



The feasibility of delivering first suspected seizure care using telehealth: A mixed methods controlled study

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ABSTRACT

Purpose: Prompt access to specialist assessment is critical after a first suspected seizure. We aimed to test the feasibility of providing this service via telehealth, compared with usual care (face-to-face appointment) in patients referred to a first seizure clinic.

Method: This feasibility study was a prospective mixed-methods non-randomised controlled design in a single centre. Patients referred to the first seizure clinic chose to receive their consultation by telehealth (intervention group) or face-to-face (usual care). Demand, practicality, acceptability and limited-efficacy testing were assessed using recruitment and routinely collected clinic data, participant surveys and a clinician focus group.

Results: Telehealth in the first seizure clinic was feasible; however, internet connection, computer hardware and software, patient confidence and organisational support impacted on practicality. Of patients who were eligible for telehealth, 25 % chose to use telehealth for their appointment, with more women taking up the opportunity. Geography and age were not factors in likelihood of uptake. There was no significant between-group difference found in acceptability and limited efficacy measures conducted.

Conclusion: Telehealth is a responsive and convenient way to reach some patients who face barriers in access to specialist neurology assessment following a first suspected seizure.

1. Introduction

The first seizure clinic model of care enables prompt specialist assessment by a neurologist following a first suspected seizure, facilitating rapid diagnosis of seizure versus mimic (King et al., 1998). The model has been adopted in most major metropolitan centres for epilepsy management in Australia and other countries. It achieves high rates of diagnostic accuracy (King et al., 1998) but relies on access to a tertiary hospital with sub-specialty epilepsy expertise. This limits the availability of the service for people in outer-metropolitan, rural and remote areas, and those who find accessing hospital-based services difficult for social, practical or emotional reasons.

Telehealth has the potential to make an important contribution to first seizure care by improving access, and facilitating early assessment, management and advice; care which empowers people to effectively self-manage after experiencing a first seizure (Foster et al., 2019). Telehealth enables a medical consultation to be performed using a secure digital platform with audio and visual communication between specialist neurologist and patient, and in some cases can also include other people such as a carer, less specialised physicians or primary healthcare provider (Kissani et al., 2020).

Although telehealth provides many benefits for patients and health services (Jennett et al., 2003), adoption has been limited, in part due to its complexity (Ekeland et al., 2010). Uptake has been accelerated in

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2020 out of necessity for physical distancing, isolation and rationalisation of on-site health care resources during the COVID-19 pandemic, but there are still many questions about its practicality, acceptability and effectiveness in different settings. In epilepsy care, feasibility of telehealth has been reported for review appointments (Ahmed et al., 2008) and for inpatient consultations (Craig et al., 2000), but not for first seizure clinic. Given the rapid transition to delivery of telehealth for all care it is important to investigate the feasibility of telehealth for the first consultation, not just ongoing care. The application of telehealth to outpatient epilepsy care is considered to have “the potential of addressing limited resources and improving access to people with epilepsy across the globe”(p.1) but is underutilised (Kissani et al., 2020).

The aim of this study was to investigate the feasibility of providing outpatient appointments in first seizure clinic by telehealth to patients living in both metropolitan and regional areas of a large health network.

2. Methods

2.1. Design

This feasibility study was a prospective mixed-methods non-randomised controlled design in a single centre. Patients referred to the first seizure clinic between July 2019 and April 2020 received either a telehealth consultation (intervention group) or a face-to-face appointment (usual care), according to their preference. Bowen’s framework for conducting feasibility trials was used as a basis for the study, and the four domains of demand, practicality, acceptability and limited-efficacy testing were considered (Bowen et al., 2009). Data sources included recruitment data, routinely collected clinic data, participant surveys and a clinician focus group. Approval for the study was obtained from the health network ethics committee (LR19/033) and participants provided written informed consent.

2.2. Setting

This study was conducted in the first seizure clinic operating from a hospital site within a large health network in Melbourne, Australia, which has a catchment area of more than 2800 square kilometers. The clinic is publicly funded and patients have no out-of-pocket expenses. Referrals come from Emergency Departments, General Practitioners or other health professionals. Each week, the 3.5 h clinic is run by one of the four staff neurologists specialising in epilepsy, supported by an administrative officer. A video-conferencing platform had been available at the health network for some time but had never been used to provide care within the epilepsy service.

2.3. Participants

Participants included patients and service providers, who were meeting each other for the first time after the patient had experienced a first suspected seizure. Patients were eligible for inclusion if they: had been referred and accepted to the first seizure clinic; were aged 18 years and over; met the health network’s criteria for telehealth suitability; had access to suitable technology; and agreed to either receive their appointment via telehealth (intervention group) or were willing to complete a survey about their experience of a face-to-face appointment (usual care). Exclusions, consistent with the health network’s criteria for telehealth suitability, included patients: with cognitive, physical or sensory impairment that would restrict participation in a video consultation; who required an interpreter; who required a physical examination; or who did not give informed consent.

Service providers were invited to participate in a focus group to discuss their perceptions of using telehealth. The four specialist neurologists who worked in the first seizure clinic and the staff member who provided administration support were eligible to participate.

2.4. Procedure

All patients referred to first seizure clinic between July 2019 and April 2020 were triaged by the senior neurologist who, in addition to usual practice, applied the health network’s telehealth suitability criteria, providing an estimate of potential demand.

All patients were scheduled for an appointment in the usual way by clinic administrator. A reminder phone call from a representative of the neurology department was made to a convenience sample of patients, if they could be reached prior to the appointment with sufficient lead time to make arrangements for a telehealth consultation. During the phone call, patients were asked if they would be interested in using telehealth for their appointment. Those who agreed were offered the opportunity to participate in the study, and written informed consent was sought. If they declined, the reason why was recorded and were counted as “prefers face to face appointment”.

Usual care group participants were recruited by clinic administration staff when they attended their appointment in person. If agreeable, the researcher provided an explanation of the study and obtained written informed consent.

Participants in the intervention group used telehealth for their first seizure clinic appointment with the neurologist. A research assistant provided telephone support and text message instructions to patients to assist them to access the health network’s telehealth platform prior to the appointment. On the day of the appointment, the research assistant provided support to both patient and neurologist to coordinate the telehealth appointment. Patients in the control group attended a usual care, face-to-face appointment in the specialist outpatient clinic at the hospital.

After the appointment, participants from both groups completed an online questionnaire developed for the study. One reminder message was sent if the questionnaire had not been completed within 5 days.

At the conclusion of the study, the four neurologists and the clinic administrative officer were invited to participate in a focus group to explore satisfaction and acceptability, barriers and practicality, and opinions on clinical outcomes (limited efficacy testing). The focus group was run as an online meeting (due to COVID restrictions which came in at the end of the study) by an independent member of the research team not otherwise involved with the clinic. The focus group was guided by a schedule of questions related to feasibility domains (Bowen et al., 2009).

Additional data sources included information routinely collected by the health network, a record of triage decisions regarding telehealth eligibility, and an audit of time taken to arrange telehealth appointments. A summary of all data sources mapped to feasibility outcomes is presented in Table 1.

2.5. Analysis

Sample sizes between 24 and 50 have been recommended for feasibility studies (Sim and Lewis, 2012; Julious, 2005). An audit of sample size of feasibility studies found a median sample size of $n = 36$. (Billingham et al., 2013). If we identify 100 eligible participants we will be able to estimate a participation rate (demand) of 20 % in telehealth to within a 95 % confidence interval of $\pm 8\%$. A sample of $n = 40$ (20 in each group) provided more than 0.80 power at alpha level 0.05 to detect a between-group difference of 45 % of agreed survey statements on demand, practicality, acceptability and limited efficacy testing, assuming 80 % agreed in one of the groups. Therefore, we aimed to recruit 40 participants (20 in each group) from potentially eligible participants referred to the first seizure clinic.

Descriptive analysis was used to estimate potential demand for telehealth. Differences between the intervention and usual care groups in relation to clinical outcome and responses to survey questions were compared using Chi squared or Fisher’s exact test, as appropriate, for categorical data and t-tests (or equivalent non-parametric tests as appropriate) for interval/ratio data.

Table 1
Outcome measures.

Domain of feasibility (Bowen et al., 2009)	Measurement	Data source
Demand- the extent to which a new intervention is likely to be used	1 Number of patients referred and proportion considered suitable for telehealth;	1 Record by triaging neurologist
	2 Response to question: "Would you be interested in using telehealth for your consultation instead of usual face-to-face appointment?"	2 Patient preference, expressed during reminder phone call
	3 Response to question: "Would you have attended your appointment at the hospital if telehealth was not available?" or "Would you attend your next appointment by telehealth if it was offered?"	3 Online survey for participants in usual care and intervention groups
Practicality- how to deliver telehealth within the context of potential organisational and stakeholder constraints, related to existing resources, time and commitment	1 Responses to questions about operating technology, location for appointment, whether a carer attended, travel arrangements, whether the appointment was abandoned, delayed or cancelled and if money and time was saved	1 Online survey for participants in usual care and intervention groups
	2 Service provider perceptions of preparation and follow-up, reliability/ use of technology and practical barriers	2 Service provider focus group
	3 Time spent on administrative activities beyond usual processes	3 Audit by project officer
Acceptability- the reaction of patients and service providers to utilising telehealth	1 Responses to questions about satisfaction, comfort and ease, and a rating on recommendation to others	1 Online survey for participants in usual care and intervention groups
	2 Service provider perceptions of satisfaction, barriers, benefits and support for future use of telehealth	2 Service provider focus group
Limited efficacy testing- an immediate outcome in a convenience comparison sample to test limited effectiveness of telehealth	1 Clinical outcome for patients categorised as: i) diagnosed with epilepsy; ii) unclear clinical picture, for further investigation or wait-and-see; iii) patient does not have epilepsy	1 Medical record audit of usual care and intervention group participants
	2 Patient rated confidence with management plan	2 Online survey for participants in usual care and intervention groups
	3 Response to question: "What differences would you say there were in the quality of care you provide between a telehealth consultation and a face-to-face consultation?"	3 Service provider focus group

Free-text answers to an open-ended question in the survey provided qualitative data from patients, with telehealth participants providing further information about their experience, and the usual care group participants describing the reason they preferred to attend in person. Qualitative data from the service provider focus group were analysed deductively against the domains of feasibility. Responses were coded into units and arranged using a matrix to identify themes, providing a narrative outcome.

3. Results

3.1. Participants

A total of 329 patients were referred to the first seizure clinic and triaged during the study. Of these, 41 patients consented to participate in the study, 25 who received their appointment by telehealth (intervention group), and 16 who received a face-to-face appointment (usual care group).

The groups were similar in age and days waited for the appointment. The observed mean distance between clinic and residence was higher in the telehealth group (21 km) than the usual care group (16 km). There was no group difference in triage category indicating severity of condition may have been similar in both groups.

There was an observed and significant difference in gender, with a higher proportion of women in the telehealth group (60 %) compared to the usual care group (19 %, Table 2). The gender distribution of the clinic population overall is 45 % female.

All four neurologists agreed to participate in the focus group, however the administration officer declined. Each of the four neurologists conducted consultations with between 5 and 8 patients allocated to telehealth.

3.2. Demand

Of all referrals received and triaged during the study period, 80 % (n = 265) were considered eligible for telehealth. The most common reasons for patients being ineligible were the need for an interpreter (n = 20) and impaired cognition (n = 25). A total of 104 patients (39 % of patients eligible for telehealth) with scheduled appointments, were offered a telehealth appointment and the opportunity to participate in the study. Of these, 25 % (n = 26) agreed to use telehealth; 12 % (n = 12) declined the service all together and 65 % (n = 66) preferred to attend their appointment in person. The main reasons for preferring face-to-face over telehealth were technology barriers (poor internet, no access to a device or lack of confidence using technology, n = 22), or face-to-face interaction was perceived as better for communication, particularly for the first appointment after a critical event (n = 22) (Fig. 1).

When participants were asked if they agreed with the statement "I would be happy to attend my next appointment by telehealth", 68 % of

Table 2
Participant characteristics.

Data type	Telehealth/ Intervention group n = 25	Usual care group n = 16	Significance
Age in years			p = .87
Median [range]	38 [20–73]	31 [22–81]	
Mean (SD)	41(16)	42 (22)	
Gender n (%)			p = .01
Male	10 (40)	13 (81)	
Female	15 (60)	3 (19)	
Days between date of referral & appointment			p = .99
Median [IQR]	57 [48–73]	52 [45–74]	
Assigned priority at triage n (%)			p = .36
High	23 (92)	13 (81)	
Routine	2 (8)	3 (19)	
Distance between clinic and residence in km			p = .43
Mean (SD)	21(19)	16(10)	

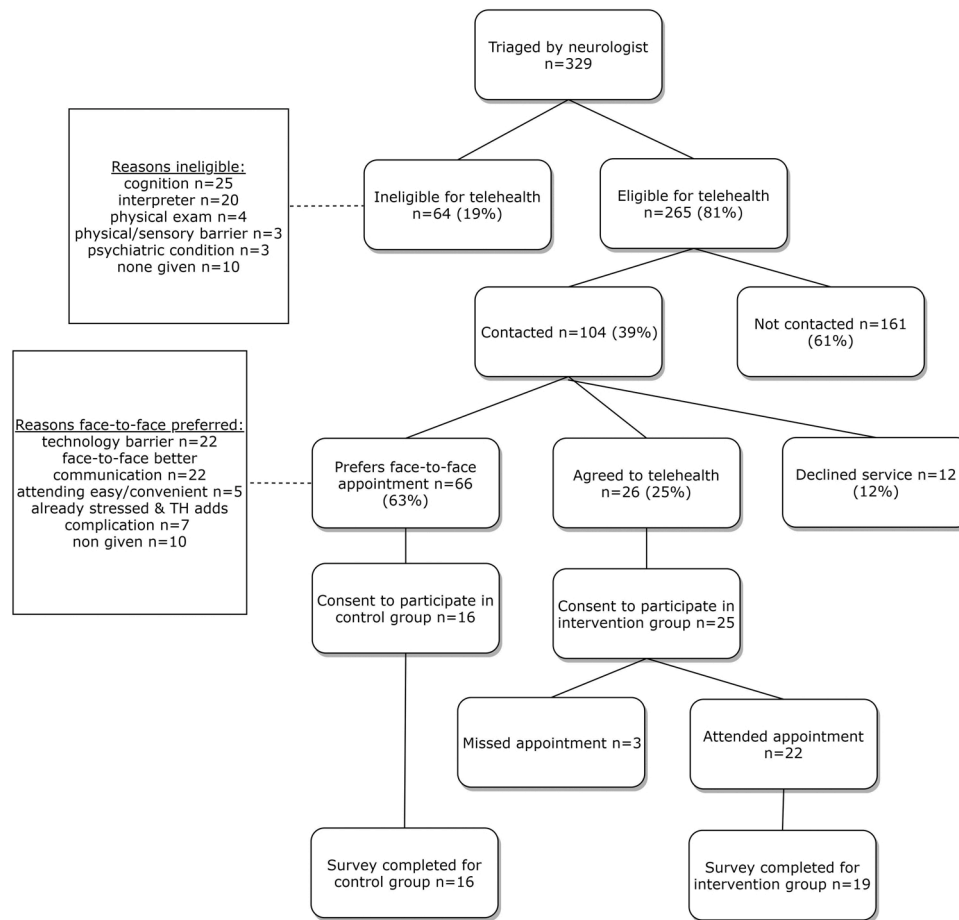


Fig. 1. Participant recruitment flowchart.

the intervention group agreed compared with 24 % of the usual care group.

Five participants choosing telehealth (26 % of the intervention group) stated they would have missed their appointment if they had been required to attend the hospital.

“I’m not allowed to drive because of said first seizure, so I would have had to take public transport, so I probably would not have attended.” – telehealth survey respondent

3.3. Practicality

The intervention and usual care groups showed minimal differences in survey responses about ease of attending and appointment delays. More patients in the usual care group were accompanied by a family member or carer (60 %, n = 9) compared to 21 % (n = 4) in the telehealth group. This may relate to driving restrictions after a suspected seizure: the majority (73 %) of the usual care group were driven to the appointment by family or friend. Qualitative data from the survey suggested this was recognised as an advantage by telehealth participants:

“This [telehealth] was great as I did not have to have my husband take a day off work to drive me to appointment.” – telehealth survey respondent

The majority of telehealth participants’ responses indicated that they were able to see and hear the doctor clearly and that using the technology was straightforward, although this was not the case for all.

“We ended up on a phone call as telehealth dropped out.” – telehealth survey respondent

In terms of efficiency, 78 % (n = 14) of participants in the intervention group reported that attending the appointment by telehealth saved them time and money (Tables 3 and 4).

“It was extremely easy to get started and my appointment was exactly the same as if I were there except, I did not have to travel, no parking fees and not having to sit in waiting area.” – telehealth survey respondent.

Three people in the telehealth group (11 %) missed their appointment by cancelling on the day of the appointment, compared to the clinic’s usual missed appointment rate of 15 %.

Time taken to set up and coordinate appointments varied depending on the patient’s confidence with technology. As a new process, setting up telehealth appointments required more time than the usual administrative procedures in the clinic. The time required ranged from 5 min (to send a pro-forma text message with telehealth access instructions) to one hour (for a patient requiring several phone calls and a trial-run). On average, the time taken for set up was approximately 10 min per patient.

The focus group with service providers indicated that telehealth worked well for the majority of telehealth consultations but several barriers were acknowledged. Poor infrastructure (including the hardware and software not fit-for-purpose) and internet drop-out affected the quality of audio and vision. In some cases this led to neurologists having to swap from telehealth to telephone calls during the consultation.

“It’s been pretty positive. The only issue was that the connection dropped out a number of times” – neurologist

The neurologists also noted the need for changes to ancillary clinic processes in order to continue to provide an effective telehealth service at the end of the study. This included having administrative and

Table 3
Survey data comparing Telehealth (intervention group) to face-to-face appointments (usual care).

Domain Survey question	Intervention (%)	Usual care n (%)	Significance *
Demand			
Rate the statement: I would be happy for my next appointment to be telehealth			p = .01
Agree	13 (68)	4 (24)	
Neutral/Disagree	6 (32)	13 (76)	
Practicality			
Was your appointment on-time or delayed?			p = 1.00
On time	14 (74)	12 (80)	
delayed	5 (26)	3 (20)	
How did you travel to your appointment? (usual care only)			
Self-drive		1 (7)	
Driven by family/friend		11 (73)	
Public transport		2 (13)	
Walk		1 (7)	
Was a friend or family member with you for your appointment?			p = .03
With friend/family	4 (21)	9 (60)	
Alone	15 (79)	6 (40)	
Rate the statement: It was easy for me to attend			p = .10
Agree	13 (68)	14 (93)	
Neutral/Disagree	6 (32)	1 (7)	
Acceptability			
Rate the statement: I was satisfied with the clinic appointment experience			p = .11
Agree	15 (79)	15 (100)	
Neutral/Disagree	4 (21)	0 (0)	
Rate the statement: I was comfortable and at ease			p = .67
Agree	15 (79)	13 (87)	
Neutral/Disagree	4 (21)	2 (13)	
How likely would you be to recommend telehealth to a family member or friend?			p = .12
Promoter	17 (89)	9 (60)	
Neutral	1 (5)	4 (27)	
Detractor	1 (5)	2 (13)	
Limited Efficacy Testing			
Rate the statement: I am confident with the management plan my neurologist recommended			p = .35
Agree	15 (79)	14 (93)	
Neutral/Disagree	4 (21)	1 (7)	
Medical Record Audit			
Clinical (diagnostic) outcome			p = .23
Seizure	11 (50)	11 (69)	
Not a seizure	6 (27)	4 (25)	
Further investigation	5 (23)	1 (6)	
Appointment outcome			p = .48
For review	17 (68)	13 (81)	
Discharged	8 (32)	3 (19)	

* Fisher's exact test used for significance testing of variables with 2 categories, and Pearson chi square for variables with 3 or more categories.

organisational support, and electronic methods of delivering prescriptions and ordering investigations.

“There is a bit of background coordination and tech support that’s required for a successful telehealth clinic.” - neurologist
“You need structure, where it’s actually backed up by clerical staff who know what they’re doing and it’s organised in a way that patients and doctors both know it’s happening” - neurologist

Table 4
Telehealth experience from intervention group participants.

Survey question	n (%)
Would you have attended Box Hill Hospital if this telehealth appointment had not been offered?	
Yes	14 (74)
No	5 (26)
What was your location during the appointment?	
Home	16 (84)
Work	2 (11)
Other (car)	1 (5)
Rate the statement: Using the technology was straight forward	
Agree	13 (68)
Neutral/Disagree	6 (32)
Rate the statement: I could see the specialist clearly	
Agree	14 (74)
Neutral/Disagree	5 (26)
Rate the statement: I could hear the specialist clearly	
Agree	14 (74)
Neutral/Disagree	5 (26)
Rate the statement: Attending by telehealth instead of in person saved my time and/or money	
Agree	14 (74)
Neutral/Disagree	5 (26)

3.4. Acceptability

Patients’ reactions to implementation of telehealth were positive overall but some individuals had reservations. There was no significant difference between the usual care group and the telehealth group in satisfaction, feelings of comfort and ease, and likelihood of recommending telehealth to others.

“I would highly recommend this process for anyone.”
“The doctor was very easy to understand, and I felt very comfortable.”
 –telehealth survey respondents

Three participants in the telehealth group reported not being as ease, compared to none in the usual care group (Tables 3 and 4).

The neurologists considered telehealth to be an acceptable option to provide first seizure clinic appointments for patients who would otherwise not be able to access the service. They acknowledged that telehealth provides opportunity and choice for vulnerable patients facing practical barriers related to transport or childcare, and for patients who might not be comfortable or able to attend in person for emotional, behavioural or psychological reasons.

“At the time that they need us at first seizure, they are not able to access transport- either themselves because we’ve just taken away their driver’s licence or on public transport and they just can’t come and see us. And a third of the time, if we can just talk to them, we can give them back their licence on the spot. Because they haven’t had a seizure. They’ve fainted or whatever. We can just have a 20-minute conversation and put their life back on track. But we’ve got to be able to talk to them and telehealth is a way we can solve the problem rapidly for a group [of those seriously disadvantaged people]” - neurologist

However, they acknowledged that being in the same room as the patient is always preferable.

“Nothing is quite the same as sitting in front of someone. But I think overall if you get the tech right, then you can deliver pretty good care to most people.” - neurologist

3.5. Limited efficacy testing

Medical record audits showed that the clinical outcome of appointments was similar for the usual care and telehealth groups in terms of whether a diagnosis was made and whether patients were discharged or scheduled for a review appointment. It was observed that five telehealth participants required further investigation before a diagnosis could be made compared to one patient in the usual care group.

Patients surveyed indicated that both groups had similar levels of confidence in their management plan after their appointment (Table 3).

Neurologists reported that telehealth was comparable to a face-to-face appointment in that usual care in first seizure clinic consisted of a detailed history taking and rarely required physical examination.

“We can really deliver good care to them, quickly and conveniently. So that’s really positive.” -neurologist

Telehealth did not impede the neurologist’s ability to see and talk with the patient, and sometimes family member, to provide a clinically appropriate assessment.

“It’s good actually seeing someone on the screen, being able to do a visual examination- can you stand up? Can you touch your nose with your finger? And seeing their faces- at least you’re developing some sense of who that person is” -neurologist

It was suggested there may be less ability to control a highly emotive consultation using telehealth, although this did not occur in the study sample. The neurologists agreed that patients attending first seizure clinic may be given life-changing and upsetting news such as recommending driving restrictions. Being face-to-face is considered better to manage, contain and positively redirect the patient to a resolution however this was weighed up against advantages of improved access.

4. Discussion

This study showed that provision of initial appointments with a specialist neurologist, provided by telehealth following a first suspected seizure is feasible for some patients. There is demand for this option for particular groups of patients who find it difficult to attend and would be more likely to miss their appointment if they were required to come to the hospital outpatient department. Acceptability was variable and depended on access to, and prior experience and confidence with technology; as well as the individual’s motivation and circumstances related to transport, work, childcare, anxiety and other personal factors. Internet reliability, computer hardware and software are variable for both patients and service providers, but with adequate infrastructure and support, telehealth is a practical alternative to face-to-face appointments. Limited efficacy testing showed telehealth was comparable to face-to-face consultations. At a time when health services endeavour to reduce infection by minimising face-to-face appointments, this study adds to the existing literature on telehealth for review appointments by providing reassurance that [first seizure care] can be provided by telehealth.

Prior to the onset of the COVID-19 pandemic, interest and uptake of telehealth was relatively low. Many patients expressed a preference to see a clinician in person, even if it meant travelling a considerable distance to the clinic. This suggests that for many patients the familiarity and comfort associated with a face-to-face interaction outweighs considerations of convenience, particularly in a time of stress. However, some were willing to take up the opportunity to try telehealth, and appeared to be influenced by a number of factors. Patients were more likely to agree to a telehealth consultation if they were women, they had

previous experience and comfort using videoconferencing technology and had access to a device (smartphone or computer) and adequate internet. Others who readily agreed to telehealth were parents with young children, those who had restrictions on driving post suspected-seizure and people wanting to minimise time off work. Those who tried telehealth once were more likely to be willing to use it in the future. This may be explained by overcoming fear of the unknown as was illustrated post COVID-19 with the sudden uptake and normalising of online interaction in all spheres of life.

The COVID-19 pandemic coincided with the final stages of the project, and concern about exposure to infection became another reason for acceptance of telehealth consultations. Of six patients invited to participate in the study during this time, five agreed to use telehealth and one declined the service all together, taking demand from 21 % of eligible patients (pre-COVID-19) to 25 %. This indicates that acceptance and demand for telehealth is heavily influenced by perception of choice, and the relative benefits perceived by patients. These observations suggest that issues such as discomfort with technology or a preference for a face-to-face appointment can be overcome if patients are presented with telehealth as a standard care option that provides advantages over attending the clinic.

This study challenges the idea that telehealth should only be considered to be beneficial for people who live far from the health service. A mother of three children with special needs, who lived 2 km from the clinic enthusiastically agreed to telehealth, while others who lived over 30 km away preferred to come as they felt the quality of interaction would be better face-to-face. For the first seizure clinic population, restrictions on driving as well as a high rate of co-morbidity of depression and anxiety (LaFrance et al., 2008; Thapar et al., 2009) may mean that telehealth is suited to vulnerable groups who may not otherwise attend and receive the care they require.

Telehealth may reduce missed appointments at a first seizure clinic. Given the potential outcomes of this appointment, ensuring a high level of attendance is important not only for the patient, but also for their families and community. A young woman reported that she would not have attended in person as she had post-traumatic stress disorder and reported crippling anxiety on public transport. The outpatient clinic fail-to-attend rate is a recognised problem (McLean et al., 2016) with the rate being reported in an epilepsy service as 20 %, and up to 50 % for disadvantaged patients (Haque et al., 2018). Non-attendance has clinical implications for patients who fail to get expert advice placing them at risk of harm when the commencement of appropriate treatment is delayed or absent (Foster et al., 2019). It also contributes to waiting lists and waste within the health system, as patients effectively use more than one appointment if they are offered another chance to attend (Henderson, 2008). We cannot be sure that the observed reduction in missed appointments was due to telehealth, as reasons for missed appointments were not explored in this study. Selection bias may also be a factor if some patients deliberately selected telehealth to overcome anticipated access barriers. However, the findings are consistent with a randomised controlled trial of telehealth in a rehabilitation clinic setting that also reported a reduced number of missed appointments (Covert et al., 2018).

It was observed that a diagnosis of epilepsy was ruled out in a similar number of patients in both groups, suggesting that telehealth may be an efficient way to provide an expert opinion and reassurance in cases that are unlikely to result in an epilepsy diagnosis. However, a slightly higher proportion of patients in the telehealth group were not diagnosed at the first appointment, and required further investigations. While the numbers in the sample are small, the potential for delayed diagnosis and the possibility of an increased patient burden where a definitive diagnosis is not possible is a consideration in using telehealth.

The main limitation of this study is that its ability to reach conclusion on the effectiveness of care and cost is limited due to the design and relatively small sample size. For example, it needs to be considered whether the non-random sampling of participants with only a small

proportion who preferred face-to-face consultations agreeing to participate in the study may have affected measured outcomes. In addition, this study did not differentiate whether there were differences in functional limitations identified at the consultation, although the proportion of patients assigned a high priority triage rating was similar in both groups (Table 2). Regarding cost, previous research in an epilepsy outpatient clinic has however shown that the cost to the service of providing telehealth is comparable to traditional face-to-face care and that patients have less expense by using telehealth, particularly if travel over long distance is required (Ahmed et al., 2008).

While our study provides data that suggests that telehealth may be feasible for some patients attending a first seizure clinic, an adequately powered non-inferiority randomised controlled trial would address questions about whether telehealth quality of care is as effective as face-to-face care and the effect of telehealth on appointment completion rates. This feasibility study may also be helpful in informing further research in other subspecialty clinics that service similar patient populations. Results therefore can be used to inform design of a large randomised controlled trial, alongside a health economic evaluation.

We contacted 104 of 265 potentially eligible participants during the data collection period, which was sufficient to reach our target sample size. It could be questioned whether the sample we approached was representative of the clinic. Our sample was also impacted by the COVID-19 pandemic; no patients attended first seizure clinic face-to-face after physical distancing protocols were introduced in March 2020, limiting the final numbers available to participate in the usual care group. The extent to which the findings of our feasibility study from a single centre may be generalisable to other settings may be influenced by factors such as organisational telehealth infrastructure, and senior neurologist leadership and support.

5. Conclusion

Our descriptive study of a single centre's early experiences with telehealth in a first seizure clinic has shown that telehealth is a feasible method of delivering specialist epilepsy assessments for people referred to a first seizure clinic, particularly for those who may not otherwise access the service. In terms of the study type, it is mixed methods, combining quantitative data, for example numbers of people agreeing to use telehealth and qualitative analysis. Telehealth is practical and acceptable for those who have access to appropriate technology and confidence to use it. People who have experienced a first suspected seizure may have particular barriers to attending traditional health services, such as driving restrictions or anxiety that may increase relative benefit of telehealth over face-to-face appointments.

Inclusion of telehealth as an option for delivery of first seizure clinic may provide an effective way to meet the needs of a group of potentially vulnerable patients who would not otherwise have access to specialist assessment after a first suspected seizure.

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