urgent. Section IV included the demographic characteristics of the respondent.

All questions were in English and participants responded by choosing a single answer to each question. The questionnaire took an average of 10-15 minutes to complete. The authors presented the questionnaire to three experienced phoniaticians other than the authors as a pilot study to evaluate the questionnaire in terms of the feasibility of answering; duration spent to be answered, fulfillment of the intended goals (face validity), coverage of all aspects of Phoniatic practice (content validity); and additional suggestions that might improve the questionnaire. The comments were considered, and the amendments were added to the questionnaire accordingly. Their responses

were, however, not included in the statistical analysis.

Our research complied with human studies guidelines and was conducted ethically following the World Medical Association Declaration of Helsinki. The survey carried no risk to participants, and it was basically directed to scrutinize Phoniatic clinical practice in the current pandemic situations without affecting it in any way. Therefore, it was qualified for exemption from the Institution Review Board (IRB)'s approval (Blinded for review).

### **3. Statistical analysis:**

Data from all responses were exported to SPSS version 22 (Statistical Package for Social Science) for Windows. Each grade/category was assigned a score, and the total scores were calculated. Descriptive statistics were presented as number, percentage, mean, and standard deviation. Independent samples t-test was used to compare between quantitative variables of parametric data. Pearson correlation test was done to measure the correlation between quantitative variables. P-value considered statistically significant when  $P < 0.05$ .

### **4. Main outcome measures:**

The recognition of the high acuity Phoniatic clinical services and the identification of the Phoniatic critical patients/complaints during pandemics.

## **RESULTS**

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All received responses are included in the statistical analysis, and none of them was incomplete. The majority of respondents had sufficient years of experience in practice, so we considered their responses reliable.

### **5.1. Survey descriptive statistics:**

#### **Demographic data:**

One hundred five responses are received. The highest representation (96, 91.4%) was from Egypt, while 8.6% was from other countries. The respondents were mainly females (90, 85.7%), and 15 (14.3%) were males. More than half (56, 53.3%) lied in the age group 30-40 years and had 3-10 years (39, 37.1%), or 10-20 years (37, 35.2%) of professional experience. Over half worked in academic institutions (58, 55.2%), mostly included to treat COVID-19 cases (67, 63.8%). Nearly half (48, 45.7%) were provided with the necessary PPE by their institutions, and most of them (96, 91.4%) had access to technical support tools.

#### **Implemented services:**

The majority of phoniaticians graded the non-interventional diagnostic services of voice disorders grade one; the highest number observed in the voice-related quality of life questionnaires (76, 72.4%) and the lowest in the diagnostic interview (49, 46.7%). However, the interventional diagnostic services of voice disorders were mostly considered grade two. This was also noted

in phonosurgeries, except the office-based vocal fold injection were considered grade one. The rehabilitative services were also considered grade one.

Most respondents graded the non-interventional diagnostic services of speech, language and hearing disorders as grade one. Likewise, Language and speech therapies and alternative/augmentative communication. However, most contributors considered the interventional diagnostic services grade 2. Similarly, the rehabilitation of the hearing disabled and prosthesis application were considered grade 2 (50, 47.6%) and (56, 53.3%) respectively.

The majority graded the non-interventional diagnostic services of swallowing disorders grade 2, especially the nutritional evaluation (49, 46.7%) ; yet, the swallowing-related quality of life questionnaires was considered

grade one (57, 54.3%). The interventional diagnostic services of swallowing disorders were also rated grade 2 with the highest rates noted in the videofluoroscopic swallow study (VFSS); (55, 52.4%) and the lowest in the flexible endoscopic evaluation of swallowing (FEES); (49, 46.7%). Swallowing therapy was equally assigned grades 2 and 3 (45, 42.9%); however, dietetic/nutritional therapy was mostly considered grade 3 (44, 41.9%). The treatment services, e.g., UES botulinum toxin injection, were considered grade 1. Notably that the instrumental diagnostic services in all domains were mostly considered grade 1 (Table 1).

### **Service delivery:**

The majority of respondents chose tele-practice as a delivery approach for most Phoniatic services (Table 2).

**Table 1:** Descriptive statistics; implemented services/treatment

Implemented services/treatment	Grade 1 <sup>1</sup>		Grade 2 <sup>2</sup>		Grade 3 <sup>3</sup>	
	No.	%	No.	%	No.	%
<b>I. Voice Disorders</b>						
<b>Non-interventional diagnostic services</b>						
Diagnostic interview	49	46.7	38	36.2	18	17.1
Perceptual evaluation of voice	52	49.5	38	36.2	15	14.3
Voice-related quality of life questionnaire	76	72.4	21	20.0	8	7.6
Voice recording	70	66.7	24	22.9	11	10.5
<b>Interventional diagnostic services</b>						
Indirect laryngoscopy	34	32.4	51	48.6	20	19.0
Rigid video/digital laryngostroboscopy	25	23.8	56	53.3	24	22.9
Flexible transnasal video/digital laryngostroboscopy	20	19.0	62	59.0	23	21.9
Instrumental diagnostic measures; EMG and EGG	75	71.4	25	23.8	5	4.8
<b>Rehabilitative Services</b>						
Voice therapy	64	61.0	32	30.5	9	8.6
Electrolarynx rehabilitation	59	56.2	37	35.2	9	8.6
Phonosurgery/ surgery						
Suspension microlaryngoscopic vocal fold surgery; exophytic lesions	30	28.6	49	46.7	26	24.8
Suspension microlaryngoscopic vocal fold surgery; intracordal lesions	29	27.6	52	49.5	24	22.9
Laryngeal framework surgery; approximation, expansion, tensioning and relaxation	40	38.1	43	41.0	22	21.0
Office-based transoral vocal fold injection	51	48.6	42	40.0	12	11.4
Office-based transcuteaneous vocal fold injection	46	43.8	45	42.9	14	13.3
Application of voice prosthesis	40	38.1	46	43.8	19	18.1
<b>II. Speech, language and hearing disorders</b>						
<b>Non-interventional diagnostic services</b>						
Diagnostic interview including family tree in familial hearing disorders	65	61.9	31	29.5	9	8.6
Developmental questionnaires	76	72.4	18	17.1	11	10.5
Evaluation of verbal and amp; non-verbal communication	54	51.4	38	36.2	13	12.4
Evaluation of speech perception and production	58	55.2	37	35.2	10	9.5

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Estimation of cognitive and developmental age	61	58.1	37	35.2	7	6.7
Evaluation of reading and writing	76	72.4	24	22.9	5	4.8
<b>Interventional diagnostic services</b>						
Neurological examination	37	35.2	57	54.3	11	10.5
Speech and oral motor examination	39	37.1	52	49.5	14	13.3
Ear endoscopy and microscopy	43	41.0	50	47.6	12	11.4
Newborn hearing screening	22	21.0	39	37.1	44	41.9
Audiometric and electro-physiologic testing	33	31.4	45	42.9	27	25.7
Fiberoptic evaluation of velopharyngeal function	44	41.9	47	44.8	14	13.3
Instrumental diagnostic measures; acoustic and aerodynamic	79	75.2	23	21.9	3	2.9
<b>Rehabilitative services</b>						
Language and speech therapy	51	48.6	42	40.0	12	11.4
Rehabilitation of hearing disabled	22	21.0	50	47.6	33	31.4
Augmentative and alternative communication	51	48.6	44	41.9	10	9.5
Treatment services						
Prosthesis application; palatal lift or speech prosthesis	36	34.3	56	53.3	13	12.4
<b>III. Swallowing Disorders</b>						
<b>Non-interventional diagnostic services</b>						
Diagnostic interview	33	31.4	43	41.0	29	27.6
Bedside evaluation of swallowing	25	23.8	48	45.7	32	30.5
Nutritional evaluation	19	18.1	49	46.7	37	35.2
Swallowing-related quality of life questionnaires	57	54.3	30	28.6	18	17.1
<b>Interventional diagnostic services</b>						
Flexible Endoscopic Evaluation of swallowing (FEES)	14	13.3	49	46.7	42	40.0
Videofluoroscopic Evaluation of Swallowing (VFES)	14	13.3	55	52.4	36	34.3
Manometry	64	61.0	30	28.6	11	10.5
<b>Rehabilitative services</b>						
Swallowing therapy	15	14.3	45	42.9	45	42.9
Dietetic and nutritional therapy	20	19.0	41	39.0	44	41.9
<b>Treatment services</b>						
Auxiliary Devices application in swallowing disorders	44	41.9	44	41.9	17	16.2
UES botulinum toxin injection and myotomy	41	39.0	42	40.0	22	21.0

<sup>1</sup> Low acuity service/treatment (postponing the service/treatment will not harm the patient)

<sup>2</sup> Intermediate acuity service/treatment (postponing the service/treatment will potentially harm the patient)

<sup>3</sup> High acuity service/treatment (postponing the service/treatment will harm the patient)

**Table 2:** Descriptive statistics; Services delivery

Implemented services/treatment	Tele-practice		Face-To-Face practice	
	No.	%	No.	%
<b>I. Voice Disorders</b>				
<b>Non-interventional diagnostic services</b>				
Diagnostic interview in voice disorders	84	80.0	21	20.0
Perceptual evaluation of voice disorders	75	71.4	30	28.6
Voice-related quality of life questionnaire	93	88.6	12	11.4
Voice recording	80	76.2	25	23.8
<b>Rehabilitative services</b>				
Voice therapy	74	70.5	31	29.5

Electrolarynx rehabilitation	59	56.2	46	43.8
<b>II. Speech, Language and Hearing Disorders</b>				
<b>Non-interventional diagnostic services</b>				
Diagnostic interview <sup>1</sup>	88	83.8	17	16.2
Developmental questionnaires	95	90.5	10	9.5
Evaluation of verbal and non-verbal communication	64	61.0	41	39.0
Evaluation of speech perception and production	67	63.8	38	36.2
Estimation of cognitive and developmental age	62	59.0	43	41.0
Evaluation of reading and writing	64	61.0	41	39.0
<b>Rehabilitative services</b>				
Language and speech therapy	67	63.8	38	36.2
Rehabilitation of hearing disabled	45	42.9	60	57.1
Augmentative and alternative communication	61	58.1	44	41.9
<b>III. Swallowing disorders</b>				
<b>Non-interventional diagnostic services</b>				
Diagnostic interview in swallowing disorders	68	64.8	37	35.2
Bedside evaluation of swallowing	26	24.8	79	75.2
Nutritional evaluation	54	51.4	51	48.6
Swallowing-related quality of life questionnaires	84	80.0	21	20.0
<b>Rehabilitative services</b>				
Swallowing therapy	54	51.4	51	48.6
Dietetic and nutritional therapy	76	72.4	29	27.6

<sup>1</sup> Including family tree tracing in familial hearing disorders

### **Classification of patients according to morbidity:**

Most respondents classified dysphonic patients with airway compromise as urgent patients (56, 53.3%), whereas patients without airway compromise and phonaesthetic patients were considered elective (43, 41%) and (85, 81%) respectively (Table 3). Patients receiving regular botulinum toxin treatment and laryngectomees were mostly classified as semi-elective (56, 53.3%), and (51, 48%), respectively. Similarly, patients with dysarthria, aphasia or dysphasia, and childhood hearing disorders

(60, 57%), (59, 56.2%), and (55, 52.4 %) respectively. However, patients with developmental language delay, resonance disorders, reading and writing disorders, and lastly, childhood and adulthood fluency disorders were mostly considered elective.

The majority classified patients with swallowing/feeding disorders whether childhood or adulthood post-traumatic and stroke patients as urgent patients (60, 57%), (57, 54.3%), and (66, 62.9%) respectively.

**Table 3:** Classification of patients according to morbidity

Patients/complaints	Elective patient <sup>1</sup>		Semi-elective patient <sup>2</sup>		Semi-urgent patient <sup>3</sup>		Urgent patient <sup>4</sup>	
	No.	%	No.	%	No.	%	No.	%
<b>I. Voice Disorders</b>								
Dysphonia with airway compromise	19	18.1	13	12.4	17	16.2	56	53.3
Dysphonia without airway compromise	43	41.0	43	41.0	15	14.3	4	3.8
Phonaesthesia	85	81.0	18	17.1	2	1.9	0	0.0
Patients receiving regular botulinum toxin injection for voice spasm, tremors or VCD	23	21.9	56	53.3	18	17.1	8	7.6
Laryngectomees receiving Provox electrolarynx, oesophageal speech or voice prosthesis	34	32.4	51	48.6	16	15.2	4	3.8

**II. Speech, language, and hearing disorders**

Developmental language delay	56	53.3	45	42.9	2	1.9	2	1.9
Acquired language disorders (aphasia or dysphasia)	31	29.5	59	56.2	13	12.4	2	1.9
Dysarthria	33	31.4	60	57.1	12	11.4	0	0.0
Resonance disorders	49	46.7	48	45.7	8	7.6	0	0.0
Reading and writing abnormalities	69	65.7	34	32.4	2	1.9	0	0.0
Childhood fluency disorders	58	55.2	43	41.0	4	3.8	0	0.0
Childhood hearing disorders	19	18.1	55	52.4	27	25.7	4	3.8
Adulthood fluency disorders	52	49.5	47	44.8	6	5.7	0	0.0

**III. Swallowing disorders**

Early childhood feeding or swallowing difficulties or failure to thrive	4	3.8	10	9.5	31	29.5	60	57.1
Post-traumatic or post-operative feeding or swallowing difficulties	4	3.8	8	7.6	36	34.3	57	54.3
Acute cases of dysphagia including ICU and stroke patients	5	4.8	10	9.5	24	22.9	66	62.9

<sup>1</sup> Patients without significant morbidity

<sup>2</sup> Patients with significant morbidity if not corrected within 3-6 months

<sup>3</sup> Patients with significant morbidity if not corrected within 48-72 hours

<sup>4</sup> Patients with significant morbidity if not corrected immediately

**5.2. Association between demographic characteristics and the overall score of implemented services, the score of patients' morbidity:**

The differences in implemented services grading were significantly related to the gender, type of working institution, and inclusion of working institutions to treat COVID-19 cases. While the differences in gender and age significantly influenced respondents' classification of patients/complaints (Table 4).

**5.3. Association between service delivery and the overall score of implemented services grading, the**

**score of patients' morbidity:**

The face-to-face practice was a significantly more likely approach to swallowing, dietetic and nutritional therapies than tele-practice. Likewise, it was a significant approach to handle critical patients requiring swallowing therapy (Table 5).

**5.4. Correlation between the overall score of implemented services grading and score of patients' morbidity:**

Respondents' grading of implemented services was positively correlated to the degree of patient morbidity (Figure 1).

**Table 4:** Association between demographic characteristics and the overall score of implemented services grading, score of patients' morbidity classification

	Implemented services score	P value	Score of patients' morbidity	P value
	Mean ± SD		Mean ± SD	
Gender				
Male	70.07 ± 12.49	0.037*	29.93 ± 4.33	0.023*
Female	78.62 ± 14.84		34.29 ± 7.09	
Age: (years)				
< 40	76.01 ± 14.73	0.204	32.54 ± 6.89	0.026*
≥ 40	79.84 ± 14.74		35.66 ± 6.59	
Current social status				
Married	77.06 ± 14.22	0.498	33.46 ± 6.83	0.367
Not-married	80.27 ± 19.52		35.45 ± 7.72	
Number of children				
No	77.07 ± 15.08	0.925	35.73 ± 6.10	0.213
Yes	77.46 ± 14.81		33.32 ± 7.01	

Country of residence				
Egypt	77.47 ± 14.68	0.877	33.40 ± 7.01	0.191
Other country	76.67 ± 16.73		36.56 ± 5.27	
Duration of your professional experience				
< 10 years	76.84 ± 12.56	0.717	32.78 ± 5.88	0.218
≥ 10 years	77.89 ± 16.57		34.45 ± 7.68	
Kind of working institutions:				
Academic institution	73.98 ± 15.39	0.008*	33.17 ± 7.96	0.419
Non-academic/ Mixed	81.62 ± 12.94		34.28 ± 5.39	
Type of working community				
City or urban community	77.69 ± 14.60	0.310	33.88 ± 6.51	0.111
Rural community	70.00 ± 19.70		28.25 ± 14.29	
Access to technological support tools				
Yes	77.48 ± 14.69	0.859	33.76 ± 6.55	0.652
No	76.56 ± 16.63		32.67 ± 10.55	
Inclusion of working institution to treat COVID-19 cases				
Yes	75.24 ± 13.35	0.046*	33.06 ± 6.09	0.234
No	81.21 ± 16.51		34.74 ± 8.15	
Working institution providing with the necessary personal protective equipment (PPE)				
Yes	77.73 ± 15.39	0.272	33.90 ± 6.14	0.188
No	73.69 ± 15.76		31.69 ± 8.39	

Test used: Independent sample T-test

\* Significant *P*-value <0.05

**Table 5:** Association between service delivery and the overall score of implemented services grading, score of patients' morbidity classification

Service delivery	Implemented services score	<i>P</i> value	Patient morbidity score	<i>P</i> value
	Mean ± SD		Mean ± SD	
Diagnostic interview in voice disorders				
Tele-practice	78.57 ± 14.72	0.105	34.32 ± 6.55	0.052
Face-To-Face practice	72.71 ± 14.43		31.05 ± 7.85	
Perceptual evaluation of voice disorders				
Tele-practice	78.80 ± 15.03	0.125	34.37 ± 6.68	0.098
Face-To-Face practice	73.90 ± 13.74		31.90 ± 7.29	
Voice-related quality of life questionnaire				
Tele-practice	78.37 ± 14.48	0.062	34.13 ± 6.68	0.056
Face-To-Face practice	69.92 ± 15.59		30.08 ± 7.98	
Voice recording:				
Tele-practice	78.18 ± 13.96	0.339	33.53 ± 6.11	0.709
Face-To-Face practice	74.92 ± 17.22		34.12 ± 9.18	
Voice therapy:				
Tele-practice	76.20 ± 14.01	0.201	33.62 ± 6.20	0.918
Face-To-Face practice	80.26 ± 16.35		33.77 ± 8.50	
Electrolarynx rehabilitation				
Tele-practice	74.95 ± 12.98	0.054	33.07 ± 5.19	0.317
Face-To-Face practice	80.54 ± 16.42		34.43 ± 8.65	
Diagnostic interview including family tree in familial hearing disorders				
Tele-practice	77.60 ± 14.01	0.751	33.66 ± 6.63	0.980
Face-To-Face practice	76.35 ± 18.72		33.71 ± 8.50	

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<b>Developmental questionnaires</b>				
Tele-practice	78.12 ± 14.36	0.127	33.79 ± 6.46	0.577
Face-To-Face practice	70.60 ± 17.71		32.50 ± 10.76	
<b>Evaluation of verbal and non-verbal communication</b>				
Tele-practice	75.44 ± 13.95	0.089	32.98 ± 6.75	0.208
Face-To-Face practice	80.46 ± 15.68		34.73 ± 7.12	
<b>Evaluation of speech perception and production</b>				
Tele-practice	76.10 ± 14.01	0.235	33.30 ± 6.71	0.472
Face-To-Face practice	79.68 ± 15.98		34.32 ± 7.32	
<b>Estimation of cognitive and developmental age</b>				
Tele-practice	75.87 ± 13.85	0.205	33.35 ± 5.87	0.582
Face-To-Face practice	79.60 ± 15.93		34.12 ± 8.25	
<b>Evaluation of reading and writing</b>				
Tele-practice	76.52 ± 13.86	0.446	33.72 ± 6.27	0.924
Face-To-Face practice	78.78 ± 16.19		33.59 ± 7.90	
<b>Language and speech therapy</b>				
Tele-practice	76.43 ± 14.50	0.376	33.40 ± 6.68	0.706
Face-To-Face practice	79.11 ± 15.30		34.13 ± 7.39	
<b>Rehabilitation of hearing disabled</b>				
Tele-practice	75.51 ± 14.51	0.259	33.64 ± 6.49	0.977
Face-To-Face practice	78.82 ± 14.94		33.68 ± 7.28	
<b>Augmentative and alternative communication</b>				
Tele-practice	75.72 ± 14.34	0.172	33.39 ± 6.46	0.636
Face-To-Face practice	79.73 ± 15.23		34.05 ± 7.57	
<b>Diagnostic interview in swallowing disorders</b>				
Tele-practice	77.60 ± 13.68	0.850	34.53 ± 6.33	0.083
Face-To-Face practice	77.03 ± 16.81		32.08 ± 7.73	
<b>Bedside evaluation of swallowing</b>				
Tele-practice	74.65 ± 15.32	0.277	33.12 ± 5.81	0.642
Face-To-Face practice	78.30 ± 14.58		33.85 ± 7.27	
<b>Nutritional evaluation</b>				
Tele-practice	76.15 ± 13.34	0.374	33.50 ± 5.89	0.801
Face-To-Face practice	78.73 ± 16.19		33.84 ± 7.91	
<b>Swallowing-related quality of life questionnaires</b>				
Tele-practice	77.64 ± 13.28	0.738	34.23 ± 6.25	0.098
Face-To-Face practice	76.43 ± 20.06		31.43 ± 8.95	
<b>Swallowing therapy</b>				
Tele-practice	73.39 ± 13.48	0.004*	32.31 ± 6.07	0.039*
Face-To-Face practice	81.65 ± 15.03		35.10 ± 7.51	
<b>Dietetic and nutritional therapy</b>				
Tele-practice	75.49 ± 13.23	0.031*	33.12 ± 5.90	0.190
Face-To-Face practice	82.41 ± 17.50		35.10 ± 9.03	

Test used: Independent sample T-test

\* Significant *P*-value <0.05

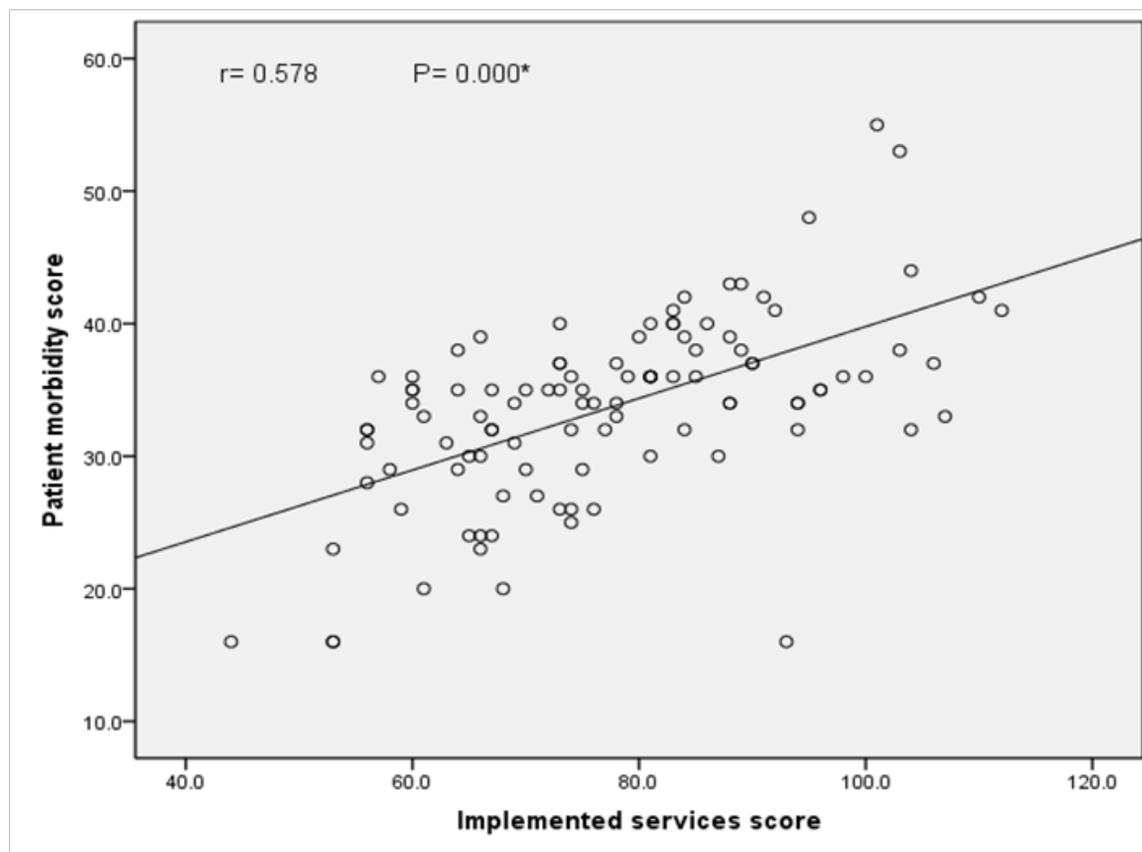


Fig. 1: Correlation between the overall score of implemented services grading and the score of patients' morbidity

## DISCUSSION

Phoniatricians are not among the frontline health care professionals in caring for patients during infectious outbreaks. Nevertheless, this practice entails providing clinical services to patients with upper airway disorders, swallowing, and feeding disorders who might be at a considerable risk if the clinical services' suspended or postponed. Guidelines for Phoniatic practice during the COVID-19 pandemic are still lacking. In this study, we used a survey as a measure of phoniaticians' practices during the pandemic.

Our survey shows that most participants agree that the non-interventional diagnostic measures of voice disorders, speech, and language and hearing disorders can be safely postponed. The results were incongruent with the UEP statement expressing that these measures can be done through tele-consultation<sup>[3]</sup>. Still, our data show that similar measures of swallowing disorders can be undertaken with precautions agreeing with the recommendations of the UEP statement<sup>[3]</sup> and in fact anticipated given the potential complications of oropharyngeal dysphagia as aspiration pneumonia and malnutrition.

Interventional diagnostic procedures of voice and swallowing disorders, including trans-oral rigid or trans-nasal flexible laryngoscopies, are among the AGPs that

carry the risk of infection transmission. Thus concerns have to be taken to balance the risk of infection transmission and patients' complications, which is illustrated in our survey. Most respondents consider them intermediate acuity services, which supports the available corresponding guidelines and recommendations<sup>[3-7]</sup>. The same applies to the survey results concerning the interventional diagnostics of speech, language, and hearing disorders however, contrasting with the UEP statement that declared that hearing examinations and assessment should be executed promptly<sup>[3]</sup>. A possible explanation is that most of our responses are received from phoniaticians residing in Egypt where Phoniatics and Pediatric audiology are separate specialties. Nevertheless, our survey confirms that newborn hearing screening is a high acuity service agreeing with the UEP statement that emphasized the same point<sup>[3]</sup>.

In line with the international recommendations<sup>[3]</sup>, we found that the instrumental voice, speech, language disorders diagnostics, especially for patients with elective scenarios, can be postponed since they are also considered potential AGPs.

While, the UEP recommendations highlighted that laryngeal procedures/surgeries, including office-based vocal fold injection, can be performed after prior SARS-Cov-2 testing<sup>[3]</sup>, our data describe that these procedures can

be delayed. This is Likely due to the restriction of testing in Egypt to the suspected cases during the current survey<sup>[8]</sup>. However, our results agree with the guidelines introduced by the American Academy of head and neck surgery which reported the consideration of postponing these procedures for more than 30 days<sup>[6]</sup>.

Contrary to the UEP recommendations that advocated the delivery of language, and speech therapy in the presence of special protective precautions [3], our survey recommends postponing them. This may be due to the anticipated less adherence of Egyptians to the various protective precautions<sup>[9]</sup>. Nevertheless, our findings support the UEP recommendations that stipulated that rehabilitation of the hearing disabled should be prioritized. Our results advocate postponing voice therapy while the UEP recommendations embraced the use of remote voice therapy<sup>[3]</sup>. This variation is possibly due to the lack of patients' awareness of tele-medicine in Egypt<sup>[10]</sup>.

ENT and Phoniatic societies' recommendations<sup>[2-7, 12]</sup>, implied that clinical service delivery should be transferred more to the tele-practice patterns. This was further supported by our data showing that tele-practice is a suitable approach for service delivery during pandemics.

In the context of the COVID-19 pandemic, it was crucial to triage patients/complaints according to potential morbidity. This is reflected by our survey, which reveals that most Phoniatic patients are regarded as elective except for patients with airway compromise and those with swallowing disorders are considered urgent patients. These findings are concordant with the corresponding recommendations<sup>[4-7, 12]</sup>. Whereas, patients receiving regular botulinum toxin treatment, laryngectomees, and patients with dysarthria and aphasia are considered semi-elective. The latter responses are owed to the concerns for the increased risk of transmission of the virus with close examinations/procedures of the head and neck<sup>[4-7]</sup>.

Interestingly, our data show that females are significantly inclined to advance services. In contrast, males tend to postpone them, supporting the opinion stating that physicians' dedication toward their patients during pandemics is not restricted to the male gender<sup>[11]</sup>. While respondents working in academic institutions consider most Phoniatic services to be intermediate acuity, those working in non-academic institutions tend to consider them higher acuity. This is true as most academic institutions are currently directed toward managing patients with COVID-19, which consumes most of their resources; thus, managing patients with elective or semi-elective scenarios has been deferred<sup>[4, 12, 13]</sup>. Furthermore, respondents working in institutions treated COVID-19 cases were significantly more likely to postpone most of the services than those whose institutions did not treat

COVID-19 cases. Institutional priority to treat COVID-19 cases probably contributed to the later findings<sup>[12]</sup>.

Additionally, phoniaticians more than 40 years old are significantly more likely to triage patients to be critical than phoniaticians less than 40 years (35.66 vs. 32.54,  $P < 0.026$ ). The duration of professional experience maybe a plausible cause of this finding. Female phoniaticians are significantly more likely to triage patients to be more morbid than male phoniaticians. This may be because most of our survey's respondents were female. It is noteworthy that this is the first formal Phoniatic guideline to associate between demographic characteristics and patient triaging during the COVID-19 pandemic.

Despite the current pandemic situation, face-to-face practice is a significantly more likely approach for swallowing, dietetic, and nutritional therapy than tele-practice. Similarly, it is a significant approach to handle urgent patients requiring swallowing therapy. These findings are consistent with the available guidelines and recommendations<sup>[3-7]</sup> and maybe attributed to the urgency of swallowing rehabilitation that necessitates patient confrontation.

The positive relationship between the implemented services and patients' morbidity grading is an expected outcome that reinforces the recommendations advocated that Phoniatic and/or ENT services should be prioritized to urgent patients<sup>[4-7]</sup>.

This survey was conducted during the first wave of the COVID-19 pandemic. At that time, it was a critical situation that confronted all health care providers, including phoniaticians who generally deal with patients with less acute pathology; nonetheless, examinations/treatments are challenging to execute remotely. We provided a risk-assessment framework that guides Phoniaticians to a safer practice without affecting patients' survival or recovery.

The only limitation is that most of the responses were from Egypt, with a few responses from other areas of the world. However, it is essential to note that Egypt's Phoniatic specialty is well established and assembles many well-experienced phoniaticians. Nevertheless, we intend to repeat the questionnaire and include a larger group of phoniaticians to investigate service implementation adjustments in the post-vaccination period.

## **CONCLUSION**

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We provided evidence-based guidelines of Phoniatic service implementation during the current or future infective outbreak. Most Phoniatic services can be safely postponed except for voice and swallowing disorders diagnostics and treatments. Dysphonic patients with airway compromise and patients with swallowing or feeding

difficulties are considered urgent patients. A paradigm shift to tele-practice is recommended.

## ACKNOWLEDGMENT

We gratefully acknowledge the support of the Egyptian Society of Phoniatics and Logopedics (ESPL) for assistance in obtaining the data of the questionnaire. We also acknowledge Prof. Nirvana Gamal-Eldin (Ain Shams University), Prof. Sahar Shohdy (Cairo University), and Prof. Amal Elsaed (Zagazig University) for their valuable comments in reviewing the questionnaire-based survey of the current study.

## CONFLICT OF INTEREST

There are no conflicts of interest

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