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RESEARCH ARTICLE

Turning Electromyography Reports Upside Down: A Pilot Study Surveying Referring Providers

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Abstract: Providers are expressing a desire for more efficient ways to retrieve relevant clinical data from the Electronic Health Record. In an effort to improve our Electromyography and Nerve Conduction Study reports, we surveyed referring providers on the effects of having the IMPRESSION at the start of the report. Our survey respondents felt that using this format for an Electromyography and Nerve Conduction Study report significantly improved the quality of the report while saving them time and/or mouse clicks when interpreting the report. Electro diagnosticians might consider using this format for their Electromyography and Nerve Conduction Study reports to improve referring provider satisfaction.

Keywords: APSO note, Clinical documentation, Clinical electrophysiological testing, Electromyography, Nerve conduction studies.

INTRODUCTION

The era of the Electronic Health Record (EHR) has provided better access to patient records [1]. Despite this, many providers have found EHRs time consuming, inefficient and costly [2]. For this reason, providers are expressing a desire for more efficient ways to retrieve relevant data from the EHR [3]. This has led to further investigation into ways to enhance EHR documentation. One example of this is the APSO note format in which clinical notes are restructured from the traditional Subjective-Objective-Assessment-Plan (SOAP) note format to the Assessment-Plan-Subjective-Objective (APSO) note format [4, 5]. In this format, the more relevant clinical information is placed at the start of the note where it can more easily be found. The American Association of Neuromuscular and Electrodiagnostic Medicine (AANEM) have a published position statement on what an Electromyography and Nerve Conduction Study Report should contain but there is no specific guidance about the order of these components [6]. Our aim was to investigate what effect applying a different format to our electrodiagnostic reports would have on the quality of the report as measured by referring provider satisfaction.

MATERIAL & METHODS

The Neurodiagnostics and Sleep Center at Baystate Medical Center is accredited through the AANEM with exemplary status. Two identical Electromyographyand Nerve Conduction Study reports were created on a mock patient named Report 1 and Report 2. Both reports contained all the recommended components dictated by the AANEM position statement [6]. The only difference between the two reports was that Report 2 had the IMPRESSION section at the front of the report while Report 1 had the IMPRESSION at the end of the report. Providers who had referred a patient to our laboratory in the last year were sent a copy of both reports with a link to a survey at the start of the studyand at 3 weeks' time. The survey was kept open for a total of 5 weeks. The survey consisted of a series of 6

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questions as detailed in Results section. This study was granted Exempt status by our Institutional Review Board.

RESULTS

Our survey was sent to 150 providers of which we received 34 responses. The survey consisted of 6 total questions. The first 3 questionswere about demographic information about the provider's credentials, specialty and experience ordering electrodiagnostic studies (see Table **1**). Question 4 asked about how the provider typically reviews Electromyography and Nerve Conduction Study reports. More specifically, they were asked "*When you receive an Electromyography report, do you read the entire report or just the impression?*" For this question, 6 providers (17.65%) read the entire report, 15 providers read just the impression (44.12%) and 13 providers did either depending on the particular patient (38.24%). The last 2 questions were specific questions comparing the format of Report 1 to Report 2 (see Table **2**). A chi-square test was performed to determine whether there was a significant difference between the number of Yes and No responses in questions 5 and 6. The chi-square test statistic when comparing "yes" responses to "no" responses in question 5 was 7.759 with one degree of freedom and a two-tailed p-value of 0.0053, which is less than the alpha level of 0.05 and is therefore significant. The chi-square test statistic when comparing "yes" responses to "no" responses in question 6 was 7.258 with one degree of freedom and a two-tailed p-value of 0.0071, which is less than the alpha level of 0.05 and is therefore significant. In other words, the majority of respondents (64.71%) felt having the IMPRESSION at the front of Report 2 improved its quality (p value= 0.0053). Furthermore, the majority of respondents (67.65%) felt having the IMPRESSION at the front of Report 2 saved them time and/or mouse clicks when reviewing Report 2 (p value=0.0071).

Table 1. Characteristics of the survey respondents.

	Responses					
Type of Provider	Nurse Practitioner or Physician Assistant 8 (23.53%)			M.D. or D.O. 26 (76.47%)		
Specialty	Neurology 10 (29.41%)	Surgery 2 (5.88%)	Physiatry 4 (11.76%)	Primary Care 15 (44.12%)	Hospitalist 1 (2.94%)	Other 2 (5.88%)
Studies Ordered in a Year	Less than 5 7 (20.59%)		5 to 20 22 (64.71%)	20 to 50 3 (8.82%)	Greater than 50 2 (5.88%)	

Table 2. Responses to questions comparing report 1 and report 2.

Question	**Number of Responses (%)**		
Do you think having the Impression at the front of the report improved the quality (legibility, interpretability or readability) of Electromyography Report 2 when compared to Report 1?	Yes 22 (64.71%)	No 7 (20.59%)	Not Sure 5 (14.71%)
Did having the impression at the front of the document save you time and/or mouse clicks when interpreting Report 2 when compared to Report 1?	Yes 23 (67.65%)	No 8 (23.53%)	Not Sure 3 (8.82%)

DISCUSSION

In this era of the Electronic HealthRecord (EHR), provider dissatisfaction with the inefficiencies of documentation are well described leading providers to look for better ways to retrieve relevant clinical data from the EHR [2, 3]. Our pilot study investigated whether placing the IMPRESSION of an Electromyography and Nerve Conduction Study report at front might be more desirable for our referring providers. This is a variation on the Assessment-Plan-Subjective-Objective (APSO) note format being used for other clinical documentation [4, 5]. Our survey respondents felt that using this format for an Electromyography and Nerve Conduction Study report significantly improved the quality of the report while saving them time and/or mouse clicks when interpreting the report. Electrodiagnosticians might consider using this format for their Electromyography and Nerve Conduction Study reports to improve referring provider satisfaction.

Though it is a hallmark of neuromuscular doctors to review all the details of our Electromyography and Nerve Conduction Study studies, our survey responses indicated that not all providers review Electromyography and Nerve Conduction Studyreports this way. In fact, 44.12% of respondents to our survey read only the IMPRESSION. Some of this might be the byproduct of the characteristics of our survey respondents. For example, we had a higher proportion of providers that orderless than 20 studies per year (85.3%) which might lead them to not be familiar with electrodiagnostic medicine. However, it would be important to remember when structuring our reports that valuable

clinical information and/or study limitations should be placed in the IMPRESSION section or it might be missed by the referring provider.

This was a pilot study to start investigating this premise of putting the IMPRESSION at the start of an Electromyography and Nerve Conduction Study report. In future studies, one might test this premise using actual clinical Electromyography and Nerve Conduction Studyreports returned to referring providers rather than the mock patients that we used. Furthermore, our pilot study characterized the validity of this new format based on subjective answers from our referral base. Future studies could look for objective evidence of validityby tracking time, tracking mouse clicks and/or using eye tracking programs [7]. Lastly, one of the limitations of our study was that we only received 34 responses. Though this was enough to get statistical significance to answer our primary questions, it was not enough to do any subgroup analyses. For example, it would be interesting to know if different specialties view Electromyography and Nerve Conduction Study reports differently. A future study might try and get more participants so that this type of subgroup analysis can be conducted.

CONFLICT OF INTEREST

The authors confirm that this article content has no conflict of interest.

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