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Original Contribution

Language disparities in patients transported by emergency medical services☆

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ABSTRACT

Background: The population of the United States continues to diversify with an increasing percentage of residents with limited English proficiency (LEP). A major concern facing emergency medical services (EMS) providers is increasing scene and transport times. We hypothesized that there would be a significant difference in EMS scene and transport times when comparing LEP and English-speaking (ES) patients and there would be a difference in care, both in and out of hospital.

Methods: This is a retrospective case-control study with patient data extracted from hospital records and EMS run reports from a 911 emergency ambulance service. Patients were only included if they were transported to our level I trauma center. Inclusion in the LEP group was based on a field in EMS run reports that claimed language barrier as the sole reason for no patient signature. All LEP patients from July 1, 2012, to November 1, 2012, were reviewed. A random comparison sampling of ES patients from the same period was evaluated. The patients' demographic data, pain scores, interventions, medications, transport times, and scene times were analyzed. Patients were followed up from emergency department (ED) management through to disposition. Percentages were compared using 95% confidence intervals (CIs). Bivariate analysis used the Student *t* test and χ^2 test. A multivariable logistic regression model was created to determine predictive variables. A 5% random sampling was compared by 2 investigators for interrater agreement.

Results: Data were collected from a total of 101 ES and 100 LEP patients. Interrater agreement was 94% between extractors. Limited English proficiency patients were significantly older (56 ± 20 years old) than ES patients (41 ± 21 years old) and more likely to be female (odds ratio [OR], 2; 95% CI, 1.1-3.3). Limited English proficiency patients had a greater mean EMS transport time of 2.2 minutes (95% CI, 0.04-4.0). The odds of LEP patients receiving electrocardiograms were greater both in the ambulance (OR, 3.7; 95% CI, 1.7-8.1) and in the ED (OR, 2.0; 95% CI, 1.1-3.3) compared to ES patients. There were no differences in additional interventions, medications administered, or pain scores obtained between the 2 groups. In a multivariable logistic regression model corrected for age, type of call, smoking history, and sex, there was no difference in transport times in LEP patients.

Conclusion: Compared to ES patients, LEP patients are older and more likely to be female. When corrected for differences in age, type of call, smoking history, and sex, we found no difference in scene or transport time for LEP patients. Results of this study indicate that EMS providers should be prepared for a different patient encounter when responding to 911 calls involving LEP patients rather than language variations alone.

1. Background

Two separate problems in ethnic disparity in health care are described in the literature: racial differences and language differences. Racial differences occur in patients regardless of their language [1-11]. Multiple studies have shown racial disparities in emergency department (ED) waiting time and length of stay (LOS) for a variety of admission diagnoses. Analysis of the data shows that differences exist for problems such as acute stroke care [5,6], home health care [12,13], and length of ED stay [7,14].

The population of the United States continues to diversify with an increasing percentage of homes with limited English proficiency (LEP). Language disparity offers significantly more obstacles than racial disparity, including lack of awareness of disease processes [15], inability to understand instructions and prescriptions [16], inability to use 911 services [17,18], and lack of providers who speak their language [3,19]. These problems also occur often in pediatrics and can be magnified in pediatric population [8,9,12,13,19-27].

Managing LEP patients can be challenging for emergency medical services (EMS) and in the EDs. Limited English proficiency patients increasingly use EMS [17,18,26] and EDs [7,10,11,14,21,23,28-30] as an entry point to health care. Multiple studies have shown that interpreters, specifically Spanish interpreters, have many positive outcomes based on patient satisfaction and LOS in the ED [24,31-34]. Although interpreters are a growing force in most US hospitals, it is difficult to use

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Table 1
Baseline demographics comparing ES and LEP patients transported by EMS

		ES	LEP	OR (95% CI)	Difference (95% CI)
	201	101	100		
Age	48 ± 21	41 ± 21	56 ± 20	–	15 (7.5-22.5)
Female sex	109 (54%)	46 (45%)	63 (63%)	2.0 (1.1-3.3)	
Smoker	45 (22%)	30 (30%)	15 (15%)	0.3 (0.2-0.7)	
Type of call					
Medical	94 (47%)	52 (52%)	42 (42%)	NS	
Trauma	88 (44%)	33 (33%)	55 (55%)	2.5 (1.4-5)	
Pediatric	19 (10%)	16 (16%)	3 (3%)	0.2 (0.05-0.6)	
Call priority					
A	66 (33%)	30 (30%)	36 (36%)	NS	
B	52 (26%)	30 (30%)	22 (22%)	NS	
C	46 (23%)	20 (20%)	26 (26%)	NS	
D	35 (17%)	20 (20%)	15 (15%)	NS	
E	2 (1%)	1 (1%)	1 (1%)	NS	
Time of day					
Midnight-6 AM	37 (18%)	20 (20%)	17 (17%)	NS	
6 AM-noon	51 (25%)	20 (20%)	31 (31%)	NS	
Noon-6 PM	63 (31%)	35 (35%)	28 (28%)	NS	
6 PM-midnight	50 (25%)	20 (26%)	24 (24%)	NS	
Smoker	45 (22%)	30 (30%)	15 (15%)	0.3 (0.2-0.7)	
ED time	595 ± 428	656 ± 453	534 ± 395	–	122 (4-240)
First EMS pain scores (N)	4.7 ± 4.0 (115)	4.7 ± 4.0 (63)	4.8 ± 4.1(52)	–	NS
First ED pain scores(N)	4.7 ± 3.8 (161)	5.1 ± 3.8 (85)	4.2 ± 3.7 (76)	–	NS

Odds ratios with 95% CIs are listed for discrete variables, and differences with 95% CIs are listed for continuous variables.

their services in the prehospital environment. No studies have examined specifically whether EMS management of LEP patients differs in terms of field interventions, the duration of transport, or outcome. This study evaluated differences in EMS and ED care of LEP patients compared to English-speaking (ES) patients. Our primary hypothesis was that there would be a significant difference in EMS scene and transport times when comparing LEP and ES patients. In addition, we hypothesized that we would find a difference among LEP and ES patients in both EMS and ED care.

2. Methods

In this retrospective case-control study, data on all patients transported by EMS were available in an agreement between Albuquerque Ambulance Service and our ED for sharing research purposes. The study was approved by the university human research review committee and the institutional review board overseeing our local ambulance company.

The EMS system in our city handles approximately 50 000 transports per year and has average transport times of 6 ± 4 minutes(range, 0-30 minutes). The distances to the main trauma center range within an 8-mile radius within the city limits. The hospital ED where patient care was evaluated is the main level 1 trauma center and is both a heart and a stroke center.

All LEP patients, as indicated by inability to sign the EMS run report secondary to language barrier, transported by the ambulance service between July 1, 2012, and November 1, 2012, were included. A randomly chosen group of ES patients transported by the ambulance service

Table 2
Demographics comparing ES and LEP patients transported by EMS

		ES	LEPs	OR (95% CI)	Difference (95% CI)
	201	101	100		
Scene time	18.5 ± 9.0	18.2 ± 9.3	18.8 ± 8.7	–	NS
Transport time	14.4 ± 6.4	13.3 ± 5.9	15.5 ± 6.7	–	2.2 (.04-4.0)
Change in EMS pain score (N)[a]	−0.7 ± 2.4 (87)	−0.7 ± 2.4 (39)	−0.6 ± 2.4 (48)	–	NS
Any interventions by EMS	123 (61%)	57 (57%)	65 (65%)	NS	
ECG	39 (19%)	10 (10%)	29 (29%)	3.7 (1.7-8.1)	
Any EMS meds	106 (53%)	51 (51%)	55 (55%)	NS	
Pain meds	126 (63%)	59 (59%)	67 (67%)	NS	
Antiemetics	9 (9%)	4 (4%)	5 (5%)	NS	
ED time	595 ± 428	656 ± 453	534 ± 395	–	122 (4-240)
Change in ED pain score (N)[a]	−2.6 ± 3.4 (117)	−1.9 ± 2.9 (48)	−3.0 ± 3.6 (69)	–	NS
ED interventions					
X-rays	130 (65%)	59(59%)	71 (71%)	NS	
ECG	76 (38%)	30 (30%)	46 (46%)	2.0 (1.1-3.3)	
Labs	151 (75%)	74 (74%)	77 (77%)	NS	
ED meds					
Pain meds	93 (46%)	44 (44%)	49 (49%)	NS	
Antibiotics	21 (10%)	12 (12%)	9 (9%)	NS	
Antiemetics	42 (21%)	17 (17%)	25 (25%)	NS	
Disposition					
Admit	64 (32%)	32 (32%)	32 (32%)	NS	
Discharge	115 (57%)	53 (53%)	62 (62%)	NS	
Other (LWBS and AMA)	20 (10%)	16 (15%)	4 (4%)	0.2 (0.1-0.7)	

Odds ratios with 95% CIs are listed for discrete variables, and differences with 95% CIs are listed for continuous variables.
[a] Only included cases with both first and last pain scale while under care.