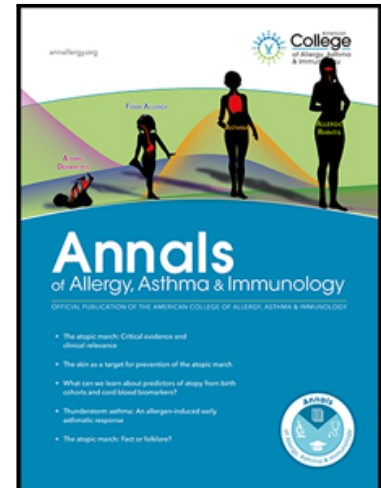


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Anupama Kewalramani MD , Jaylyn Waddell PhD ,
Elaine Leonard Puppa RN, MEd

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Telemedicine During the COVID-19 Pandemic for Pediatric Eosinophilic Esophagitis Patients

Anupama Kewalramani¹, MD, Jaylyn Waddell, PhD², Elaine Leonard Puppa, RN, MEd³

Affiliations:

¹Department of Pediatrics, Division of Pulmonology/Allergy, University of Maryland School of Medicine, Baltimore, MD

²Department of Pediatrics, Division of Neonatology, University of Maryland School of Medicine, Baltimore, MD

³Department of Pediatrics, Division of Gastroenterology, University of Maryland School of Medicine, Baltimore, MD

Corresponding Author:

Anupama Kewalramani, MD
Assistant Professor
University of Maryland School of Medicine
Division of Pediatric Pulmonology/Allergy
737 W. Lombard Street, Suite 314
Baltimore, MD 21201
(410) 706-2443 (P)
(410) 706-8407 (F)
akewal@som.umaryland.edu

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Abbreviations:

EoE: eosinophilic esophagitis
EGD: esophagogastroduodenoscopy
COVID-19: coronavirus disease 2019
PPE: personal protective equipment
TM: telemedicine
IP: in-person
EGDP: Eosinophilic Gastrointestinal Disease Program
GI: gastrointestinal

Eosinophilic esophagitis (EoE) is a chronic disease in which patients require long-term therapy and management by Gastroenterologists and Allergists/Immunologists^{1,2}. The coronavirus disease 2019 (COVID-19) pandemic led to a shift in how physicians treat patients with increasing reliance on telemedicine (TM). As cases of COVID-19 surged in the United States and the world, TM became a mainstay of care. Even with declines in cases and medical practices having in-person (IP) visits, recommendations were made to continue TM, especially for those with lower acuity diseases such as EoE³. We are unaware of any published studies evaluating TM in the care of EoE patients. We assessed the utility of TM in the care of pediatric EoE patients during the COVID-19 pandemic.

We conducted a retrospective chart review of EoE patients evaluated at the University of Maryland Children's Hospital Eosinophilic Gastrointestinal Disease Program's (EGDP) clinic by TM or seen IP from June 2020 through November 2020. All TM patients interacted with a Pediatric Gastroenterologist and Allergist at the same time through Zoom (Zoom Video Communications, San Jose, CA). All encounters were documented in the electronic medical record (EMR) application, Epic (Verona, WI). In June 2020, only TM visits were offered but starting in July, patients were offered either TM or an IP visit. There are 2 EGDP clinics in the state of Maryland. IP patients were seen in the location closer to their house, while TM patients could choose a date they preferred at either clinic.

We investigated adherence to visits based on the visit type. We collected data from the EMR on age, gender, and insurance type in addition to documenting atopic comorbidities. Clinical outcomes such as scheduling an EGD, initiating or changing therapy, ordering laboratory or other Gastrointestinal (GI) imaging (ultrasound, swallow study, or upper GI series),

and/or undergoing skin testing were explored. Lastly, travel time, distance, and cost savings were reviewed for TM patients. We used Google Maps to estimate the distance in miles and time in minutes to and from the clinics using the patients' addresses. The "fastest route" was selected in all cases. To calculate travel costs, the Internal Revenue Service annual standard mileage reimbursement rate of \$.575 for 2020 was used⁴.

Differences in patient characteristics and outcomes between those who had TM visits and those who had IP visits were compared using X^2 tests. Statistical analyses were performed using SPSS version 26 (IBM). All statistical testing was 2-tailed, with the criterion of significance $p < .05$.

A total of 92 visits (63 patients) were scheduled during the study period. Sixty-eight (74%) TM visits were scheduled for 51 patients, and 24 (26%) IP visits were scheduled for 22 patients. Sixty-two (91%) patients presented for their TM visit, while 15 (62%) showed for their IP visit. There was a statistically significant difference in the show rates for TM and IP visits ($p = .001$).

There was no difference in demographics, insurance, or atopic conditions between the 2 groups except for allergic rhinitis (Table 1). There was no significant difference in outcomes between TM and IP patients related to scheduling for an EGD ($p = .16$), changing or initiating therapy ($p = .41$), ordering laboratory or imaging studies ($p = .73$) or undergoing skin testing ($p = .98$). TM patients did come in for a separately scheduled clinic visit for skin testing, while IP patients had skin testing during the regularly scheduled visit.

TM families saved 3,489.9 (range 3.9 to 239) miles to and from the clinic, with a mean of 56.3 miles saved for each visit. The total travel time saved to and from the clinic was 4,369

minutes (range 19 to 280) with a mean of 70.5 minutes. Overall, \$2006.69 was saved by the TM patients for travel, with an average of \$32.37 saved for each visit.

Although this study was conducted during the COVID-19 pandemic, our findings suggest that TM is an effective method of delivering care to pediatric EoE patients. The difference in the show rate between TM and IP visits was significant. At our institution, both TM and IP patients receive phone calls, emails, and/or text messages reminding families of the appointment. However, attendance at TM appointments may have been further facilitated by phone calls from the clinic's Medical Assistant to families not logged on at the scheduled time, reminding the family to attend. It is unclear why there was such a high no-show rate for IP visits. Further studies determining show rates prior to the pandemic would be helpful.

When comparing TM visits and IP visits, studies have shown either no difference or superior outcomes for chronic diseases such as asthma^{5,6}. In this research, outcomes did not differ between the TM and IP visits for pediatric EoE patients.

TM can connect clinicians and patients without long travel distances and times, which can lead to cost savings, less lost time from work and school, and potentially have a positive impact on the environment⁷. Similarly, this study demonstrated savings in travel distance, time, and associated costs.

There are several limitations to this study. First, this was a retrospective study, so the available data and analyses are limited. Additionally, possible sampling error given the small sample size may contribute to the significant differences in the likelihood to show and the rate of allergic rhinitis between groups. It is also possible that the patients were more accepting of a TM appointment due to the pandemic, so a prospective study will be needed to determine if families continue to prefer TM visits or if there is a return to predominantly IP visits. Third, travel

distance and time savings, as well as mileage costs, were estimated based on the assumption that patients traveled to their appointment using their car, when, in fact, patients may have relied on alternative forms of transport such as bus, train, etc.

TM has the potential to transform the delivery of care to EoE patients, especially for patients who may live far away from Allergists/Immunologists who are experts in the disease.

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Table 1. Patient Demographics

	Telemedicine Patients (n = 51)	In-person Patients (n=22)	<i>p</i> value
Mean age, yr	10.6	10.4	.899
Gender			
Male	30 (59%)	14 (63%)	.700
Female	21 (41%)	8 (36%)	
Atopic Conditions			
Asthma	25 (49%)	16 (73%)	.061
Allergic rhinitis	35 (69%)	20 (91%)	.043
Eczema	18 (35%)	9 (41%)	.648
IgE-mediated food allergy	27 (53%)	12 (54%)	.900
Any atopic condition	43 (84%)	21 (95%)	.184
Insurance			
Private	30 (59%)	12 (54%)	.731
Medical Assistance/Medicaid	20 (39%)	10 (45%)	
Other	1 (2%)	0	

Gailen D. Marshall, MD, PhD
Editor-in-Chief
Annals of Allergy, Asthma & Immunology

May 10, 2021

Dear Mr. Editor,

We wish to submit a letter entitled Telemedicine During the COVID-19 Pandemic for Pediatric Eosinophilic Esophagitis Patients for consideration by the Annals of Allergy, Asthma & Immunology.

We confirm that the manuscript has been read and approved by all authors.

We confirm that each author has met the requirements for authorship.

We certify that we have personally written 100% of the manuscript.

We confirm that this manuscript has not been published previously in print/electronic format or in another language and that the manuscript is not under consideration by another publication or electronic media.

Contact information for corresponding author on this manuscript:

Anupama Kewalramani, MD
University of Maryland School of Medicine
Division of Pediatric Pulmonology/Allergy
737 W. Lombard Street, Suite 314
Baltimore, MD 21201
Phone: (410) 706-2443
Fax: (410) 706-8407
akewal@som.umaryland.edu