

# Patient preference for virtual versus in-person visits in neuromuscular clinical practice

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## Abstract

**Introduction/Aims:** It is unknown if patients with neuromuscular diseases prefer in-person or virtual telemedicine visits. We studied patient opinions and preference on virtual versus in-person visits, and the factors influencing such preferences.

**Methods:** Telephone surveys, consisting of 11 questions, of patients from 10 neuromuscular centers were completed.

**Results:** Five hundred and twenty surveys were completed. Twenty-six percent of respondents preferred virtual visits, while 50% preferred in-person visits. Sixty-four percent reported physical interaction as “very important.” For receiving a new diagnosis, 55% preferred in-person vs 35% reporting no preference. Forty percent were concerned about a lack of physical examination vs 20% who were concerned about

**Abbreviations:** ALS, amyotrophic lateral sclerosis; CI, confidence interval; COVID-19, coronavirus disease 2019; NMJ, neuromuscular junction; OR, odds ratio; RRNMf, Rick's Real Neuromuscular Friends.

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evaluating vital signs. Eighty four percent reported virtual visits were sufficiently private. Sixty eight percent did not consider expenses a factor in their preference. Although 92% were comfortable with virtual communication technology, 55% preferred video communications, and 19% preferred phone calls. Visit preference was not significantly associated with gender, diagnosis, disease severity, or symptom management. Patients who were concerned about a lack of physical exam or assessment of vitals had significantly higher odds of selecting in-person visits than no preference.

**Discussion:** Although neither technology, privacy, nor finance burdened patients in our study, more patients preferred in-person visits than virtual visits and 40% were concerned about a lack of physical examination. Interactions that occur with in-person encounters had high importance for patients, reflecting differences in the perception of the patient-physician relationship between virtual and in-person visits.

#### KEYWORDS

COVID-19, in-person, neuromuscular, preference, telemedicine, virtual

## 1 | INTRODUCTION

Telemedicine implies the provision of healthcare services remotely through direct clinician-patient interactions using various communication platforms. Traditional telemedicine services have long been available but used and studied primarily as an alternative means of providing access to remote or underserved areas. In some sub-specialties, such as stroke, telehealth has become common enough that studies exploring its effectiveness have been published.<sup>1</sup> There is also evidence to support telemedicine use in some chronic conditions such as Parkinson disease and epilepsy, but data from routine clinical practice are limited.<sup>2,3</sup> Widespread adoption of tele-neurology outside of the traditional telemedicine scenario was limited by policies and regulations that have temporarily been lifted to allow for care in the era of “social distancing.”<sup>4</sup> The coronavirus disease 2019 (COVID-19) pandemic has led to increased use of telemedicine in clinical neurology practice.<sup>5</sup> To improve virtual care, there are ongoing efforts directed toward refining video exams and introduction/standardization of disease scoring systems.<sup>6</sup> Data regarding telemedicine use in neuromuscular clinical practice are limited.<sup>7</sup> We aimed to determine patient preference for in-person, virtual, or lack of preference for the type of their visit. We also evaluated factors associated with patient visit preferences for both in-person and virtual medicine visits. Results from this study should be useful in informing clinical decisions about using telehealth once the COVID-19 pandemic is over.

## 2 | METHODS

### 2.1 | Study design and data collection

We used a telephone survey to collect data on patients seen in neuromuscular clinics from 10 sites (Supporting Information Material, which are available online) between May 2020 and August 2020. This study

was approved by a central Institutional Review Board in May 2020 and advertised through Rick’s Real Neuromuscular Friends (RRNMF).<sup>8</sup> RRNMF is a collaborative community of neuromuscular physicians dedicated to helping fellow members primarily through online discussion. Each site selected eligible patients from their clinic records. Patients were eligible for the study if they had both (1) virtual real-time visits and (2) in-person clinic visits. Virtual real-time visits were defined as audio-video or audio visits conducted via any platform permitted by participating institutions or by telephone. In-person visits were defined as visits where patients were physically present in the clinic with their provider. All study participants provided informed consent and the questionnaire can be found in the supplemental material.

Information on age, sex, patient impression of disease severity and disease symptom management and other patient preferences was obtained. The primary outcome, patient visit preference, was assessed by the survey item “When you have an appointment at the clinic, what type of visit do you prefer?” Responses were categorized as “Physical (in-person),” “Virtual (through the phone or video-audio system),” or “No preference.” A secondary outcome of interest, virtual visit preference, was categorized as “Video calls,” “Phone calls,” or “No preference.” Patients were assigned to four common diagnostic categories: “Myasthenia,” “Motor neuron disease,” “Neuropathy,” and “Myopathy” and the rest were grouped into “Other.” The disease severity was categorized by the patient as “Mild,” “Moderate,” or “Severe,” while disease symptom management, was characterized by the patient as “Controlled,” “Fairly controlled,” or “Uncontrolled.”

### 2.2 | Data analysis

The patient characteristics, preferences, and behaviors with frequencies and percentages were summarized. Differences in patient visit preference, using chi-square tests of independence, were evaluated.

**TABLE 1** Demographics and disease characteristics by visit preference

	Total (N = 520)	Virtual (N = 133)	In-person (N = 262)	No preference (N = 125)	p-Value <sup>a</sup>
Gender (n%)					.3376
Female	234 (45.0%)	62 (46.6%)	110 (42.0%)	62 (49.6%)	
Male	286 (55.0%)	71 (53.4%)	152 (58.0%)	63 (50.4%)	
Age <sup>b</sup>					.0031 <sup>c</sup>
Mean (SD)	59.0 (16.2)	60.9 (15.4)	60.1 (16.4)	54.8 (16.0)	
Diagnosis (n%)					.5127
Myasthenia gravis	223 (42.9%)	60 (45.1%)	117 (44.7%)	46 (36.8%)	
Myopathy	94 (18.1%)	22 (16.5%)	45 (17.2%)	27 (21.6%)	
Motor neuron disease	43 (8.3%)	12 (9.0%)	23 (8.8%)	8 (6.4%)	
Neuropathy	112 (21.5%)	23 (17.3%)	57 (21.8%)	32 (25.6%)	
Other	48 (9.2%)	16 (12.0%)	20 (7.6%)	12 (9.6%)	
Disease severity (n%)					.8794
Mild	178 (34.2%)	48 (36.1%)	85 (32.4%)	45 (36.0%)	
Moderate	251 (48.3%)	62 (46.6%)	128 (48.9%)	61 (48.8%)	
Severe	91 (17.5%)	23 (17.3%)	49 (18.7%)	19 (15.2%)	
Disease control management					.2236
Controlled	235 (45.2%)	68 (51.1%)	112 (42.7%)	55 (44.0%)	
Fairly controlled	171 (32.9%)	44 (33.1%)	83 (31.7%)	44 (35.2%)	
Uncontrolled	114 (21.9%)	21 (15.8%)	67 (25.6%)	26 (20.8%)	

<sup>a</sup>Chi-squared test.<sup>b</sup>Analysis of variance test.<sup>c</sup>Indicates significance at  $\alpha = 0.05$  level.

Bivariate multinomial models were fitted to evaluate the association between each patient factor and the outcome of interest. Additionally, a multivariable multinomial logistic regression model was fitted to assess the relationship between virtual visit preference and the following factors: gender, age, diagnosis, disease severity, disease management, concerns about privacy during virtual visits, and level of comfort with technology. Odds ratios (ORs) and confidence intervals (CIs) were reported for all models. All statistical analyses were with a specified statistical significance level of .05.

### 3 | RESULTS

The original sample consisted of 523 patients; however, three participants were removed for incomplete data. The characteristics of the 520 patients included in the analyses are presented in Table 1. Approximately half of the patients (50.4%) preferred in-person visits, whereas approximately one quarter (25.6%) preferred virtual visits or had no preference (24.0%). The associations between overall concerns and preferences for actions during a visit and visit preference are presented in Table 2.

For patients who indicated that face-to-face interactions during an in-person visit and physical gestures with the healthcare provider were very important, the odds of preferring an in-person visit were significantly greater than having no preference. Patients who

preferred to receive new diagnoses or bad news virtually had significantly higher odds of selecting virtual visits over no preference, while those who preferred to receive new diagnoses or bad news in-person had significantly higher odds of selecting in-person visits over no preference. For patients who were very concerned about either a lack of physical examination by a neuromuscular specialist or vitals check, the odds of preferring an in-person visit were significantly greater than having no preference. All other associations between patient factors and visit preferences can be found in Table 3. Greater than half of the patients (55.2%) preferred video calls to virtual visits, and in our secondary analysis we observed that regardless of patient perception of the adequacy of privacy in virtual visits, the odds of preferring video calls were higher than having no preference (Table 4).

### 4 | DISCUSSION

Half of the neuromuscular clinic patient population in our study preferred in-person visits. For neuromuscular disorders, performing a detailed physical examination during in-person visits plays a pivotal role in diagnosis and management. The virtual neurologic examinations lack detailed evaluation of certain parameters such as strength or sensation, however, the virtual neurologic exam is evolving.<sup>7,9</sup> For patients, the feasibility of these interactions in a calm, quiet, private setting is a measure of quality of care. This is also reflected in our bias

**TABLE 2** Questionnaire responses by visit preference

	Total (N=520)	Virtual (N=133)	In-person (N=262)	No Preference (N=125)	p-value <sup>†</sup>
<b>Face-to-face interaction during in-person visit (n%)</b>					<0.0001*
Very important	331 (63.7%)	62 (46.6%)	204 (77.9%)	65 (52.0%)	
Somewhat important	150 (28.8%)	52 (39.1%)	54 (20.6%)	44 (35.2%)	
Not important	39 (7.5%)	19 (14.3%)	4 (1.5%)	16 (12.8%)	
<b>Physical gestures with healthcare provider (n%)</b>					0.0007*
Very important	196 (37.7%)	36 (27.1%)	119 (45.4%)	41 (32.8%)	
Somewhat important	197 (37.9%)	52 (39.1%)	96 (36.6%)	49 (39.2%)	
Not important	127 (24.4%)	45 (33.8%)	47 (17.9%)	35 (28.0%)	
<b>New diagnosis visit preference (n%)</b>					<0.0001*
In person	286 (55.0%)	48 (36.1%)	193 (73.7%)	45 (36.0%)	
Virtual	52 (10.0%)	35 (26.3%)	8 (3.1%)	9 (7.2%)	
No preference	182 (35.0%)	50 (37.6%)	61 (23.3%)	71 (56.8%)	
<b>Quarantine impacts preferences (n%)</b>					0.0007*
Very much	147 (28.3%)	54 (40.6%)	66 (25.2%)	27 (21.6%)	
Somewhat	185 (35.6%)	45 (33.8%)	86 (32.8%)	54 (43.2%)	
Not at all	188 (36.2%)	34 (25.6%)	110 (42.0%)	44 (35.2%)	
<b>Worry over lack of physical exam (n%)</b>					<0.0001*
Yes	206 (39.6%)	23 (17.3%)	152 (58.0%)	31 (24.8%)	
No	250 (48.1%)	96 (72.2%)	85 (32.4%)	69 (55.2%)	
No preference	64 (12.3%)	14 (10.5%)	25 (9.5%)	25 (20.0%)	
<b>Worry over lack of vitals check (n%)</b>					<0.0001*
Yes	103 (19.8%)	7 (5.3%)	82 (31.3%)	14 (11.2%)	
No	338 (65.0%)	108 (81.2%)	143 (54.6%)	87 (69.6%)	
No preference	79 (15.2%)	18 (13.5%)	37 (14.1%)	24 (19.2%)	
<b>Adequate privacy in virtual visits (n%)</b>					0.0004*
Yes	438 (84.2%)	123 (92.5%)	202 (77.1%)	113 (90.4%)	
No	33 (6.3%)	5 (3.8%)	24 (9.2%)	4 (3.2%)	
No preference	49 (9.4%)	5 (3.8%)	36 (13.7%)	8 (6.4%)	
<b>Expenses factor into preference (n%)</b>					<0.0001*
Yes	129 (24.8%)	61 (45.9%)	41 (15.6%)	27 (21.6%)	
No	356 (68.5%)	65 (48.9%)	205 (78.2%)	86 (68.8%)	
No preference	35 (6.7%)	7 (5.3%)	16 (6.1%)	12 (9.6%)	
<b>Comfortable with technology (n%)</b>					0.0327*
Very much	272 (52.3%)	78 (58.6%)	121 (46.2%)	73 (58.4%)	
Somewhat	208 (40.0%)	43 (32.3%)	118 (45.0%)	47 (37.6%)	
Not at all	40 (7.7%)	12 (9.0%)	23 (8.8%)	5 (4.0%)	

<sup>†</sup>Chi-square test

\*Indicates significance at  $\alpha = 0.05$  level

toward assessing these factors when comparing in-person vs virtual telemedicine visits. Our study also showed that the patient preference for in-person visits was influenced by the lack of physical interaction in virtual telemedicine visits. It should be noted that virtual visits, can be audio-visual or audio only. Visits with a video component permit “face-to-face” interaction and permit one to visualize gestures. We have not performed an analysis comparing the characteristics of those who preferred audio-video visits vs. those who preferred audio-only

vs. in-person. A future study is needed to answer this question. Historically, the role of gestures has not been assessed as a factor in patient satisfaction. Our findings speak to the role of the physician as not only a medical expert but as an adept communicator given that more than 90% of communication can be non-verbal.<sup>10</sup> The selection of video visits by greater than half of those who had virtual telemedicine visits reinforces the significance. We should note that this study was performed early in the pandemic, when any in-person evaluation

**TABLE 3** Association between patient factors and visit preferences

	Virtual visit vs no preference OR (95% CI)	In-person vs no preference OR (95% CI)
Face-to-face interaction during in-person visit		
Very important	0.80 (0.38, 1.70)	12.55 (4.05, 38.89) <sup>a</sup>
Somewhat important	1.00 (0.46, 2.16)	4.91 (1.53, 15.75) <sup>a</sup>
Not important	1.00	1.00
Physical gestures with healthcare provider		
Very important	0.68 (0.36, 1.28)	2.16 (1.23, 3.80) <sup>a</sup>
Somewhat important	0.83 (0.46, 1.49)	1.46 (0.84, 2.55)
Not important	1.00	1.00
New diagnosis/bad news visit preference		
Physical	1.03 (0.88, 2.61)	4.99 (3.12, 8.00) <sup>a</sup>
Virtual	5.52 (2.44, 12.50) <sup>a</sup>	1.51 (0.38, 2.85)
No preference	1.00	1.00
Quarantine impacts preferences		
Very much	2.59 (1.36, 4.92) <sup>a</sup>	0.98 (0.55, 1.73)
Somewhat	1.08 (0.59, 1.96)	0.64 (0.39, 1.04)
Not at all	1.00	1.00
Worry over lack of physical exam		
Yes	1.32 (0.57, 3.09)	4.90 (2.49, 9.64) <sup>a</sup>
No	2.48 (1.20, 5.12) <sup>a</sup>	1.23 (0.65, 2.33)
No preference	1.00	1.00
Worry over lack of vitals check		
Yes	0.67 (0.22, 1.99)	3.80 (1.77, 8.16) <sup>a</sup>
No	1.66 (0.84, 3.24)	1.07 (0.60, 1.90)
No preference	1.00	1.00
Adequate privacy in virtual visits		
Yes	0.87 (0.23, 3.32)	0.30 (0.10, 0.88) <sup>a</sup>
No	0.50 (0.09, 2.81)	0.75 (0.20, 2.77)
No preference	1.00	1.00
Expenses factor into preference		
Yes	3.87 (1.37, 10.92) <sup>a</sup>	1.14 (0.47, 2.78)
No	1.30 (0.48, 3.47)	1.79 (0.81, 3.94)
No preference	1.00	1.00
Comfortable with technology		
Very much	0.45 (0.15, 1.33)	0.36 (0.13, 0.99) <sup>a</sup>
Somewhat	0.38 (0.12, 1.17)	0.55 (0.20, 1.52)
Not at all	1.00	1.00

<sup>a</sup>Indicates significance at  $\alpha = 0.05$  level.

would have been performed while masked, and so virtual video visits may have actually provided more facial expression and non-verbal communication between the physician and patient, possibly inflating the number of patients who preferred video visits. An additional limitation in this study is that initial and follow-up visits were not distinguished from one another; it is reasonable to expect that patients may

**TABLE 4** Factors associated with virtual visit preference

	Video calls vs no preference OR (95% CI)	Phone calls vs no preference OR (95% CI)
Age	1.03 (1.02, 1.05) <sup>a</sup>	1.03 (1.01, 1.05) <sup>a</sup>
Adequate privacy in virtual visits		
Yes	3.18 (1.53, 6.59) <sup>a</sup>	1.83 (0.79, 4.25)
No	3.67 (1.09, 12.34) <sup>a</sup>	6.87 (1.86, 25.34) <sup>a</sup>
No preference	1.00	1.00
Comfortable with technology		
Very much	3.20 (1.18, 8.66) <sup>a</sup>	0.35 (0.13, 0.96) <sup>a</sup>
Somewhat	2.20 (0.84, 5.77)	0.47 (0.19, 1.21)
Not at all	1.00	1.00

Note: Model adjusted for gender, age, diagnosis, disease severity, disease management, concerns about privacy during virtual visits, and level of comfort with technology.

<sup>a</sup>Indicates significance at  $\alpha = 0.05$  level.

strongly prefer an in-person visit for an initial assessment but after treatment initiation and stability, prefer virtual appointments given patients with NM disease often have some degree of disability making trips difficult.<sup>11</sup>

Many neuromuscular disorders affect patient lifestyle and over time leave them with significant deficits in ambulation, ventilation, oral intake, and other activities of daily living. For these reasons, telemedicine has been studied previously as a means of providing care to patients with certain neuromuscular disorders within the comfort of their homes.<sup>11</sup> A study targeting amyotrophic lateral sclerosis (ALS) patients assessed follow-up care provided at Massachusetts General Hospital and reported the feasibility of remote care.<sup>12</sup> Another study looked at the acceptability of telehealth visits for ALS patients and found that telehealth was generally viewed favorably by ALS patients, caregivers, and multidisciplinary team members.<sup>13</sup> A recent study assessed patient experience with telehealth during the COVID-19 pandemic in the ambulatory neurology clinic.<sup>14</sup> 753 patients were included. Fifty-three percent had a video visit and 47% had a phone visit. Seventy-seven percent reported satisfaction with the virtual visit, but only 51% would consider a future virtual visit. Negative patient experiences were associated with the inability to complete a neurologic exam, which agrees with our study. Patients overall viewed virtual visits as an augmentation but not replacement of in-person visits.

The telemedicine process for those with severe neuromuscular conditions and chronic respiratory failure is far more complex and may require a home set-up for pulse oximetry, blood pressure, and electrocardiography monitoring.<sup>15</sup> A few studies aimed to study remote management of such patients found a telemedicine system to be effective or helpful in reducing hospital admissions.<sup>15,16</sup> Since our study had a higher number of patients with NMJ disorders than other neuromuscular disorders and patients with self-reported "severe" and

“uncontrolled disease” were underrepresented, our study may be underpowered to detect specific patient populations that may prefer virtual visits. Of note, the inclination of at least half the patient population toward “virtual or no preference” also indicates that there may be some patients who may benefit from follow up virtual visits if given the option.

To simplify the data analysis, we excluded open-ended questions, limiting our ability to assess other reasons that may have impacted patient choice. Not all neuromuscular diseases are equally represented in our study. Also, the impact of disability was not factored in the decision making, which may have limited our ability to determine any patient population that may benefit from virtual visits. Additional limitations include (1) Failure to distinguish audio-only vs. audio/video virtual visits when comparing them to in-person visit or to no preference; (2) Asking patients to assess disease severity without clear guidelines, objective scales, or physician input; (3) Asking patients to define disease control without clear guidelines, objective scales, or physician input; (4) Not collecting data on the distance between the patient’s residence and the neuromuscular center and including it as a variable in our analysis; and (5) Survey response rates and characteristics of non-respondents vs. respondents were not evaluated, potentially creating systematic differences between responders and non-responders.

In conclusion, in-person appointments were preferred by about half of the neuromuscular patients in our study, but the remainder were about equally divided between virtual visits and no preference, thus potentially demonstrating a role for virtual visits. It is encouraging that the majority of patients felt comfortable with using technology and expressed confidence in the privacy of telemedicine appointments. Future studies could specifically assess whether there is a preference between in-person appointments and video conferencing. Also, as technology improves (better cameras, improved capability of video conferencing applications, and potential use of virtual reality headsets), there may be less of a gap between telemedicine and in-person appointments.

## CONFLICT OF INTEREST

None of the authors has any conflict of interest to disclose.

## DATA AVAILABILITY STATEMENT

Data available on request from the authors.

## ETHICAL STATEMENT

We confirm that we have read the Journal’s position on issues involved in ethical publication and affirm that this report is consistent with those guidelines.

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## SUPPORTING INFORMATION

Additional supporting information may be found in the online version of the article at the publisher's website.

**How to cite this article:** Hafeez K, Kushlaf H, Al-Sultani H, et al. Patient preference for virtual versus in-person visits in neuromuscular clinical practice. *Muscle & Nerve*. 2022;66(2): 142-147. doi:10.1002/mus.27641