Emergency Department Testing and Disposition of Deaf American Sign Language Users and Spanish-Speaking Patients

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Abstract

Objectives: Non-English speaking patients frequently present to the emergency department (ED) for acute care and may present a challenge to efficient clinical ED management and disposition. This study aimed to assess differences in the disposition and clinical management of Spanish-speaking patients and Deaf American Sign Language (ASL) users, who worked with a certified, in-person interpreter, compared with English proficient patients who did not utilize interpreter services.

Methods: A retrospective study querying electronic medical records was performed at an academic medical center ED. Patients with a chief complaint of abdominal pain were chosen for this study, as this is a common chief complaint and these patients often require numerous tests. Variables obtained from the query included patient demographic information, number of tests and imaging studies ordered, and arrival and disposition times. Bivariate tests were used to assess differences in the management and disposition of patients who worked with an in-person, certified Spanish or ASL interpreter compared with those who did not utilize interpreter services.

Results: The study sample was comprised of 310 patients, 155 of whom utilized interpreter services and 155 controls who did not. Of those who utilized interpreter services, 69% were Spanish speaking and 31% Deaf ASL users. For patients who worked with an interpreter, compared with those who did not, the median door-to-ED disposition time was significantly longer (398 minutes vs. 322 minutes; p=0.0049). There were also more imaging studies ordered (p=0.0135) in the non-English speaking group. For English proficient patients, there was a higher rate of leaving before complete evaluation (2.6% vs. 0.0%) or against medical advice (3.2% vs. 0.0%) [p<0.0088].

Conclusions: In a sample of ED patients with a chief complaint of abdominal pain, there were statistically significant differences in the door-to-disposition time and number of imaging tests among those who were non-English speaking, utilizing in-person certified interpreter services, compared with those who were proficient in English. These results underscore the need for future research to further investigate the reasons for the differences in the evaluation and timely management of Deaf ASL users and Spanish-speaking ED patients.

Keywords

Emergency Department, Deaf, American Sign Language, Spanish speaking, limited English proficiency

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ABSTRACT

Objectives: Non-English speaking patients frequently present to the emergency department (ED) for acute care and may present a challenge to efficient clinical ED management and disposition. This study aimed to assess differences in the disposition and clinical management of Spanish-speaking patients and Deaf American Sign Language (ASL) users, who worked with a certified, in-person interpreter, compared with English proficient patients who did not utilize interpreter services.

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Results: The study sample was comprised of 310 patients, 155 of whom utilized interpreter services and 155 controls who did not. Of those who utilized interpreter services, 69% were Spanish speaking and 31% Deaf ASL users. For patients who worked with an interpreter, compared with those who did not, the median door-to-ED disposition time was significantly longer (398 minutes vs. 322 minutes; p=0.0049). There were also more imaging studies ordered (p=0.0135) in the non-English speaking group. For English proficient patients, there was a higher rate of leaving before complete evaluation (2.6% vs. 0.0%) or against medical advice (3.2% vs. 0.0%) [p<0.0088].

Conclusions: In a sample of ED patients with a chief complaint of abdominal pain, there were statistically significant differences in the door-to-disposition time and number of imaging tests among those who were non-English speaking, utilizing in-person certified interpreter services, compared with those who were proficient in English. These results underscore the need for future research to further investigate the reasons for the differences in the evaluation and timely management of Deaf ASL users and Spanish-speaking ED patients.

Keywords: Deaf; American Sign Language (ASL) user; Spanish-speaking; Emergency Department; disposition

INTRODUCTION

The United States Census Bureau defines "limited English proficiency" (LEP) as speaking English less than "very well" for individuals 5 years and older (Griffin & Shin, 2007). Those who use a language other than English as their primary language (i.e. Spanish speaking people or Deaf ASL users) may fall into this category. More than 25 million individuals in the United States are considered to have LEP; overall, this population has less access to education, achieves lower levels of education, and are more likely to live in poverty than their English proficient counterparts (Batalova & Zong, 2016). For example, Schur and Albers reported that Spanish-speaking immigrants were more likely to be uninsured and poor, and less likely to have access to primary care than English-speaking Latinos (Schur & Albers, 1996).

The culturally deaf community (represented with a capital [D]) communicates primarily in ASL and is a linguistic minority with challenges in achieving English and health literacy (Barnett, 1999; People, 2010; Richardson, 2014). Although it is often thought to be a single entity, it is important to note that ASL is a unique language with a distinct grammar and syntax from the English language (Aarons, 1994). While there is evidence that some Deaf community members who have early exposure to ASL from a native Deaf ASL user are more likely to be bilingual (utilizing both ASL and written English), English remains a second language for many Deaf ASL users who have an average reading level of 4^{th}-5^{th} grade (Barnett, 1999; Davenport, 1977; Ferdinand & Napoli, 2000; Richardson, 2014; Strong & Prinz, 1997). As such, Deaf ASL users often obtain lower levels of education and income in comparison to their hearing counterparts (Jones, 2004; Richardson, 2014). Even when comparing those with similar education levels, it was also noted that a higher proportion of hearing males achieved a higher median income in comparison to the Deaf population (Jones, 2004).

Patients with language barriers face numerous challenges when navigating the American healthcare system. Studies have suggested non-English speaking patients receive fewer preventive and primary care services, report more medication complications, and have decreased satisfaction with the healthcare system (Fiscella, Franks, Doescher, & Saver, 2002; Gandhi et al., 2000; Morales, Cunningham, Brown, Liu, & Hays, 1999). In 2012, McKee et al. reported low utilization of primary care, resulting in increased emergency department (ED) visits and limited health surveillance in Deaf ASL users (McKee, Winters, Sen, Zazove, & Fiscella, 2015). While there is literature to support increased ED utilization as a source of medical care, especially for patients who are uninsured and/or from lower socioeconomic backgrounds, there is widespread conjecture that non-English speaking patients' ED evaluations may differ from similar English proficient patients (Marcozzi, Carr, Liferidge, Baehr, & Browne, 2018).

However, there are only a few studies in the literature that directly examine these assumptions and have yielded mixed results due to varying methodology. One prospective study, based only in a pediatric ED, showed increased overall ED utilization (Hampers, Cha, Gutglass, Binns, & Krug, 1999). Another study suggested patients with a language barrier were significantly more likely to be admitted to the hospital from the ED, but did not specifically examine ED resource utilization (Lee, Rosenberg, Sixsmith, Pang, & Abularrage, 1998). A prospective observational study by Waxman et al. compared resource utilization among non-English speaking who used a 'translator' and English proficient patients who presented with chest pain and abdominal pain (Waxman & Levitt, 2000). Unfortunately, they did not differentiate between translator and interpreter, which are different and require different skill sets and training (Gile, 2009). The also had less than 20% of patients in the study group who worked with the professional translators. All other patients used family, friends, or staff in close proximity. Waxman et al. found more testing among non-English speaking patients, compared with English-speaking patients with abdominal pain, but no difference for those with chest pain (Waxman & Levitt, 2000). Previous studies have examined Spanish-speaking patients only or included multiple different non-English proficient patients but there is little data on the Deaf ASL user. Many of the previously published studies also had variable rates of interpreter utilization during their patient encounters but none included a patient population that consistently utilized a live, certified, in-person ASL or Spanish interpreter (Hampers et al., 1999; Lee et al., 1998; Marcozzi et al., 2018; McKee et al., 2015; Morales et al., 1999; Waxman & Levitt, 2000).

Our study primarily aimed to assess differences in the ED door-to-disposition time of non-English speaking patients, who worked with a certified in-person interpreter, compared with English-speaking patients who presented with the same chief complaint (abdominal pain). Secondarily, we also sought to investigate differences in the number of imaging studies and tests ordered, number of consultations, and therapeutic interventions.

METHODS

Study Design

This was a retrospective cohort study of patients with a chief complaint of "abdominal pain" who presented to the XXX [de-identified hospital name] ED between January 1, 2013 and December 31, 2013. Abdominal pain was chosen because this is a common chief complaint and patients often require numerous tests, making them ideal for this type of investigation. The XXX [de-identified institution's name] Institutional Review Board approved the conduct of this study with a waiver of informed consent.

Study Setting and Population

Patients for this study were identified through a query of our hospital's electronic medical record system. XXX [de-identified hospital name] is an 838-bed tertiary referral center and the ED sees more than 100,000 patients per year. Due to the high proportion of local Deaf ASL users and primarily Spanish speaking patients, Spanish and American Sign Language in-person interpreters are available 24 hours a day, 7 days a week. All staff interpreters are employed by the hospital and are nationally certified. The majority have a certified interpreter degree (CI) (which is different than a degree and training in translation [CT]) or national interpreter certification and all have been vetted the by institution's interpreting department (Gile, 2009).

Inclusion criteria for this study were: (1) age greater than 18, (2) a chief complaint of abdominal pain, and (3) utilized in-person interpreter services for Spanish or ASL. Exclusion

criteria for the study were: (1) patients who worked with an interpreter for any other language or those who used family members or friends, and (2) those with multiple chief complaints or deemed to be clinically unstable. We queried our hospital's medical record system and identified a list of patients meeting inclusion criteria and manually reviewed each chart to determine if patients worked with an interpreter for either Spanish or ASL. The control group consisted of English proficient patients who did need an interpreter. These patients were matched to a limited English proficiency group who worked with an interpreter based on the same date of ED presentation. We decided to match on day of ED presentation to account for seasonal variations in ED processes as well as daily changes in ED patient volume. The medical record for all patients was reviewed to extract variables related to demographics, tests performed, imaging studies, and door-to-disposition time.

Outcome Measures

The primary outcome of this study was to assess the door-to-ED disposition time (defined as time of ED arrival to time the disposition order was entered). Secondary outcomes included number of blood tests and imaging studies ordered, intravenous (IV) placement, IV fluid administration, and medication orders. All of these outcome variables were manually extracted from the electronic medical record.

Data Analysis

Data were analyzed using SAS 9.4 (SAS Institute, Cary, North Carolina, USA). Descriptive statistics were used to describe the study sample. Due to the non-normal distribution of continuous variables, medians along with 25th and 75th percentiles are presented. Bivariate tests, including Wilcoxon rank sum tests, chi-square tests, and Fisher's exact tests were used to assess differences in patients who worked with an interpreter and those who did not. A Kaplan Meier curve and log-rank test were used to assess difference in door-to-disposition time between the two groups of patients. A p-value of <0.05 was considered statistically significant.

RESULTS

A total of 310 patients were identified: 155 who utilized interpreter services and 155 who did not. Median age of the study sample was 34 years (25th and 75th percentiles: 22, 51) and 63% were female. Of the patients who utilized interpreter services, 69% worked with a Spanish interpreter and 31% worked with an ASL interpreter.

The median door-to- disposition time was significantly longer among those who worked with an interpreter (limited English proficiency) compared to those who did not (398 minutes vs. 322 minutes; p=0.0049; Figure 1). As shown in Table 1, there were also more imaging studies ordered (2 vs. 1; p=0.0135) among patients who worked with an interpreter compared with patients who did not. Patients who did not work with an interpreter, compared with those who worked with an interpreter, left the ED without being seen (2.6% vs. 0.0%) and left against medical advice (3.2% vs. 0.0%) [p<0.0088] more frequently. There was no statistically significant difference in the number of blood tests, intravenous (IV) placement, IV fluid administration, or medications ordered between the two groups.

Figure 1: Door-to-Disposition Time of Patients with English Proficiency compared with Patients of Limited English Proficiency (n = 310)

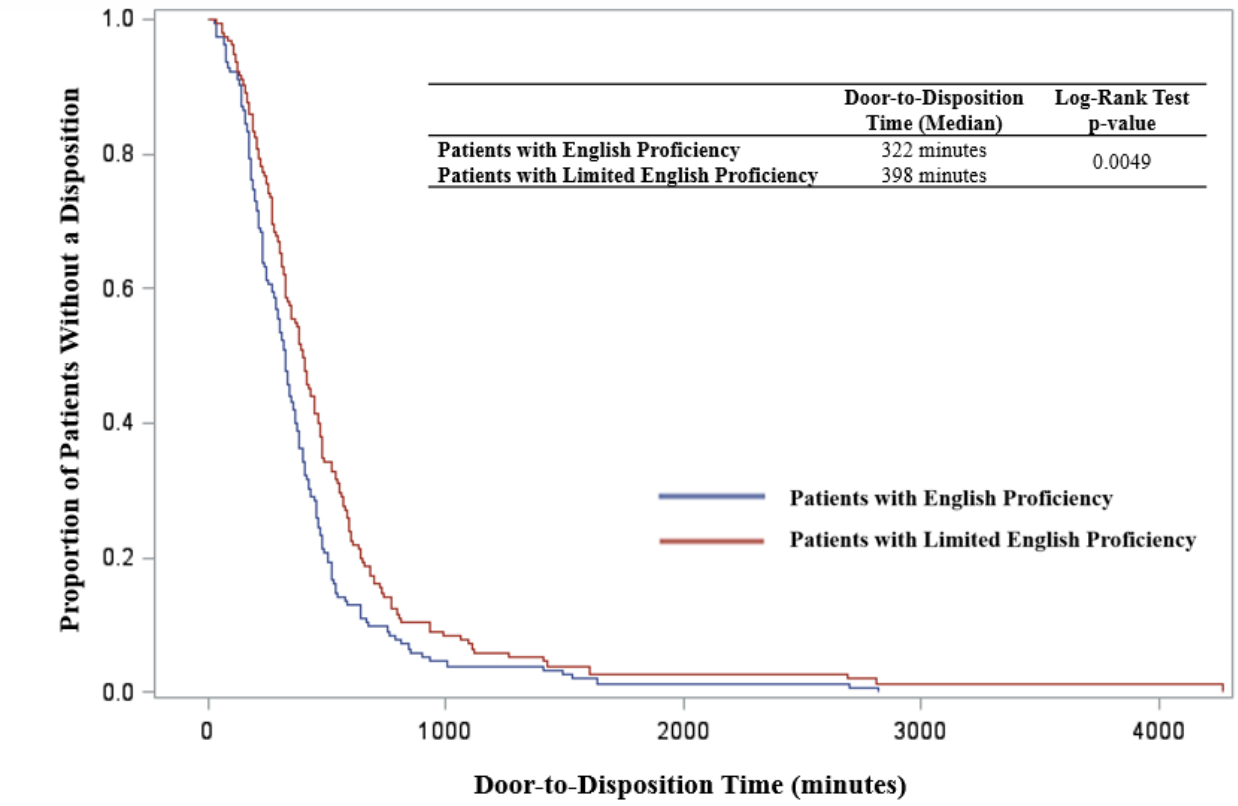

Table 1: Characteristics of the Study Sample*

	Total Study Sample (n = 310)		**Interpreter Used (n = 155)**		**No Interpreter Used (n = 155)**		**p-value†**
Age (years)	34	(22, 51)	35	(21, 50)	33	(22, 51)	0.7925
Sex							0.4105
Male	115	(37.1)	54	(34.8)	61	(39.4)	
Female	195	(62.9)	101	(65.2)	94	(60.7)	
Peripheral intravenous line placed							0.1235
Yes	255	(82.3)	131	(84.5)	124	(80.0)	
No	51	(16.5)	24	(15.5)	27	(17.4)	
Unknown	4	(1.3)	0	(0.0)	4	(2.6)	
Medications ordered							1.0000
Yes	266	(85.8)	133	(85.8)	133	(85.8)	
No	44	(14.2)	22	(14.2)	22	(14.2)	
Intravenous fluid ordered							0.9057
Yes	199	(64.2)	99	(63.9)	100	(64.5)	
No	111	(35.8)	56	(36.1)	55	(35.5)	
Number of blood tests ordered	6	(4, 8)	6	(4, 8)	6	(4, 8)	0.3707
Number of imaging studies performed	1	(0, 1)	2	(1, 2)	1	(1, 2)	0.0135
Disposition							0.0088
Admitted to floor	69	(22.3)	37	(23.9)	32	(20.7)	
Admitted to observation unit	17	(5.5)	5	(3.2)	12	(7.7)	
Discharged from ED	215	(69.4)	113	(72.9)	102	(65.8)	
Left against medical advice	5	(1.6)	0	(0.0)	5	(3.2)	
Left without being seen	4	(1.3)	0	(0.0)	4	(2.6)	
Return to same ED within six days							0.7008
Yes	30	(9.7)	16	(10.3)	14	(9.0)	
No	280	(90.3)	139	(89.7)	141	(91.0)	

*Data are presented as frequency (percentage) for categorical variables and median (25^{th}, 75^{th} percentile) for continuous variables.
†p-value derived from Chi-square or Fisher's exact test for categorical variables and Wilcoxon rank sum test for continuous variables.
Note: column percentages may not add up to 100% due to rounding.

DISCUSSION

In order to allow for equal access to health information, language accommodations for patients with limited English proficiency are deemed mandatory under federal law. For Spanish speaking patients, this is delineated under Title VI of the Civil Rights Act of 1964 (Carter, 1964). For Deaf ASL users, there is a mandate within the Americans with Disabilities Act that requires appropriate language accommodations and removes financial responsibility from the patient to foster interpreter access (Perritt, 2002). Many studies have investigated and demonstrated the positive impact of professional interpreters on medical treatment adherence, ED return visit rates, communication errors, and times spent with a physician (Hernandez et al., 2014; Karliner, Jacobs, Chen, & Mutha, 2007). However, many of these studies have variable rates of in-person interpreters, inconsistent levels of interpreter training, and infrequently include Deaf ASL users.

Our results demonstrate while working with certified, in-person interpreters, there is a statistically significant increase in the disposition time of non-English speaking patients in comparison to English proficient patients in the emergency department. Lopez et al. found a similar increased length of stay in non-English speaking patients requiring an interpreter when compared to English proficient patients (López, Rodriguez, Huerta, Soukup, & Hicks, 2015). Similarly, this was supported in a prospective cohort study by Walbrecht et al. who was examined the mean length of stay of patients proficient in English compared with those who had limited English proficiency (Wallbrecht, Hodes-Villamar, Weiss, & Ernst, 2014). In Walbrecht's study, mean length of stay was not different between the EP group and the LEP group who did not work with an interpreter; however, when involving an interpreter, there was a significant increase in length of stay in the LEP group (Wallbrecht et al., 2014). Collectively, previous literature and our findings reliably demonstrate an increased length of stay patients with limited English proficiency. The increased length of stay is complex and likely multifactorial. First, there is increased time during a patient encounter when an addition party is required for communication. For example, ASL interpreters may spend time elaborating on terms that simply do not exist in ASL or that will help improve the patient's fund of knowledge, thereby improving their understanding of the medical information being delivered in English. While incredibly important for the patient, this process is time consuming and contributes to increased lengths of stay. Secondly, variable amount of time is spent waiting for the interpreter to arrive as they are often not readily available or stationed in the ED. Lastly, since it is well documented that patients have improved satisfaction and treatment adherence with language concordant providers, ED providers may spend additional time counseling during face to face interactions in order to account for language discordance, perceived poor baseline health, or concern for poor follow-up (MacKinney, Walters, Bird, & Nattinger, 1995; Steinberg, Barnett, Meador, Wiggins, & Zazove, 2006).

We also found that English proficient patients left the ED without being seen or left against medical advice more frequently compared with patients with limited English proficiency who worked with an interpreter. This may be due to the variety of options to obtain medical care for English proficient patients (e.g., urgent care centers or primary physician offices) where interpreter services for a linguistic minority population may not be readily available.

Although the actual numbers are low, there was a statistically significant increased number of imaging studies ordered in non-English speaking group when compared to the control group, which is supported by previous literature and would certainly contribute to increased ED length of stay and delayed patient disposition (Hampers et al., 1999; Waxman & Levitt, 2000). Provider

insecurity when caring for and communicating with non-English speaking patients may contribute to this finding. Even with the use of interpreters, physicians may be compelled to order additional tests to offset perceived incomplete communication and decreased confidence in the history (Hernandez et al., 2014). Hampers et al. saw similar discrepancies in the diagnostic behavior of providers when caring for non-English speaking patients, though their study population included variable use of interpreters (Hampers et al., 1999). It is also possible that the increased number of tests ordered in non-English speaking patients may be due to disparities in baseline utilization of healthcare services before even reaching the ED. This is commonly seen in some non-English speaking populations because they receive fewer preventive and primary care services before coming to the ED due to lower health information access and comprehension, treatment avoidance, and fear of physician-patient miscommunication (Fiscella et al., 2002; McKee, Barnett, Block, & Pearson, 2011; McKee et al., 2015; Richardson, 2014; Steinberg, Wiggins, Barmada, & Sullivan, 2002). Providers may also view patients who underutilize primary care services as having more unaddressed health complaints, at risk for poor follow-up, and more likely to have other undiagnosed conditions leading to increased testing. Further investigation into these results is needed to examine whether this finding is indicative of medical necessity or provider discomfort with language discordance resulting in increased testing.

LIMITATIONS

Due to the retrospective nature of this study, there are several limitations that should be addressed. One limitation is whether interpreter use is an accurate proxy for non-English speaking. In identifying patients who only worked with a certified interpreter, it is likely that we missed some non-English speaking patients who did not utilize formal interpreter services (e.g., interpretation through family members, written language, etc.). Exclusion of these patients may have influenced the data on usage of ED services and time to disposition. Another limitation is generalizability: the age group represented by this study ranged between 21-51 years making it difficult to generalize to a broader audience of Deaf and Spanish-speaking patients. This study may also not be applicable to hospitals that do not have 24/7 in-person, certified ASL and Spanish interpreters. We also acknowledge that these results are not generalizable to regions with low numbers of Deaf ASL users. Additionally, 63% of the population in this study was female. This raises the question of whether this is an accurate representation of the non-English speaking population. There may also be confounding in our study, as providers are more likely to request an interpreter when a non-English speaking patient presents with increasing medical complexity (López et al., 2015). It is possible there are differences in the non-English speaking patient group due to gender specific differences in English proficiency (secondary to travel, work, or cultural norms) or differences in willingness of the genders to seek emergency medical services or accept/request interpreter help as seen in previous literature (Chavez, Cornelius, & Jones, 1985). Lastly, we did not adjust for certain potential confounders (e.g. socioeconomic class or co-morbidities) in our study. This may have positively skewed our findings as it seems logical to assume that, despite language concordance or discordance, those with higher co-morbidities will require more ED resource utilization leading to longer ED stays. Nevertheless, our findings demonstrate statistically and clinically significant differences in ED disposition and testing for patients working with an interpreter.

CONCLUSIONS

There may be several studies that investigate time-to-ED disposition or resource utilization in LEP patients; however, this study focused on Deaf ASL users and Spanish speaking patients in which certified, live interpretation was utilized. Our study found differences in time spent in the emergency department, differences in rates of leaving against medical advice or without being seen, and in the number of imaging tests ordered for non-English speaking patients when compared with their English-proficient counterparts. However, there is still a need for additional research to delineate the contributing factors of increased testing in non-English speaking populations, discover other possibilities to explain the increased length of stay in the ED, and measure the impact of ED patient utilization of interpreter services. Once this is more clearly understood, it may help to improve other institutional health care policies and procedures, such as interpreter services reimbursement and language accommodation resource allocation for patients with limited English proficiency.

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