




ORIGINAL ARTICLE

Headache teleconsultation in the era of COVID-19: Patients' evaluation and future directions

Leonor Dias^{1,2}  | Bárbara Martins^{1,2}  | Maria João Pinto^{1,2}  | Ana Luísa Rocha^{1,2}  |
Madalena Pinto¹ | Andreia Costa^{1,2} 

¹Neurology Department, Centro Hospitalar Universitário de São João, E.P.E., Porto, Portugal

²Clinical Neuroscience and Mental Health Department, Faculty of Medicine, University of Porto, Porto, Portugal

Correspondence

Leonor Dias, Neurology Department, Centro Hospitalar Universitário de São João, E.P.E., Alameda Prof. Hernâni Monteiro, 4200-319 Porto, Portugal. Email: leonor.dias@chsj.min-saude.pt

Funding information

The authors received no financial support for the research, authorship, and/or publication of this article.

Abstract

Background and purpose: Literature regarding headache teleconsultation and patient satisfaction is scarce. The SARS-CoV-2 pandemic led to the restructuring of traditional clinical activity by adopting telemedicine. Our objectives were to evaluate patients' satisfaction with headache teleconsultation by telephone during the SARS-CoV-2 pandemic and assess patients' preferred model of appointment (face-to-face, teleconsultation by telephone, or both).

Methods: Patients with a previous diagnosis of primary headache or neuropathies and facial pain disorders, and at least one telephone headache visit during the first wave of COVID-19, filled out an online questionnaire regarding sociodemographic parameters, satisfaction with teleconsultation, and preferred model of appointment.

Results: We included 83 patients (valid response rate of 64.3%); most had migraine (83.1%). Regarding teleconsultation, 81.9% considered this model adequate for follow-up, 88.0% were satisfied with the information provided about the disease/treatment, and 73.5% were satisfied with the medication modification. Ninety percent would agree with a new tele-evaluation if stable after the pandemic. The mixed model was the preferred medical consultation type for the postpandemic period (43.4%), followed by face-to-face visits (33.7%).

Conclusions: Patients were satisfied with the headache teleconsultation during the COVID-19 era. However, an exclusive model of telemedicine does not seem suitable for monitoring all patients. A mixed approach could be integrated into clinical practice after the pandemic to optimize health care.

KEYWORDS

COVID-19, primary headache, satisfaction, telemedicine

INTRODUCTION

COVID-19 was declared as a pandemic by the World Health Organization in March 2020 [1]. Since then, health systems around the world have been facing unique challenges in controlling the spread of the infection and applying social distancing measures

while maintaining care for nonacute and nonemergent patients [1–3]. Telemedicine played an important role in this setting; it emerged as a measure to ensure patients' and healthcare professionals' safety, while allowing for the best possible care for chronic pathologies [1,4].

Some authors have shown that, when compared to face-to-face consultations, there was no difference in treatment effect,

effectiveness, and acceptability between telemedicine and in-person therapies in patients with chronic pain [5,6]. Other prepandemic studies evidenced a high level of patient and provider satisfaction with telemedicine, particularly by overcoming geographic, physical, and time barriers to health care access [7–9].

In the neurology areas mostly followed in the outpatient clinic, such as headache, dementia, and movement disorders, telemedicine has been poorly developed, with little investment in assessment tools and management of these diseases [9,10]. Nevertheless, considering the high prevalence and lifestyle impact of headache, and the fact that most are primary and require little investigation, telemedicine seems to be an attractive alternative for care.

Our goal was to evaluate the patients' satisfaction with headache teleconsultation during the SARS-CoV-2 pandemic and to ascertain the patients' preferred model of appointment (face-to-face, teleconsultation, or both), to further validate its use for future implementation in the postpandemic era.

METHODS

Study design

We performed an observational transversal study using an electronic questionnaire delivered to a consecutive sample of patients followed in the headache clinic of a tertiary hospital. This study was approved by our institution's ethics committee. Informed consent was obtained for all participants at the beginning of the study.

Study population

We included all the adult patients followed in the headache clinic at the Neurology Department of Centro Hospitalar Universitário de São João, Porto, Portugal. All patients who agreed to do at least one headache teleconsultation by telephone between March 18, 2020 (the day of the declaration of the state of emergency in Portugal) and May 18, 2020 were invited to participate in the study. The patients had a previous diagnosis of primary headache (e.g., tension-type headache, migraine, trigeminal autonomic cephalgia, or other primary headache disorders) or neuropathies and facial pain disorders (e.g., trigeminal neuralgia) according to the third edition of the *International Classification of Headache Disorders* [11], made in a previous face-to-face consultation in the prepandemic period. First consultations were excluded. Patients who had ongoing procedures (e.g., onabotulinum toxin A or peripheral nerve blocks) were included. If the doctor decided the procedure was needed during the teleconsultation, this would be scheduled later.

Resistant headaches were defined as headaches having no response to at least two therapeutic classes studied as effective for that specific type of headache.

Patients with concomitant medication-overuse headache were also considered. Other types of secondary headache besides medication-overuse headache were excluded.

Patients treated with calcitonin gene-related peptide receptor drugs were not included, as these had not been approved by the national drug regulation agency at the time of this study.

Study measures

A telemedicine headache appointment via telephone call was performed by a total of three neurologists with expertise in headache medicine. Each neurologist regularly consults at least 25 to 30 patients with headache disorders per week.

All patients had a previous presential appointment. Consultations were booked in advance; if patients were not available for the appointment, a more convenient time would be scheduled. Appointments consisted of a semistructured interview, with a duration of about 20 min, including evaluation of the type of headache and headache frequency, medication response, and proposal of a treatment plan and/or renewal of prescriptions.

After the telemedicine headache appointment, patients were invited to fill out an online questionnaire, whose link was sent via text message. The questionnaire was built using an online, free open-access GoogleForms survey. The first page included an informed consent that would automatically close the document in case the patient chose not to participate.

The form contained questions regarding sociodemographic parameters, including sex, age, education level, work status, number of dependent family members, means of transportation, and length of the journey to the hospital. Regarding the telemedicine visit section, it included a total of six questions for patients to give their opinion ("yes" or "no" answers), on the following parameters: adequacy of the visit, satisfaction with the information provided by the doctor, satisfaction with the follow-up, satisfaction with any medication change, consideration of telemedicine visits in a nonpandemic context, and the preferred model of appointment (face-to-face, teleconsultation, or both combined). We did not find any available validated questionnaire to assess satisfaction with teleconsultation and opted for a yes/no model. We considered patients satisfied with the telemedicine model if they answered positively to at least three out of the four questions regarding the quality of the teleconsultation. An open field was used to evaluate the reasons for the preferred model and to assess the advantages and disadvantages of a telemedicine visit. It also included a general open comment section for which completion was optional. The questionnaire was completed between May 21, and July 8, 2020.

Clinical records were reviewed to define the type of headache disorder, the presence of resistant headache, acute and prophylactic medication, the need to change treatment or to request an unscheduled evaluation during SARS-CoV2 pandemic, and concomitant psychiatric comorbidity, defined as a previous psychiatric diagnosis made and registered in the clinical process.

Data analysis

We analyzed data using IBM SPSS Statistics version 26 (IBM, Armonk, NY, USA). The results of categorical variables are expressed in percentages, and quantitative variables appear as mean \pm standard deviation (SD). A two-tailed *p* value was considered statistically significant when <0.05 .

RESULTS

During the study period, 254 headache adult teleconsultations were carried out by telephone. Five patients with a first appointment made by telephone were excluded. A total of 129 forms were completed, and 83 patients had valid inquiries (valid response rate of 64.3%). One hundred forty-five patients did not answer, and 19 opted not to participate after opening the questionnaire. Two invalid forms of the questionnaires and 20 duplicated forms were also excluded (Figure 1).

The sociodemographic characterization of our sample is presented in Table 1. Of the respondents, 73 patients were women (88.0%), and the average age was 40.9 years (± 11.8 years). Most patients were married (60.2%) and had at least one dependent family member (55.4%). Regarding education, 44.6% completed high school, 42.2% had a college-level education, and only 13.2% had up to a fourth-grade education. Regarding working status, 9.6% of patients were unemployed, 4.8% were under medical leave, and 7.2% were retired. Within active workers (72.3%), 44.6% were still frequenting their workplace, whereas 27.7% were either on remote work, layoff, or under parenting license due to underage dependent family members. Most patients (55.4%) were 10 to 30 min away from the hospital, and only 6.0% had a commute time under 10 min. On the other hand, 10.8% were more than 1 h away from the hospital.

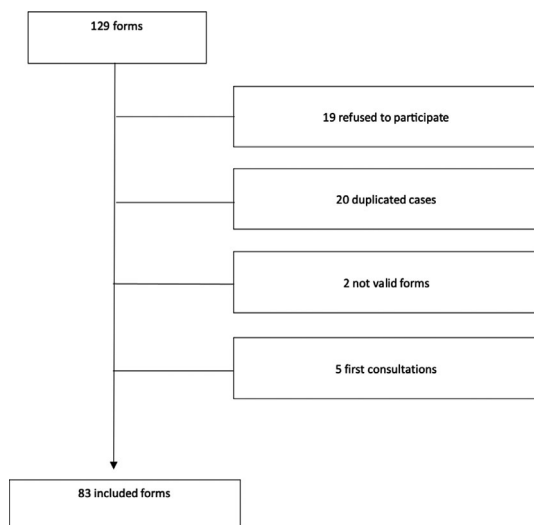


FIGURE 1 Selection algorithm.

TABLE 1 Sociodemographic characteristics of the headache patients

Sociodemographic characteristics, <i>n</i> = 83	Value
Gender, <i>n</i> (%)	
Male	10 (12.0%)
Female	73 (88.0%)
Age, years, mean (SD)	40.9 (11.8)
<20, <i>n</i> (%)	1 (1.2%)
20–40, <i>n</i> (%)	40 (48.2%)
40–60, <i>n</i> (%)	39 (47.0%)
>60, <i>n</i> (%)	3 (3.6%)
Marital status, <i>n</i> (%)	
Single	27 (32.5%)
Married	50 (60.2%)
Divorced	6 (7.2%)
No. of dependents, <i>n</i> (%)	
0	37 (44.6%)
≥ 1	46 (55.4%)
Education level, <i>n</i> (%)	
Fourth grade or less	11 (13.2%)
High school	37 (44.6%)
College	35 (42.2%)
Work status, <i>n</i> (%)	
Medical leave	4 (4.8%)
Unemployed	8 (9.6%)
Remote work	11 (13.3%)
Layoff	8 (9.6%)
Child support	4 (4.8%)
Student	5 (6.0%)
Working on place	37 (44.6%)
Retired	6 (7.2%)
Time until hospital arrival, <i>n</i> (%)	
<10 min	5 (6.0%)
10–30 min	46 (55.4%)
30–60 min	23 (27.7%)
>60 min	9 (10.8%)
Rural, <i>n</i> (%)	32 (38.5%)
Means of transportation, <i>n</i> (%)	
By foot	1 (1.2%)
Car	64 (77.1%)
Public transportation	18 (21.7%)

The most-used means of transportation was the car (77.1%); 21.7% of patients used public transportation.

The most frequent diagnosis was migraine (83.1%), followed by tension-type headache (32.5%). Five percent of patients had other types of primary headache disorder. Three patients (3.6%) had a previous diagnosis of trigeminal neuralgia. Five patients (6.0%) had a concomitant medication-overuse headache. Seventeen percent

of patients had a resistant headache. Ninety-four percent of patients had been using abortive medication for headache, and 61.4% were under preventive therapy. Table 2 summarizes the headache characteristics.

In the group of patients who opted not to answer/participate and patients with invalid questionnaires ($n = 166$), the majority were women (81.9%), with a higher percentage of men (18.1% vs. 12% in the group of respondents). The average age was 44.5 years (SD, 15.3 years), 15.1% ($n = 25$) were over the age of 60 years (vs. 3.6%; $n = 3$). Most of these patients had migraine (58.4%), with a higher percentage of patients with a previous diagnosis of trigeminal neuralgia (8.4% vs. 3.6%) and a lower percentage of resistant headache (1.2% vs. 16.9%).

Regarding the telemedicine headache visit during the pandemic era, 81.9% of patients considered that this model was adequate. Eighty-eight percent were satisfied with the information provided by the doctor about the disease and its treatment, and 86.7% were satisfied with the follow-up by teleconsultation (Table 3). Seventy-four percent were satisfied with the medication change prescribed during the telemedicine appointment. Most patients (90.4%) would agree with a new tele-evaluation if remaining stable (Table 3).

Overall, the preferred medical visit model for the postpandemic era was the mixed model (43.4%), followed by the face-to-face appointment (33.7%) (Table 3). From the group that had an unscheduled evaluation during the pandemic, 21% preferred a face-to-face evaluation (vs. 12.5% who preferred teleconsultation; $p = 0.961$).

No statistically significant differences were found in sociodemographic characteristics between patients satisfied with telemedicine and nonsatisfied patients (Table 4). Nevertheless, a higher percentage of men (90%) were satisfied with telemedicine (vs. 82.2% women). Nonsatisfied patients were more frequently married (14.3% vs. 5.8% satisfied), had less dependents (64.3% vs. 40.6%), and had a college-level education more frequently (50% vs. 40.6%). Regarding their work status, they were also more frequently unemployed (21.4% vs. 7.2%) or in layoff (14.3% vs. 8.7%). Satisfied patients were more frequently working in their usual workplace (47.8% vs. 21.4%), had resistant headaches less frequently (15.9% vs. 21.4%),

fewer psychiatric comorbidities (23.2% vs. 30.8%), and were more frequently under preventive medication (62.3% vs. 35.7%).

Table 5 shows the patients' opinions on the advantages and disadvantages of headache teleconsultation. Regarding the advantages, patients emphasized not having to go to the hospital and the easier and quicker renewal of their medication, saving time and money, mainly in transportation. Moreover, they reported that this model allowed them to better coordinate the appointment with their schedule and to reduce contact with other patients in the waiting room, thus avoiding potential contagion. Patients also considered that this was a useful model for stable headache cases. As for disadvantages, some patients felt that their complaints were not as valued as during the face-to-face visit, and that nonverbal communication, including their emotional state, was missed. Some considered that this model was not suitable in cases of uncontrolled pain.

DISCUSSION

The headache teleconsultation was found to be mostly adequate, preferably when combined with a face-to-face visit for most participants. Most were satisfied with the information and treatment provided, and most would agree with a new tele-evaluation, if remaining stable, even after the pandemic period.

In our cohort, most patients were women, with a women-to-men ratio of 7:1, which is not surprising given the greater prevalence of headaches in general in women. Nevertheless, this ratio was significantly greater to previously reported ratios of 3–4 to 1 [12,13]. Migraine was the most frequent diagnosis in our population, which is in line with its high prevalence in the general population and the headache consultation.

A recent review showed that early nonrefractory primary headaches, such as tension-type headache and migraine, were the most appropriate for teleconsultation [3]. Most of our patients fulfilled these criteria; most had one of these diagnoses, and only 17% had a resistant headache. Along with the care directly provided by their headache specialist, this may partly explain the high levels of satisfaction with teleconsultation found in all the measured parameters. The high proportion of satisfaction in our cohort is in line with that from a prospective Norwegian study that included 348 patients from a headache clinic and compared teleconsultation with face-to-face visits [14]. The authors did not find a statistical difference regarding patients' satisfaction and therapeutic adhesion [12,14,15]. Patients with other headache types or with a refractory/resistant headache might need a different approach; further studies to address the best model (e.g., individualized face-to-face, face-to-face in a multidisciplinary group, telemedicine) for this population are needed.

Eighty-seven percent of our cohort were active workers, with almost half of them still frequenting their workplace during the pandemic. This seems to be the most interested group in teleconsultation. In general, patients found this model more convenient, as it helped save time and money, allowed them to better accommodate

TABLE 2 Headache characteristics

Headache characteristics	Value, n (%)
Type of headache, episodic and chronic	
Migraine	69 (83.1%)
Tension-type headache	27 (32.5%)
Other primary headache	4 (4.8%)
Medication-overuse headache	5 (6.0%)
Trigeminal neuralgia	3 (3.6%)
Resistant headache	14 (16.9%)
Psychiatric comorbidity	20 (24.1%)
Preventive medication	51 (61.4%)
Acute medication	78 (93.9%)

TABLE 3 Question form

	Value, n (%)
1. Adequacy of telemedicine visit	
Yes	68 (81.9%)
No	15 (18.1%)
2. Satisfaction with information provided by the medical professional	
Yes	73 (88.0%)
No	10 (12.0%)
3. Satisfaction with follow-up	
Yes	72 (86.7%)
No	11 (13.3%)
4. Satisfaction with medication changes	
Yes	61 (73.5%)
No	22 (26.5%)
5. Agreement with a telemedicine visit in a nonpandemic context	
Yes	75 (90.4%)
No	8 (9.6%)
6. Preferred medical visit model	
Teleconsultation	10 (12.0%)
Regular/presential	28 (33.7%)
Mixed	36 (43.4%)
No preference	9 (10.8%)

the neurologist's visit to their schedule, and provided an easier way to renew prescriptions. These findings are in line with the pre-COVID-19 literature [1,12–22]. An American hospital-based study with a pediatric cohort concluded that headache teleconsultation was more convenient, less disruptive, and more cost-effective than a regular appointment [16]. Moreover, telemedicine eliminates the need for traveling to the hospital, which might be particularly compelling to the 10% of our cohort that spent over 1 h traveling to the hospital. Literature shows that, particularly in patients from remote areas, non-face-to-face visits have high levels of patient acceptance [16,21,22] and satisfaction [14–16,21]. Improving the access for patients who live or work far away reduced the cost of care [13,16,22] and increased physician productivity [1]. Another study demonstrated that patients from geographically remote areas, who are followed up by teleconsultation, needed less unscheduled headache visits at 3 and 12 months of follow-up, thus resulting in significant cost reductions [15].

Although satisfaction with teleconsultation was high, an exclusive teleconsultation model was only supported by 12% of our sample, and the preferred visit model was the mixed model (43%). In the open section, patients reported several reasons that made them feel that exclusive telemedicine might not be appropriate in some situations. They felt the lack of physical interaction was an important disadvantage of this model because they consider nonverbal communication an important part of the doctor-patient

TABLE 4 Satisfied (if patient answered positively in at least 3 satisfaction questions) vs. not satisfied (if patients answered positively in 2 or fewer satisfaction questions)

	Satisfied, n = 69, 83.1%	Not satisfied, n = 14, 16.9%	p
Gender, n (%)			
Male	9 (90%)	1 (10%)	1.0
Female	60 (82.2%)	13 (17.8%)	1.0
Age, years, n (%)			
<20	1 (1.4%)	0 (0%)	0.836
20–40	33 (47.8%)	7 (50%)	
40–60	33 (47.8%)	6 (42.9%)	
>60	2 (2.9%)	1 (7.1%)	
Marital status, n (%)			
Single	42 (60.9%)	8 (57.1%)	0.530
Married	4 (5.8%)	2 (14.3%)	
Divorced	23 (33.3%)	4 (26.8%)	
No. of dependents, n (%)			
0	28 (40.6%)	9 (64.3%)	0.104
≥1	41 (59.4%)	5 (35.7%)	
Time until hospital arrival, n (%)			
<10 min	5 (7.2%)	0 (0%)	0.325
10–30 min	37 (53.6%)	9 (64.3%)	
30–60 min	18 (26.1%)	5 (35.7%)	
>60 min	9 (13.0%)	0 (0%)	
Education level, n (%)			
Fourth grade or less	10 (14.4%)	1 (7.1%)	0.928
High school	31 (44.9%)	6 (42.9%)	
College	28 (40.6%)	7 (50%)	
Work status, n (%)			
Medical leave	3 (4.2%)	1 (7.1%)	0.473
Unemployed	5 (7.2%)	3 (21.4%)	
Remote work	9 (13.0%)	2 (14.3%)	
Layoff	6 (8.7%)	2 (14.3%)	
Child support	3 (4.3%)	1 (7.1%)	
Student	4 (5.8%)	1 (7.1%)	
Working on place	33 (47.8%)	3 (21.4%)	
Retired	5 (7.2%)	1 (7.1%)	
Resistant headache	11 (15.9%)	3 (21.4%)	0.617
Psychiatric comorbidity	16 (23.2%)	4 (30.8%)	0.725
Preventive medication	43 (62.3%)	5 (35.7%)	0.066
Acute medication	66 (95.7%)	14 (100%)	1.000

TABLE 5 Patient feedback regarding their telemedicine experience by phone call

Teleconsultation			
Advantages ^a	%	Disadvantages ^b	%
Reduces contact with other patients in the waiting room	23.9%	Less nonverbal interaction, highlighting the patient's emotional state	50.0%
Saves time	19.6%	Complaints felt as less valued	43.4%
Reduces costs, especially in transportation	15.2%	Not appropriate for the first appointment	6.7%
Shorter time to first consultation	13.0%		
Appropriate for stable cases (controlled pain)	10.9%		
Easier and faster to renew prescriptions without physical presence at the hospital	8.7%		
Easier to schedule	8.7%		

^aMissings: 44.6%.

^bMissings: 63.9%.

relationship. They also stated that they could not explain their symptoms as well via telephone, and that it was not adequate for cases of uncontrolled pain. A recent review showed that, retrospectively, a third of face-to-face visits could have been teleconsultations instead, based on a constructed flowchart and provider opinion [3]. However, in patients with multiple previous treatment trials and complex presentations, such as red flags, this model was not as suitable. Hence, these authors concluded that teleconsultation in headache medicine could be considered if a proper triage of the headache disorder is made [3].

This study has some limitations, including the slightly lower response rate compared to other studies (70%–80%). This may be explained by unavailable telephone numbers in the patients' records and by the fact that the questionnaire was only sent by text message, which might have led some patients to ignore it. Also, some of the invited patients did not have access to internet, which might have limited response rates. Nonparticipants in the questionnaire tended to be older and to have less resistant headache, which may contribute to a selection bias. Another shortcoming was the fact that this was a single-center study using a convenience sample, which makes it more difficult to generalize the results.

In summary, the COVID-19 pandemic led to profound restructuring of the outpatient clinics [23]. The need for social distancing and for reducing the number of patients in the hospital environment prompted the adoption of telemedicine, including in previously overlooked fields such as headache clinics. Given the high satisfaction with teleconsultation in the present study, a model combining a first-time face-to-face visit, allowing the detection of eventual focal neurological signs, followed by teleconsultation once the patient has reached symptom stability, may be appropriate, even outside a pandemic setting. In the first face-to-face visit, it would be important to evaluate the patient's preferences regarding the traditional visit and its possible complement to the teleconsultation. The patient should understand that a teleconsultation is a complementary form of follow-up, with the same rules as a face-to-face consultation, including the payment of fees

and the patient and doctor commitment. A way to address some of the patient's complaints/hesitation regarding telemedicine would be adding a virtual visit with a camera, thus improving nonverbal communication, because it has previously been applied in other studies with good results [9].

More post-COVID-19 studies are needed to increase the credibility and investment in telemedicine for the monitoring of chronic neurological diseases, with an emphasis on headache disorders.

CONFLICT OF INTEREST

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

AUTHOR CONTRIBUTIONS

Leonor Dias: Conceptualization (equal), data curation (equal), formal analysis (lead), investigation (equal), methodology (equal), software (equal), writing–original draft (lead). **Bárbara Martins:** Conceptualization (equal), data curation (equal), investigation (equal), methodology (equal), writing–original draft (lead), writing–review & editing (supporting). **Maria João Pinto:** Conceptualization (equal), data curation (equal), formal analysis (equal), investigation (equal), methodology (equal), software (equal), writing–review & editing (equal). **Ana Luísa Rocha:** Conceptualization (equal), data curation (equal), investigation (equal), methodology (equal), writing–review & editing (equal). **Madalena Pinto:** Conceptualization (equal), data curation (equal), project administration (equal), resources (equal), supervision (equal), visualization (equal). **Andreia Costa:** Conceptualization (equal), data curation (equal), investigation (equal), methodology (equal), project administration (equal), resources (equal), software (equal), supervision (equal), validation (equal), visualization (equal), writing–review & editing (equal).

ETHICAL APPROVAL

This study was approved by Centro Hospitalar de São João ethics committee. Informed consent was obtained for all participants at the beginning of the study.

CONSENT FOR PUBLICATION

All patients consented to publication of anonymous individual data.

DATA AVAILABILITY STATEMENT

All data generated or analyzed during this study are included in this published article.

ORCID

Leonor Dias  <https://orcid.org/0000-0002-2763-9440>

Bárbara Martins  <https://orcid.org/0000-0003-3026-3453>

Maria João Pinto  <https://orcid.org/0000-0001-9133-4441>

Ana Luísa Rocha  <https://orcid.org/0000-0003-2870-8177>

Andreia Costa  <https://orcid.org/0000-0002-5331-9934>

REFERENCES

- Provenzano D. Telemedicine healthcare for headache medicine during COVID-19 and beyond. *Ann Headache Med J*. 2020;2:3.
- Rizzi AM, Polachek WS, Dulas M, Strelzow JA, Hynes KK. The new 'normal': rapid adoption of telemedicine in orthopaedics during the COVID-19 pandemic. *Injury*. 2020;51(12):2816-2821.
- Robblee J, Starling AJ. E-consultation in headache medicine: a quality improvement pilot study. *Headache*. 2020;60:2192-2201.
- Szperka CL, Ailani J, Barmherzig R, et al. Migraine care in the era of COVID-19: clinical pearls and plea to insurers. *Headache*. 2020;60(5):833-842.
- Eccleston C, Blyth FM, Dear BF, et al. Managing patients with chronic pain during the COVID-19 outbreak: considerations for the rapid introduction of remotely supported (eHealth) pain management services. *Pain*. 2020;161(5):889-893.
- Herbert MS, Afari N, Liu L, et al. Telehealth versus in-person acceptance and commitment therapy for chronic pain: a randomized noninferiority trial. *J Pain*. 2017;18(2):200-211.
- Nguyen M, Waller M, Pandya A, Portnoy J. A review of patient and provider satisfaction with telemedicine. *Curr Allergy Asthma Rep*. 2020;20(11):72.
- Andrews E, Berghofer K, Long J, Prescott A, Caboral-Stevens M. Satisfaction with the use of telehealth during COVID-19: an integrative review. *Int J Nurs Stud Adv*. 2020;2:100008.
- Hatcher-Martin JM, Adams JL, Anderson ER, et al. Telemedicine in neurology: telemedicine work group of the American Academy of Neurology update. *Neurology*. 2020;94(1):30-38.
- Roy B, Nowak RJ, Roda R, et al. Teleneurology during the COVID-19 pandemic: a step forward in modernizing medical care. *J Neurol Sci*. 2020;414:116930.
- Olesen J. Headache Classification Committee of the International Headache Society (IHS). The International Classification of Headache Disorders, 3rd edition. *Cephalalgia*. 2018;38(1):1-211.
- Müller KI, Alstadhaug KB, Bekkelund SI. A randomized trial of telemedicine efficacy and safety for nonacute headaches. *Neurology*. 2017;89(2):153-162.
- Vierhile A, Tuttle J, Adams H, tenHooen C, Baylor E. Feasibility of providing pediatric neurology telemedicine care to youth with headache. *J Pediatr Heal Care [Internet]*. 2018;32(5):500-506.
- Müller KI, Alstadhaug KB, Bekkelund SI. Telemedicine in the management of non-acute headaches: a prospective, open-labelled non-inferiority, randomised clinical trial. *Cephalalgia*. 2017;37(9):855-863.
- Müller KI, Alstadhaug KB, Bekkelund SI. Headache patients' satisfaction with telemedicine: a 12-month follow-up randomized non-inferiority trial. *Eur J Neurol*. 2017;24(6):807-815.
- Qubty W, Patniyot I, Gelfand A. Telemedicine in a pediatric headache clinic: a prospective survey. *Neurology*. 2018;90(19):E1702-E1705.
- Davis LE, Coleman J, Harnar JA, King MK. Teleneurology: successful delivery of chronic neurologic care to 354 patients living remotely in a rural state. *Telemed e-Health*. 2014;20(5):473-477.
- Friedman DI, Rajan B, Seidmann A. A randomized trial of telemedicine for migraine management. *Cephalalgia*. 2019;39(12):1577-1585.
- Arena J, Dennis N, Devineni T, Maclean R, Meador K. A pilot study of feasibility and efficacy of telemedicine-delivered psychophysiological treatment for vascular headache. *Telemed J e-Health*. 2004;10(4):449-454.
- Akiyama H, Hasegawa Y. A trial case of medical treatment for primary headache using telemedicine. *Med (United States)*. 2018;97(9):1-5.
- Rajan B, Seidmann A, Friedman D. Managing migraine via telemedicine: clinical effectiveness and process implications. *Proc 50th Hawaii Int Conf Syst Sci*. 2017;5078-5083.
- Müller KI, Alstadhaug KB, Bekkelund SI. Acceptability, feasibility, and cost of telemedicine for nonacute headaches: a randomized study comparing video and traditional consultations. *J Med Internet Res*. 2016;18(5):1-12.
- López-Bravo A, García-Azorín D, Belvís R, et al. Impact of the COVID-19 pandemic on headache management in Spain: an analysis of the current situation and future perspectives. *Neurologia [Internet]*. 2020;35(6):372-380.

How to cite this article: Dias L, Martins B, Pinto MJ, Rocha AL, Pinto M, Costa A. Headache teleconsultation in the era of COVID-19: Patients' evaluation and future directions. *Eur J Neurol*. 2021;28:3798-3804. <https://doi.org/10.1111/ene.14915>