



Clinician and patient experience of neurology telephone consultations during the COVID-19 pandemic

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ABSTRACT

Background Telephone consultations are already employed in specific neurological settings. At Cambridge University Hospitals, the COVID-19 pandemic initially prompted almost all face-to-face appointments to be delivered by telephone, providing a uniquely unselected population to assess.

Objectives We explored patient and clinician experience of telephone consultations; and whether telephone consultations might be preferable for preidentifiable subgroups of patients after the pandemic.

Methods Clinicians delivering neurological consultations converted to telephone between April and July 2020 were invited to complete a questionnaire following each consult (430 respondents) and the corresponding patients were subsequently surveyed (290 respondents). The questionnaires assessed clinician and patient goal achievement (and the reasons for any dissatisfaction). Clinicians also described consultation duration (in comparison to face to face) while patients detailed comparative convenience and preference.

Results The majority of clinicians (335/430, 78%) and patients (227/290, 78%) achieved their consultation goals by telephone, particularly during follow-up consultations (clinicians 272/329, 83%, patients 176/216, 81%) and in some disease subgroups (eg, seizures/epilepsy (clinicians 114/122 (93%), patients 71/81 (88%)). 95% of telephone consultations were estimated to take the same or less time than an equivalent face-to-face consultation. Most patients found telephone consultations convenient (69%) with 149/211 (71%) indicating they would like telephone or video consultations to play some role in their future follow-up.

Conclusion Telephone consultations appear effective, convenient and popular in prespecified subgroups of neurological outpatients. Further work comparing telephone, video and face-to-face consultations across multiple centres is now needed.

care may be impeded by disease-related driving restrictions such as epilepsy.^{5 6} A pre-pandemic review of telemedicine by the American Academy of Neurology indicated its benefits in terms of cost, access and non-inferiority, but highlighted the need to validate its use in a variety of populations and settings.⁷

Telemedicine mitigates infection concerns and is sometimes more convenient for patients (particularly those of working-age or those whose diagnosis requires driving restrictions). However, face-to-face clinical examinations (eg, testing of reflexes) are not possible and previous models for general neurological telemedicine often relied on movable cameras and clinical assistants to be present with the patient.²

During the COVID-19 pandemic, many centres switched face-to-face appointments to telephone consultations, presenting a unique opportunity to assess patient and clinician experience of this medium. From late March 2020, in line with recommendations from NHS England,⁸ virtually all neurology clinic appointments at Cambridge University Hospitals were converted to telephone consultations, providing an unselected non-biased group of care episodes to explore. This tertiary centre provides general and specialist neurology services across a large urban and rural catchment area including multiple relatively sparsely populated counties in the East Anglian region of England.

We aimed to explore the benefits and limitations of outpatient telephone consultations in neurology from both the clinician and patient perspective; to identify whether telephone consultations are preferable to face-to-face consultations in particular settings after the pandemic, trying to identify demographic and clinical factors that are associated with successful consultations, and identify the deficiencies in the format compared with face-to-face consultations.

INTRODUCTION

The COVID-19 pandemic caused significant disruption to hospital outpatient appointments. As community infection rates increased, most centres cancelled all but the most urgent face-to-face appointments to minimise COVID-19 transmission to and from patients.

Prior to the pandemic, telemedicine was already employed in specific neurological settings, including where geographical barriers preclude assessment of remote populations,^{1 2} in time sensitive settings such as acute stroke^{3 4} or where patient access to

METHODS

Between the 22 April 2020 and 3 July 2020, all consultants and specialist nurses delivering telephone outpatient neurology consultations as a substitute for face-to-face appointments at Cambridge University Hospitals were invited to complete a six-question Clinician Questionnaire immediately after each consultation where the patient answered the telephone (online supplemental appendix A). This asked whether clinicians accomplished their goals for the consultation; and



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if not, what was not accomplished, whether this was due to the telephone consultation and whether a video consultation would have achieved their objectives. As different consultations had different objectives, to encompass the wide range of consultations, the clinicians were allowed to define what their goal was on a case-by-case basis. Finally, clinicians were asked to estimate if the telephone appointment was longer or shorter compared with a typical face-to-face appointment.

All patients participating in neurology telephone clinics during the same time period were sent a postal Patient Questionnaire exploring their experience (online supplemental appendix B) accompanying their clinician-dictated clinic letter detailing the results of the consultation. This explored whether patients felt they achieved their aims during the consultation (and if so, what), whether it affected the doctor-patient relationship as well as more practical questions about time taken to attend in-person appointments and where relevant, time off work to attend face-to-face appointments. Finally, patients were asked whether they found telephone or face-to-face clinics more practical before seeking their preferences for telephone, video or face-to-face appointments future appointments in the future. The last question was modified to include combination options due to patient feedback. Where Clinician Questionnaires had no corresponding Patient Questionnaire, the patient was called by telephone to explore their experience (two attempts, at different times of day, on different days); and where a Clinician Questionnaire was missing despite a returned Patient Questionnaire, the clinician was contacted to explore their experience. An interim review revealed several subspecialties were under-represented; for those subspecialties where telephone consultations were still being offered to all patients, telephone consultations between 3 July and 8 September were also surveyed.

The patient's healthcare records were then reviewed for key demographics, presenting complaint, diagnoses and concomitant psychiatric diagnoses. The patient's level of neurological disability and socioeconomic grade were estimated using the modified Rankin Score^{9 10} and the NRS (National Readership Survey) Social Grade classification, respectively.

Data were analysed using the R statistical software package, V4.1.1 (The R Foundation).

Questionnaire demographics

Four hundred and thirty clinician questionnaires were received from 18 clinicians (2 Clinical Nurse Specialists, 16 Consultant Neurologists), all describing consultations with different patients. Within these, 290 consultations (67%) had a corresponding patient questionnaire (80 postal questionnaires, 210 by telephone); the demographics of responders were broadly similar to non-responders (online supplemental table S1). A quarter of consultations were for new patients (table 1).

Clinician questionnaires

Clinicians were able to achieve their goals in 335/430 (78%) of telephone consultations. Clinician goals were achieved more

Table 2 Telephone consultations: goal achievement from clinician and patient questionnaires

	Were goals achieved from the telephone consultation?	
	No of consultations with goals achieved/total no of consultations (%)	
	Clinician Questionnaire (n=430)	Patient Questionnaire (n=290)
All consultations	335/430 (78)	227/290 (78)
New consultation	63/101 (62)	51/74 (69)
Follow-up consultations	272/329 (83)	176/216 (81)
Patient gender		
Male	135/187 (72)	97/126 (77)
Female	200/243 (82)	130/164 (79)
Patient age		
40 and under	98/116 (85)	64/72 (89)
41–60	104/133 (78)	65/85 (76)
61–80	117/153 (76)	81/113 (72)
81+	16/28 (57)	17/20 (85)
Developmental disorder		
Patient had a recorded developmental disorder	15/19 (79)	8/10 (80)
Patient did not have a recorded developmental disorder	320/401 (78)	219/280 (78)
modified Rankin Score		
0–2	279/349 (80)	186/238 (78)
3–5	55/80 (69)	41/52 (79)
Social grade		
ABC1	123/152 (81)	84/105 (80)
C2D	51/79 (65)	41/57 (72)
E	33/37 (89)	15/20 (75)
Unknown	127/161 (79)	87/106 (82)
Prior mental health diagnoses		
Present	66/92 (72)	38/57 (67)
Not present	269/338 (80)	189/233 (81)

often than not across all demographic subgroups (table 2). Clinicians achieved their goals most frequently with younger patients and in follow-up appointments (272/329, 83%) compared with new consultations (63/101, 62%).

The rate of clinician goal achievement also varied by presenting complaint (for new consultations) and for principal diagnosis (for follow-up consultations) (table 3). Clinicians achieved their goals almost universally with new and follow-up consultations concerning seizures or epilepsy. When these patients are excluded, clinicians achieved their goals in 48% of new consultations and 79% of follow-up consultations.

The only other group of new consultations where clinicians achieved their goals more often than not addressed sensory, motor or combined sensorimotor disturbance though the number

Table 1 Overall patient demographics

Patient demographics	Type of consultation		
	New	Follow-up	All
No	101	329	430
Mean age (SD, range)	52.7 (20.7, 17–93)	54.9 (18.2, 17–90)	54.3 (18.8, 17–93)
Gender (male/female)	42/59	145/184	187/243

Table 3 Goal achievement divided by (A): presenting complaint (for new consultations) and (B): primary diagnosis (for follow-up consultations)

(A)	Were goals achieved from the telephone consultation? No of consultations with goals achieved/ total no of consultations (%)	
New consultations (divided by presenting complaint)	Clinician Questionnaire	Patient Questionnaire
Seizure or epilepsy	29/30 (97)	18/24 (75)
Headache	5/13 (39)	5/10 (50)
Motor disturbance	5/9 (56)	5/6 (83)
Sensory and motor disturbance	6/8 (75)	4/6 (67)
Sensory disturbance	5/8 (63)	2/5 (40)
Cognitive problems	2/5 (40)	4/4 (100)
Dizziness	2/5 (40)	3/4 (75)
Visual disturbance	2/4 (50)	3/3 (100)
Speech disturbance	2/4 (50)	1/3 (33)
Tremor	1/4 (25)	1/3 (33)
Collapse	1/3 (33)	3/3 (100)
Other presenting complaint*	3/7 (42)	2/3 (67)

(B)	Were goals achieved from the telephone consultation? No of consultations with goals achieved/ total no of consultations (%)	
Follow-up consultations (divided by primary diagnosis)	Clinician Questionnaire	Patient Questionnaire
Parkinson's disease	70/94 (74)	50/65 (77)
Epilepsy	85/92 (92)	53/57 (93)
Huntington's disease	42/50 (84)	16/22 (73)
Multiple sclerosis	17/19 (89)	16/16 (100)
Primary headache disorders†	17/18 (94)	10/14 (71)
Peripheral neuropathy	6/9 (67)	7/8 (88)
Mitochondrial disorder	4/6 (67)	4/4 (100)
Idiopathic intracranial hypertension	4/4 (100)	2/3 (67)
Autoimmune encephalitis	2/3 (67)	No patient responses
Functional neurological disorder	3/3 (100)	1/2 (50)
Myasthenia gravis	2/3 (67)	1/3 (33)
Myelopathy	3/3 (100)	1/3 (33)
Neuromyelitis optica	2/2 (100)	2/2 (100)
Dementias	2/2 (100)	No patient responses
Other primary diagnosis‡	10/17 (59)	15/17 (88)
None	3/4 (75)	3/3 (100)

*Other presenting complaint: two cases of hearing loss; single cases of: fatigue, family history of neurological disorder, functional neurological disorder, motor neuron disease second opinion.

†Primary headache disorders: migraine, cluster headache, tension headache and unspecified primary headache.

‡Other primary diagnosis: single cases of autosomal dominant leukodystrophy, cerebellar ataxia, chronic lymphocytic inflammation with pontine perivascular enhancement responsive to steroids, cerebrospinal fluid leak, dystonia (cause unclear), hereditary spastic paraparesis, Lambert-Eaton Myasthenic syndrome, Miller-Fisher syndrome, multifactorial dizziness, neuroferritinopathy, neurosarcoïd, orthostatic tremor, restless leg syndrome, venous sinus thrombosis, statin-induced myositis, stiff person syndrome, ulnar nerve neuropathy.

of respondents is low (n=25 in total). In all other presenting complaints, clinicians achieved their goals less than half of the time in new consultations.

Among follow-up patients, clinicians achieved their aims more often than not across all primary diagnoses (table 3); only consultations addressing peripheral neuropathy, mitochondrial

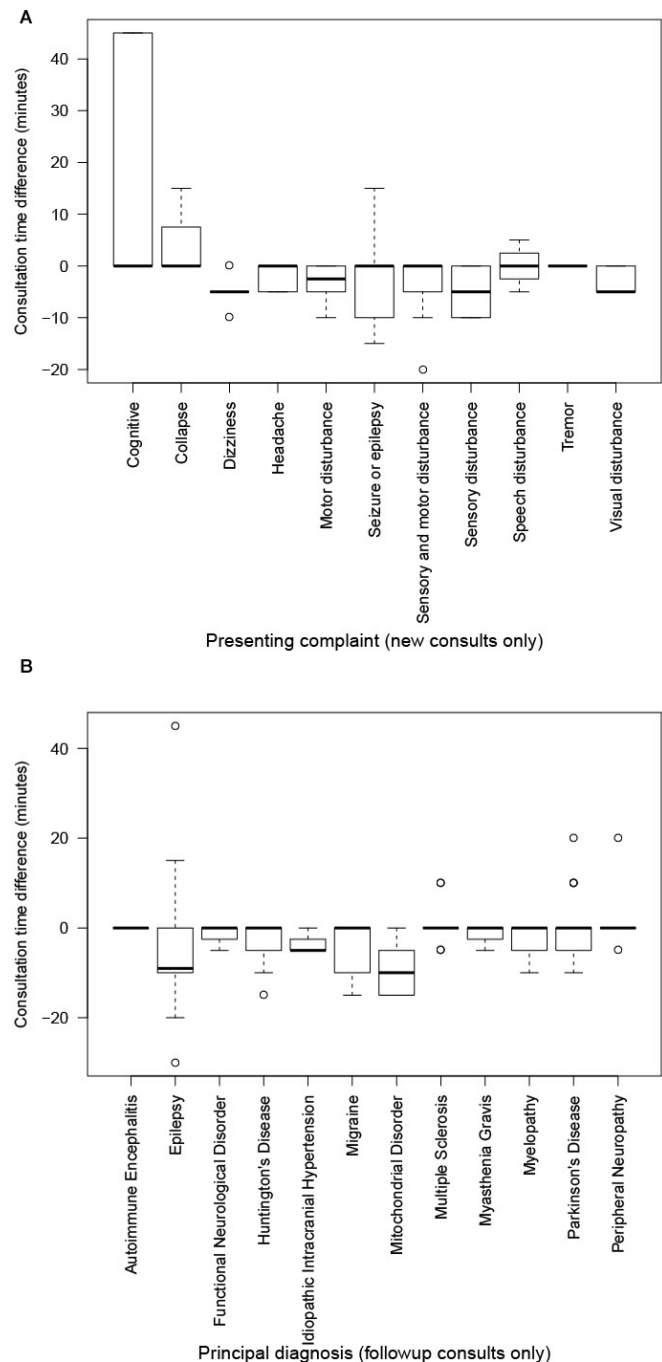


Figure 1 Time difference for telephone consultation, compared with estimated face-to-face consultation, by presenting complaint (for new consultations, (A)) and by primary diagnosis (for follow-up consultations, (B)).

disorder, autoimmune encephalitis and myasthenia gravis had achievement rates below 80% (acknowledging small numbers in each). When clinicians did not achieve their aims, the telephone medium was usually the cause (93/95, 98%) principally reflecting the inability to examine the patient (66/93, 71%). This was particularly cited in appointments with patients new to the service (29/38 unsuccessful new consultations, 76%). Less frequently cited reasons included in-clinic investigations (n=12, of which five were in the transient ischaemic attack clinic), patient deafness (n=4), the need for a collateral history (n=4) or cognitive assessment (n=4). In 10/93 (11%) multiple reasons

Table 4 Patient preference for future consultations, with comparison by mean age of patient and percentage of patients in new consultations

Patient preference for future consultations:	No (%)	Mean age (SD), years	No (%) undergoing new consultation when surveyed
All face to face	62 (29)	60.4 (±17.5)	16 (26)
All by telephone	22 (10)	49.0 (±15.5)	5 (8)
All by video	7 (3)	56.3 (±18.1)	2 (3)
Mix of face to face and telephone	53 (25)	49.4 (±19.6)	14 (23)
Mix of face to face and video	40 (19)	52.5 (±19.7)	17 (28)
Mix of telephone and video	27 (13)	45.0 (±17.9)	7 (12)

were cited. In 40/93 (43%) of consultations where clinicians did not achieve their aims due to the telephone, the clinicians deemed that a video consultation would have done so. Only 10/93 patients were felt to require urgent face-to-face clinical assessment and were rebooked in for a face-to-face appointment within 1 month of the telephone appointment (five new patients, five follow-up patients).

Clinicians generally did not feel that the telephone consultation impaired the doctor-patient relationship (impaired in 55/430 consultations, 13%) though this figure was greater in new (30/101, 30%) compared with follow-up (25/329, 8%) consultations.

Finally, clinicians were asked about the duration of each telephone consultation compared with what they estimate they would have spent on the same face-to-face consultation. In both new and follow-up consultations, clinicians estimated that the telephone consultation required less time (41/101 (41%) and 168/329 (51%) respectively) or the same time (53/101 (53%) and 145/329 (44%), respectively) with only 5% of consultations in each category taking longer by telephone. The median time difference for telephone consultations (compared with face-to-face consultations) was 0 min for both new and follow-up consultations (mean 2 min shorter and 3 min shorter, respectively). Within new consultations, patients presenting with dizziness, motor or sensory disturbance or visual disturbance took shorter median consultation time than estimated face-to-face (all less than 5 min shorter) while no median difference was seen in any other presenting complaint (figure 1A). Follow-up consultations addressing epilepsy, idiopathic intracranial hypertension and mitochondrial disorders took 5–10 min less time than estimated face-to-face consultations, while no median difference was seen in other primary diagnoses (figure 1B).

Patient Questionnaires

Patients were able to achieve their goals in 227/290 (78%) of telephone consultations. Patient goals were achieved more often than not across all demographic subgroups (table 2). Younger patients achieved their goals more frequently than older patients (though 73% of consultations with the over 60s were still successful). Similar to clinicians' perception, patients were more likely to achieve their goals in follow-up (81%) consultations as opposed to new (69%) consultations. Of the patients that

did not achieve their goals, 39/49 (80%) attributed this at least partially to the telephone appointment.

Multiple reasons were cited for not achieving the consultation aims, and in over a third of such cases (24/63) multiple reasons were cited. Overall, half (33/63, 52%) raised issues communicating over the phone, and just under a third (20/63, 32%) wanted a physical examination as part of the consultation. Seven patients (11%) reported not feeling sufficiently in control of the consultation over the telephone.

Fifty-three patients (20%) felt the telephone hampered the doctor-patient relationship, with minimal difference seen between follow-up (34/197, 17%) compared with new consultations (19/71, 21%).

Patients were also asked about the practicality and ease of attending a telephone appointment compared with a face-to-face appointment. The majority of respondents (203/285, 69%) found the telephone consultation more convenient or practical than a face-to-face consultation. Of note, 101/285 (35%) patients were employed at the time of the consultation, 97 of which needed to take time off work for their consultations (mean 5.4 (SD 5.0) working hours lost). Furthermore, most patients (201/285, 70%) would be accompanied to face-to-face consultations by a family member or friend, of which half (102/201, 50%) would also take time off work to attend. Patients also generally reported having to spend an average of two and a half hours (mean 157 min, SD 86 min) attending an appointment, including return travel time.

Finally, patients were asked about their preferences for future consultations. Of 211 respondents, 62 (29%) wanted exclusively face-to-face consultations, 56 (27%) wanted only telephone or video consultations or a mixture of the two, while 93 (44%) wanted a mixture of face-to-face consultations with either telephone or video consultations (table 4). These preferences varied by age, with older patients generally preferring future consultations to all be face-to-face, and younger patients preferring at least some telephone and video appointments. Despite the high goal achievement by patients with epilepsy (93%) and multiple sclerosis (100%) (table 3) future consultations wanted at least some face-to-face consultations in 42/62 and 7/12, respectively (table 5)

Table 5 Patient preferences for future consultations, by diagnosis (only if >10 respondents to question)

Patient preference for future consultations by diagnosis:	All face to face (%)	All telephone (%)	All video (%)	Mix of face to face and telephone (%)	Mix of face to face and video (%)	Mix of telephone and video (%)	Respondents
Epilepsy	15 (24)	7 (11)	1 (2)	16 (26)	11 (18)	12 (19)	62
Parkinson's disease	12 (30)	2 (5)	2 (5)	11 (28)	11 (28)	2 (5)	40
Migraine	3 (23)	0 (0)	1 (8)	4 (31)	3 (23)	2 (15)	13
Huntington's disease	6 (50)	3 (25)	0 (0)	1 (8)	1 (8)	1 (8)	12
Multiple sclerosis	2 (17)	4 (33)	0 (0)	4 (33)	1 (8)	1 (8)	12

DISCUSSION

Converging evidence from patients and clinicians found that in particular settings—any seizure or epilepsy consultation; follow-up consultations for most diseases; and consultations with younger patients—telephone consultations may be advantageous for future care delivery, probably in combination with face-to-face consultations. Across all demographics, clinicians and patients achieved their goals from telephone consultations more often than not: in follow-up consultations, goal achievement exceeded 80% in patients with primary diagnoses of epilepsy, Huntington's disease, multiple sclerosis and migraine; 50%–83% of these subgroups wanted future consultations to include telephone or video consultations; and the consultation itself took the same or less time than face-to-face consultations.

With the exception of seizures or epilepsy, new consultations delivered by telephone were not associated with high goal achievement from clinicians (34/71, 48%) or patients (33/56, 59%). For clinicians, this predominantly reflected the inability to examine the patient and to a lesser extent, in-clinic investigations. A video consultation was predicted to have enabled clinician goal achievement in 13 instances, bringing the total clinician success rate to 76/101 for all new consultations. However, some factors driving unsuccessful telephone consultations (particularly increasing age and lower socioeconomic status) will likely impair video consultations.^{11 12} Future work comparing face-to-face, telephone and video consultations across all demographics and disease types is now required.

The telephone was deemed to have impacted on the clinician–patient relationship in less than 20% of consultations. More than one-third of patients questioned were employed prior to the pandemic (necessitating missing half a day of work to attend face-to-face appointments) while more than two thirds would be accompanied by a family member, friend or carer, of which half would also need to take time off from work to attend. The reported convenience of a telephone appointment for patients may stem from this, from the driving restrictions resulting from certain neurological diagnoses (particularly seizures and epilepsy) and from the lower perceived value of facets requiring face-to-face consultation (such as clinical examination) in some follow-up scenarios, particularly headache or epilepsy.

To the best of our knowledge, this is the first simultaneous assessment of patient and clinician perceptions of telephone consultations, incorporating a broad and unselected range of adult neurological presentations, solely using the telephone (as opposed to video) medium. With the exception of age and disease, we found no consistent relationship between demographics and consultation success. The absence of a relationship between socioeconomic status and goal achievement may reflect our crude method of quantifying socioeconomic status, the relative affluence of the surrounding areas or a true lack of an effect. Our overall findings on patient and clinician satisfaction are broadly in line with other studies and adds to the body of evidence produced both prior to and as a result of the pandemic.^{13–19}

Our findings are also in line with the approach outlined by NHS England/National Institute for Health and Care Excellence suggesting that remote consultations are more appropriate for consultations of chronic, stable patients, where a physical examination may not be required.⁸ It also provides the beginnings of an evidence base for which hospitals can start adapting to digital health clinics as part of the pre-pandemic NHS Long Term Plan to move up to a third of visits non-face to face.²⁰

A number of limitations are worth addressing. Foremost, many presentations or diagnoses are under-represented, reflecting the finite period when unselected referrals were converted to telephone clinics (following which a more judicious approach based on clinician experience was adopted). Additionally, the peripheral nerve service did not undertake telephone consultations due to the importance of the clinical examination to their clinical assessments; the small number of neuropathies included here were those from general clinics so are not generalisable. The unique aspect of the study, looking at telephone consultations, also restricts its scope; with many factors reported by both clinicians and patients as hindering the consultations (such as difficulties with non-verbal communication or inability to examine/inspect the patient) possibly being addressed in video consultations. The majority of patient questionnaires were collected by telephone rather than written, but we found no meaningful difference between the rates of patient-reported goal achievement or patient's future consultation medium preference between the two approaches suggesting this methodological issue did not introduce bias. To improve uptake and avoid unnecessary burden we relied on self-reported consultation duration from clinicians which may not be accurate. Some demographic factors (such as the social grade or presence of a mental health diagnosis) relied on the information to be present in clinic and referral letters, so may also be incomplete. The lack of trainee clinics (due to clinical redeployments) and small number of nurse specialist consultations (from epilepsy and headache) precluded exploring whether goal achievement varied due to clinician type. All surveys are inherently prone to respondent bias with those responding potentially more likely to have had particularly negative or positive experiences: the high response rate should have minimised this. Finally, this was a single centre survey, and should be repeated in other centres, comparing face-to-face, video and telephone consultations to seek whether our findings are generalisable; and, if so, whether an algorithmic triage process can be employed by non-clinical staff at the time of appointment booking to determine the appropriate consultation modality. As highlighted by other studies

Main messages

- ▶ Neurological outpatient services can be delivered by telephone to most subgroups of follow-up appointments. Here—and in some easily preidentified subgroups of new consultations—both patients and clinicians achieve their goals, and do so in the same or less time than a traditional face-to-face consultation.
- ▶ The majority of patients that responded would like at least some of their future follow-up appointments by telephone.

Current research questions

- ▶ Is there a role for telephone consultations in the delivery of outpatient Neurological services postpandemic?
- ▶ For a general neurological service, are there preidentifiable subgroups of patients in whom telephone consultations yield a high rate of clinician and patient satisfaction?
- ▶ What are the limitations of the telephone consultation medium, from both a clinician and a patient perspective?
- ▶ Do telephone consultations take the same, less or more time than corresponding face-to-face consultations?

What is already known on the subject

- ▶ Telemedicine can be effective from a clinician perspective in certain neurological specialist follow-up clinics, such as in the delivery of stroke and epilepsy services.
- ▶ Neurologists working throughout the COVID-19 pandemic have found that video-based telemedicine is satisfactory in the majority of cases, but access to equipment for both clinicians and patients can hamper these encounters.

conducted during the pandemic, these clinics represent a snapshot of a single neurological consultation and may not be indicative of successful longer-term outcomes and care.

In conclusion, subgroups of neurology outpatient consultations appear effective, convenient and popular when delivered by telemedicine. A mixture of such remote methods with face-to-face consultations appears the most popular approach with patients.

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