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Original Article

Ear,Nose and Throat Section

Role of Telemedicine in Otorhinolaryngology during COVID-19 Pandemic in a Tertiary Care Centre of Tamil Nadu: A Prospective Cohort Study

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ABSTRACT

Introduction: Telemedicine is the practice of using telecommunication technology to provide healthcare services to patients in remote areas. Teleconsultation is used in various specialties of medicine, especially during the COVID-19 pandemic situation. But in developing countries like India, it is less practicable in surgical specialties like Otorhinolaryngology.

Aim: To determine the eligibility and effectiveness of telemedicine practice in otorhinolaryngology during the COVID-19 pandemic in a tertiary care centre of Chengalpattu district, Tamil Nadu, India.

Materials and Methods: A prospective cohort study was conducted at Chettinad Hospital and Research Institute, Tamil Nadu, India from September 2021 to February 2022 which involved 90 patients who requested a consultation for various ear, nose, and throat complaints. Based on history, a provisional diagnosis was made and treated. Feedback forms contained 11 questions were sent during the revisit and analyses were made. Statistical analysis were done using mean, proportion and Chi-square test.

Results: This study included 49 (54.4%) male and 41 (45.6%) female patients with a mean age of 40.68 years. Only 23 (25.6%) patients had no problem seeing the doctor clearly and 19 (21.1%) had no trouble hearing the doctor. Only 4 (4.4%) patients accepted teleconsultation and will use teleconsultation services again.

Conclusion: This study concluded that teleconsultation practice was not satisfactory for the majority of patients in the field of otorhinolaryngology. The inability to arrive at the definitive diagnosis and subsequent therapeutic procedures by using telemedicine was the limitation.

Keywords: Coronavirus disease-2019, Ear, nose and throat, Teleconsultation, Video consultation

INTRODUCTION

Telemedicine is defined as a practice that uses telecommunication technology to provide medical care in remote access areas, especially in an underserved regions [1]. Telemedicine was used for the first time during the outbreak of contagious disease when smoke signals were sent by ancient civilisations to warn about an outbreak [2]. Telemedicine is successfully used in many fields of medicine like ophthalmology, radiology, cardiology, psychiatry, and dermatology [3]. As technology improves, the use of telemedicine will continue to expand in all areas of medicine. Otorhinolaryngology is a small subset of surgical specialties and the practice of telemedicine is now accepted slowly. Since most otorhinolaryngologists are located in urban areas, it is difficult to access patients from rural areas to travel for hours [4]. Initially telemedicine was established to provide adequate medical care to patients living in underserved areas. Telemedicine aims to reduce the time and cost required to travel to the hospital with improved efficiency and quality of care [5]. There are two types of telemedicine: synchronous and asynchronous [6]. Because of increased population and shortage of doctors, teleconsultation has gained popularity. In otorhinolaryngology, objective tests including tympanograms, audiograms, and diagnostic images are available, but history taking and examinations like endoscopy are vital for the diagnosis [5].

The novel coronavirus Severe Acute Respiratory Syndrome Corona Virus 2 (SARS-CoV-2) infection emerged as a pandemic from 17th November 2019 [7]. The rapid progression of the virus caused a pandemic and became a real challenge for the whole world. Social distancing is very important to control the spread of this communicable disease which makes it difficult access to medical care. The usage of telemedicine during the coronavirus epidemic has been the first line of defence to reduce and slow the spread of disease, keep social distance, and provide services by phone or videoconferencing [7]. Some conditions in otorhinolaryngology can be treated through electronic consultations but many may require a traditional face-to-face approach [4]. Previous studies have showed the use of telemedicine in otorhinolaryngology was effective, especially in rural areas with significant cost and time savings [4,5]. Telemedicine in Otorhinolaryngology is practiced in developed countries and numerous studies are testing its efficacy [1,3,4]. There are very few studies testing the feasibility of telemedicine in Otorhinolaryngology in India [8,9]. The application of telemedicine during the COVID-19 pandemic especially in developing countries like India is very challenging and this current study was conducted when access to the healthcare system was difficult in both urban and rural areas due to the rapid spread of infection and social distancing practices. This study aimed to determine the eligibility and effectiveness of telemedicine practice in otorhinolaryngology during the COVID-19 pandemic in a tertiary care centre of Chengalpattu District, Tamil Nadu, India.

MATERIALS AND METHODS

This prospective cohort study was done at Chettinad Hospital and Research Institute, Chennai, Tamil Nadu, India, which involved a total of 90 patients who requested teleconsultation over six months during the COVID-19 pandemic from September 2021 to February 2022 in the Otorhinolaryngology Department, Chettinad Hospital, and Research Institute after getting approval from the Ethical Committee (Ref No: IHEC-II/0033 /21).

Sample size calculation: Sample size was calculated with the formula of sample size for observational study, $n=Z^2 pq/l^2$ (p-percentage of satisfaction with telemedicine services taken as 87%,

l- relative error of 7%), P=87% [10], q=13%, Z=1.96 and l=7%. Substituting these values, a sample size of 88 was arrived. Thus sample of 90 were included.

Inclusion criteria: Patients with minor ear, nose, and throat complaints requested telemedicine consultation, all patients >18 years of either sex and postoperative patients after one month of surgery who needed regular follow-up were included in this study.

Exclusion criteria: Patients who presented to the outpatient department of Otorhinolaryngology, all patients <18 years of age, patients requiring emergency/major ear, nose, and throat management (such as foreign bodies, stridor, etc.,), patients with uncontrolled co-morbidities and postoperative patients less than one month of surgery were excluded from this study.

Study Procedure

Patients who attended teleconsultation in the Department of Otorhinolaryngology, at the tertiary care centre were evaluated after obtaining informed and written consent. Demographic details of the patients were collected. Clinical history and symptoms were noted. Based on their history and symptoms provisional diagnosis was made. Then the patients were treated through teleconsultation. Follow-up of the patients was done after two days through teleconsultation. While giving teleconsultation patients were advised to immediately contact their concerned doctor in case of any adverse reactions like vomiting, headache, breathing difficulties, rashes, etc. Feedback form TESQ (TeleENT Satisfaction Questionnaire) was modified according to Indian context and pretesting was done [1]. This study was assessed for criteria validity and cronbach's alpha measurement was done. Pretesting and pilot testing was done in around 10 patients and tool was modified on the basis of this pilot testing. Original version had 14 questions, three questions were removed after the pilot testing. The modified questionnaire contained 11 questions which had five options ranging from strongly disagree to strongly agree [Annexure 1]. All these responses were downloaded, tabulated, stored, and assessed for the effectiveness of telemedicine. A total score of 30 or more was considered a good response and considered that patient was satisfied. The cut-off value of 30 value was arrived by pretesting and pilot testing.

STATISTICAL ANALYSIS

Statistical analysis was carried out using Statistical Package for the Social Sciences (SPSS) version 21.0 and Microsoft excel software. The means and proportions were used. The association between two groups were assessed by independent t-test. The statistical significance was considered when p-value <0.05.

RESULTS

Out of 90 patients, 49 (54.4%) males and 41 (45.6%) females were involved [Table/Fig-1]. The mean age of the study population was 40.68±12.9 years. Among them, 26 (28.9%) patients had otological complaints like ear pain, ear discharge, hard of hearing, etc., 28 (31.1%) patients had nasal symptoms like nasal block, nasal discharge, headache, etc., 27 (30%) patients had pharyngeal complaints like throat pain, dysphagia, etc., 9 (10%) patients consulted for postoperative follow-up after one month of surgery [Table/Fig-2].

Variables	N (%)
Gender	
Male	49 (54.4)
Female	41 (45.6)
Age (years)	
18-39	45 (50.0)
40-59	36 (40.0)
60 and above	9 (10.0)

[Table/Fig-1]: Distribution of gender and age (N=90).

Complaints	N (%)
Otologic	26 (28.9)
Sinonasal	28 (31.1)
Pharyngeal/tonsil	27 (30.0)
Follow-up	9 (10.0)

[Table/Fig-2]: Various ear, nose and throat complaints (N=90).

All the patients who needed teleconsultation were evaluated and treated. During follow-up, feedback forms were sent to all these patients and were analysed. Among those, only 23 (25.6%) patients agreed that they can clearly saw the doctor, 19 (21.1%) patients had no trouble hearing the doctor, 20 (22.2%) patients agreed that the doctor seemed to understand the problem, and 17 (18.9%) patients understood clearly what the doctor told during the teleconsultation visit [Table/Fig-3]. About 22 (24.4%) patients stated that receiving the medical care was more accessible, 18 (20%) patients agreed that teleconsultation saved their time and only 4 (4.4%) patients found telemedicine was acceptable to receive healthcare services. About 63 (70%) patients disagreed with the concept of telemedicine in receiving healthcare, 53 (58.9%) patients preferred face-to-face visits rather than teleconsultation, 17 (18.9%) patients were satisfied with teleconsultation and only 4 (4.4%) would use the teleconsultation services again in the future. 48 (53.3%) scored <30 and 42 (46.6%) scored >30 in the teleENT satisfaction questionnaire analysis.

Sl. no.	Question	Disagree N (%)	Neutral N (%)	Agree N (%)
1	See the doctor clearly	44 (48.8)	23 (25.6)	23 (25.6)
2	Hearing the doctor	53 (58.9)	18 (20.0)	19 (21.1)
3	Doctor seemed to understand	46 (51.1)	24 (26.7)	20 (22.2)
4	Understood what the doctor told	51 (56.7)	22 (24.4)	17 (18.9)
5	Care more accessible	41 (45.6)	27 (30.0)	22 (24.4)
6	Saves me time	41 (45.6)	31 (34.4)	18 (20.0)
7	Acceptable	63 (70.0)	23 (25.6)	4 (4.4)
8	Prefer a face-to-face visit	10 (11.1)	27 (30.0)	53 (58.9)
9	Was good as face-to-face	59 (65.6)	31 (34.4)	0 (0.0)
10	Satisfied	45 (50.0)	28 (31.1)	17 (18.9)
11	Use telemedicine services again	72 (80.0)	14 (15.6)	4 (4.4)

[Table/Fig-3]: Feedback after teleconsultation encounter (N=90).

Independent t-test was applied to compare the score between age groups and sex. It was found from the analysis that there was no statistical significant difference among the groups [Table/Fig-4].

Variables	Mean±SD	T Statistics	Mean difference	p-value
Age group (years)				
<60	31.59±5.49	5.49	-1.85	0.317
≥60	33.44±0.53			
Gender				
Male	32.22±6.64	6.64	.98	0.380
Female	31.24±2.77			

[Table/Fig-4]: Feedback after teleconsultation encounter (N=90).

DISCUSSION

This prospective cohort study included 90 patients to evaluate the effectiveness of teleconsultation practice in the field of otorhinolaryngology during the COVID-19 pandemic. This study included 49 (54.4%) male and 41 (45.6%) female patients with a mean age of 40.68 years who requested teleconsultation for various otorhinolaryngology symptoms. Only 23 (25.6%) patients

Sl no.	Author's name and publication year	Place of study	Number of subjects	Study design	Parameters assessed	Conclusion
1.	Seim N et al., [1] 2017	USA	21	Prospective	Patient-provider satisfaction	Telemedicine clinics equivalent to standard otolaryngology clinics with patient-provider satisfaction.
2.	Philips R et al., [3] 2019	USA	21	Prospective	Cost savings	Patients and peripheral healthcare systems were benefited.
3.	Rimmer R et al., [4] 2018	USA	250	Retrospective	Travel time and communication	Telemedicine is an effective way to conduct the outpatient clinic and maintains high patient satisfaction in terms of fewer travel times and easy communication.
4.	McCool R and Davies L [11] 2018	USA	-	Retrospective	Eligibility of telemedicine in otorhinolarngology	Telemedicine significantly reduces the travel time, especially in rural places.
5.	Fieux M et al., [10] 2020	France	125		Will teleconsultation provide complete medical care	But it was acceptable during a pandemic.
6.	Saha R and Chellaiyan V [8] 2020	India	-	-	Contibution, adaptation, accessability and utilisation of telemedicine during COVID-19 pandemic	In India, the concept and uptake of telehealth is still complex, fragmented, and is sluggardly reaching its impetus.
7.	Present study, 2022	India	90	Prospective	Patient satisfaction, accessibility and time saving	Though accessible and time saving, very less number of patients were satisfied.

[Table/Fig-5]: Similar studies from different region [1,3,4,8,10,11].

had no problem seeing the doctor clearly and 19 (21.1%) had no trouble hearing the doctor), 22 (24.4%) patients stated that receiving the medical care was more accessible. 63 (70%) patients disagreed with the concept of telemedicine in receiving healthcare. Only 17 patients (18.9%) were totally satisfied with teleconsultation 4 (4.4%) patients accepted teleconsultation and will use teleconsultation services again.

During the COVID-19 pandemic, teleconsultation has been satisfactorily used in various non surgical specialties. There was a big gap in the healthcare and resources during these situations and telemedicine was essential to sort out this issue to a greater extent [9]. Otorhinolaryngology is relatively a small surgical field that requires advanced equipment for definite diagnosis and management. It can be affected by the quality of information transferred and the skills of examiners [1]. Diagnostic procedures like otoscopic examination, diagnostic nasal endoscopy, video laryngoscopy, audiometry, and therapeutic procedures like ear wax removal, aural toilet, foreign body removal, and postoperative nasal cleaning are necessary for definite diagnosis and effective management of patients in otorhinolaryngology [10]. In otorhinolaryngology practice, telemedicine was useful for temporary symptomatic relief but definite diagnosis and treatment should be made for complete care of the patient which was not possible with the use of telemedicine and also there was a longer surgical wait list [11]. Another limitation was lack of awareness and accepting the new technology by the patients mainly in developing countries like India [12].

This current study showed the patients were less satisfied with telemedicine consultation due to the lack of diagnostic and therapeutic procedures when compared to traditional outpatient practices. Seim N et al., conducted a study on developing synchronous telemedicine clinics in 21 patients and found it to be equivalent to standard otolaryngology clinics with patient-provider satisfaction [1]. Philips R et al., concluded that both patients and the peripheral healthcare system benefitted from telemedicine in the otorhinolaryngology field in terms of cost savings, especially in rural areas [2]. Comparative evaluation of different studies have been done in [Table/Fig-5] [1,3,4,8,10,11]. With further improvements in technology and with improved fluency in telecommunication services, telemedicine in Otorhinolaryngology may be feasible in the upcoming years.

Limitation(s)

The previous studies were conducted during non pandemic time with the help of on-site and remote physicians which made diagnosis and treatment easier with more patient satisfaction. But the current study was conducted during the Coronavirus Disease-2019 (COVID-19) pandemic, there was no on-site doctor available. It makes definite diagnosis and treatment for the patient was difficult and the patient needs to come to the hospital for specific diagnostic and therapeutic procedures.

CONCLUSION(S)

Telemedicine is successfully used in various fields of medicine due to advancements in technology mainly after COVID-19 pandemic. In this study, only 17 patients (18.9%) were totally satisfied with teleconsultation and only 4 (4.4) were willing to use the teleconsultation services again in the future. The current study concluded that teleconsultation practice was less satisfactory for the patients in the field of otorhinolaryngology. This was due to the lack of definitive diagnosis and subsequent therapeutic procedures especially in developing countries like India. Further studies are required to overcome the limitations like the development of fully equipped otorhinolaryngology sub-centers, provision of healthcare at patient's homes, etc.

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[ANNEXURE-1]

ENT teleconsultation questionnaire:

Answer the following questions as: strongly disagree (1), disagree (2), neutral (3), agree (4), strongly agree (5).

1. I could see the doctor clearly during Telemedicine videocall
2. I had no difficulty hearing the doctor when he/she spoke
3. The doctor seemed to understand complaints and concern
4. I understood what the doctor told me
5. I felt receiving speciality care more accessible (I don't have to travel from my place to hospital during pandemic)
6. Online consultation saves my time spent for travelling
7. I find Teleconsultation via videocall, an acceptable way to receive treatment
8. I would choose a face to face consultation rather than Teleconsultation
9. Teleconsultation was worthy and good as face to face consultation
10. Totally satisfied with Teleconsultation
11. I will use Telemedicine services for future consultations