The Effect of Language Congruency on the Out-Of-Hospital Management of Chest Pain

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Abstract:

Language incongruences between patients and providers are associated with delays in hospital based care, yet little is known about how they affect the prehospital setting. The out-of hospital (OOH) management of chest pain is protocol driven, however communication likely influences care provided by paramedics of Emergency Medical Services (EMS) units. This is a cross-sectional analysis of New Jersey patients who called 911 for chest pain from 2008 to 2011. Using an electronic record system, we examined the association between language congruency and total on-scene-time (OST) spent by advanced life support (ALS) paramedics. A series of linear regression models were built to examine this association. Eleven thousand two hundred forty-nine patients with chest pain were included in our study. Of these, 222 had language incongruences with paramedics (1.98%). Contrary to expectations, language incongruences were associated with less OST ($\beta = 0 - 0.85400$, $p < 0.0028$). After adjusting for demographic and clinical variables, language incongruences persisted as a significant independent predictor of less OST. Paramedics spent less time with Hispanics ($\beta = -0.3717$, $p < 0.0228$) and Asians ($\beta = -0.5647$, $p < 0.0101$). The association between language incongruences and OST varied significantly among racial/ethnic groups in adjusted models. Language incongruences between patients and paramedics are associated with decreased OST suggesting that disparities may not occur in the prehospital setting.

Keywords: cardiology | emergency | chest pain | language congruency | language barriers | health disparities

Article:

1 Introduction

1.1 Background

Cardiovascular care is time-sensitive and dependent on effective communication between patients and providers. Currently 55.4 million individuals in the United States report speaking a language other than English at home, 25% of which report speaking English “not well” or “not at all” (U.S. Census Bureau, 2010). Many non-English speakers possess limited English proficiency (LEP), which has lasting consequences in the U.S. health-care system (Skinner, Wright, Aratani, Cooper, & Thampi, 2010). LEP persons access the healthcare system less frequently than native-English speakers; when they do, their first point of care is often the emergency department (ED) (Goff et al., 1999; Ponce, Hays, & Cunningham, 2006). In the ED and hospital, disparities in cardiovascular care and outcomes exist for those with limited English proficiency. Language barriers have been associated with greater tests, interventions, and hospital admissions, independent of the chief complaint being managed (Lee, Rosenberg, Sixsmith, Pang, & Abularrage, 2008). This population often endures greater delays in care (Schyve, 2007) and is discharged without complete or language-appropriate information and follow-up instructions (Crane, 1997). Despite the implementation of hospital-based translator services, language barriers continue to negatively affect the quality of hospital care (Carrasquillo, Orav, Brennan, & Burstin, 1999; Meischke, Chavez, Bradley, Rea, & Eisenberg, 2010).

1.2 Importance

Less is known, however, about how language and communication difficulties between patients and providers affect the care received in the prehospital setting. Despite being protocol driven, gender (Meisel et al., 2010) and age (Ponce et al., 2006) have been shown to influence the out-of-hospital (OOH) management of chest pain. Given that communication pervades all medical interactions, it is likely that language congruency between paramedics and providers affects the care received en route to the hospital. Emergency medical service (EMS) systems and advanced life support (ALS) paramedics are fundamental in the chain of care; they are the first to arrive at the scene of requested care to assess the patient. They offer diagnostic evaluation and provide therapeutic intervention(s), which must be performed efficiently such that patients can be transported to the nearest hospital (Moser et al., 2006). In a study conducted in Minnesota, delays in care secondary to language barriers occur at a rate of 3.3 per 1,000 pre-hospital patient encounters (Grow, Sztajnkrycer, & Moore, 2008). New Jersey, a state with significant linguistic, ethnic, and racial diversity (U.S. Census Bureau, 2009) is likely to have high rates of language barriers among patient–paramedic interactions.

1.3 Goals of This Investigation

In this study, we investigate if language congruency between patient and paramedics is associated with the amount of on-scene-time spent by ALS providers. Since language incongruences delay care in the emergency department and hospital, this may also be the case in the prehospital setting. Delays at the scene are detrimental for patients since cardiac outcomes are dependent on timely diagnosis and management.

2 Methods

2.1 Study Design and Population

Using EMS-Charts (www.emscharts.com, Pittsburgh, PA), an electronic database of all 911 callers placed in the state of New Jersey (NJ), we conducted a cross-sectional analysis of adults 18 years and older for whom an EMS unit and ALS paramedic team were dispatched for a complaint of "chest pain" during January 2008–April 2012. EMS-Charts, which is overseen by the NJ Department of Health, records all health-care interactions that occur in the field and en route to emergency departments and hospitals. Paramedics are required to enter demographic, socioeconomic, and clinical data electronically at the scene of care. Starting in 2008, paramedics were required to comment on language congruency with the patient at the scene of care. The patient records are available (via the database) for viewing in the emergency department within 24 hours of their initiation in the field.

Within the database, we restricted our analysis to patients cared for by one of the state's largest EMS systems. The EMS system serves 1.1 million people and 894 square miles. The two counties it serves are geographically diverse, covering urban, suburban, and rural regions of the southern part of the state. The system receives approximately 52,000 911 requests per year, 15,800 of which are for chest pain (30.38%). Like many EMS systems, this one is two-tiered and comprised of paid and volunteer basic life support (BLS) units, and paid hospital-based ALS units that contain two paramedics each. There are twelve ALS units that only respond to 911 requests and three EMS paramedic supervisors remain on the road at all times. Patients with a dispatch complaint of chest pain who were within the system's catchment area were transported to one of 12 hospitals, 6 of which are capable of percutaneous coronary intervention (PCI).

At the scene of care, paramedics are required to enter demographic and clinical information into the electronic database using tablets and in-vehicle computer systems. Drop-down menus prompt the entry of these data into the records and forcing functions prohibit entries from being left blank. Electronic records are not accessible to nondesignated care providers and all data are encrypted.

For our designated study period, we identified 12,809 patients who called 911 and were diagnosed with chest pain related diagnoses by paramedics at the scene (Fig. 1). Chest pain was chosen by paramedics for patients whose primary complaint related to any symptomatology within the chest area. If the primary complaint was shortness of breath or abdominal pain, patients did not get included in our analysis. The statewide protocol for ALS OOH care specifies the administration of oxygen, cardiac monitoring, chewed aspirin, intravenous (IV) access, and sublingual nitroglycerin (if systolic blood pressure is >100 mmHg) for all patients with suspected ACS, which is defined as patients over the age of 30 with non-pleuritic chest pain. In addition to these measures, paramedics were permitted to administer diuretics, and antiarrhythmic and pain medications if they felt necessary. We included all adults age 18 and older to gain a representative sample; we excluded persons found to be in cardiac arrest at the time of paramedic arrival, which would have limited communication. Patients in which no information for language congruency ($n = 1.443$), those who were less than 18 years of age ($n = 44$) and those in which heart rate was not entered ($n = 59$) were excluded. Excluded also were patients in which the total on-scene time (OST; minutes) was not captured due to time-stamp malfunction ($n = 14$). The total study population included 11,249 patients (Fig. 1).

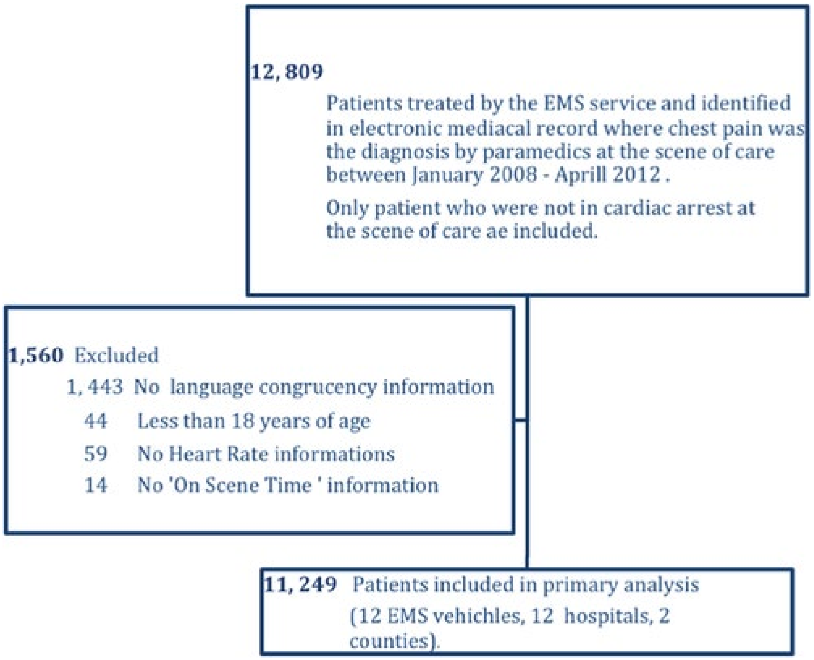

Figure 1. Selection of Study Population.

3 Measures

3.1 Main Independent Variable

Language congruency between patient and paramedic is the main independent variable of interest in our analysis. Language congruency between patient and provider is a robust method for detecting if communication barriers exist during the healthcare interaction. Prior studies have used terms such as "language barrier" or "communication barrier" to capture the ability of the healthcare provider and patient to communicate with one another such that a level of fluency was present. However both are broader than our research interests. Here, we build on previous studies that use the term congruence and concordance to characterize the healthcare interaction and the role of language (Cooper & Powe, 2004; Johnstone & Kanitsaki, 2006). In the EMR system, paramedics were required to enter "yes" or "no" in the "language congruency" dropdown menu of the in-vehicle electronic medical record soon after the treatment of patients. By selecting "congruent," the paramedic indicated that he/she felt able to communicate freely with the patient such that translators or other language-assisted devices were not needed to extract the necessary health-care related information. This variable does not require the patient and paramedic to be of the same native tongue; a Spanish-speaking paramedic who also speaks English could select "yes" to language congruency with an English-speaking patient. The term language congruency is meant to capture interactions in which there was no difficulty in communicating effectively at the scene of injury. Paramedics were trained (prior to the 2008 implementation) that "language congruency" did not include medical conditions at the scene which impaired communication such as: patients with severe hearing loss, those who were obtunded or unconscious, patients in severe pain who could not communicate, and those with strokes or other conditions which impair speech itself. Our study population excludes 1,443 patients for which the paramedic did not comment on "language congruency" in the field.

3.2 Main Outcome Variable

Previous studies have assessed the quality of OOH management of chest pain with other measures (e.g., number of procedures, interventions, dose of medication administered, etc.) (Meisel et al., 2010). Here, we use the total OST (minutes) spent by the paramedic team with the patient at the scene. As a result, we capture the cumulative amount of time spent to assess the situation, make a tentative diagnosis of “chest pain,” and perform diagnostic and therapeutic interventions. Other authors have divided the prehospital time interval into time-en-route (TER), time-to-destination (TTD), and total time-on-scene (TOS). We find these intervals cumbersome and unnecessary for our analysis (Henderson, Magna, Korn, Genna, & Bretsky, 2002). Our focus is on potential language barriers, which might hinder the assessment of chest pain and the implementation of interventions (Timmins, 2002). The time interval of interest begins with paramedic arrival since this is when communication is first possible. By nature of the chief complaint, chest pain, the total OST includes time during which diagnostic (EKG lead placement, O_2 saturation) procedures were performed and may include time in which therapeutic (IV line placement, and nitroglycerin and aspirin administration) interventions were rendered en route to the hospital.

3.3 Confounders/Covariates

Age, gender, race/ethnicity, and heart rate of patients were measured at the scene and included in our analysis. Age was categorized as those 18–45, 46–75, and 76+ years of age. Detailed information on race/ethnicity was entered by paramedics and confirmed by patients once in the ED. The EMS database contained the following subgroups: American Indian, Alaskan Native, Asian, Pacific Islander, Black Hispanic, Black Non-Hispanic, Multiracial, Native American, N/A, other, White Hispanic, White-Non Hispanic, and unknown. Similarly to other studies (Henderson et al., 2002) we created four groups of race/ethnicity: White–Non-Hispanic, Black–Non-Hispanic, Hispanic, and Asian/Other (Timmins, 2002). Heart rate (HR), a clinical variable of cardiac severity, was electronically recorded at the scene and used as an objective measure to adjust for cardiovascular function (Carrasquillo et al., 1999). We considered “normal” to be any value between 60 bpm and 100 bpm and “abnormal” to be rates which measured 59 bpm and less and 101 bpm and greater. Other clinical variables were captured by our EMR such as blood pressure and percent of oxygen saturation, but were not included in our analyses.

3.4 Analysis

The purpose of the statistical analysis was to examine if language incongruence between patients and paramedics was associated with different total mean on-scene-time (minutes) spent by ALS paramedics for patients with chest pain in the prehospital setting.

First, descriptive statistics were computed by language congruency. Associations were tested for statistical significance using the chi-square statistic for dichotomous variables and the Student's *t*-test for continuous and normally distributed variables with confidence intervals set to 95% (Table 1). Diagnostic tests of the crude and fully adjusted model(s) were performed. Models did not indicate any substantive deviation from normality or homoscedasticity. Moreover, since our main independent variable is binary (language congruency), linearity assumptions no longer applied. Outliers were identified and analyzed but were ultimately included in the model(s) because there was no indication that their inclusion biased estimates or made the models less stable. A series of linear regression models were then fit by sequentially entering covariates identified *a priori* as potentially important confounders of the language–OST association (Table 2). The first model captures the crude, or unadjusted, association between language incongruence and total OST. The second model adjusts for age and gender. Model 3 further adjusts for race/ethnicity. The fourth (final model), includes heart rate as a clinical variable. Using the fully adjusted model, we entered a cross-product term between language congruency and race/ethnicity to determine if the main association differed by race and present results stratified by race/ethnicity (Table 3). Results are based on 95% confidence intervals with statistical significance set at $p < 0.05$. SAS 9.2 software and Vanderbuilt PS 3.0.43 version EpiStat software were used to carry out the statistical analyses.

Table 1. Baseline Characteristics of the Study Population by Language Congruency

Characteristics	All (No. %)	Language Congruency (No. %)	Language Incongruence (No. %)	*p*-Value[c]
Gender				
Male	5,507 (48.96%)	5,403 (98.1%)	104 (1.9%)	0.53
Female	5,742 (51.04%)	5,624 (97.9%)	118 (2.06%)	
Age (years) mean (SD)	63.08 (16.79)	63.04 (16.8)	65.25 (16.2)	
18–45	1761 (15.65%)	1,736 (98.5%)	25 (1.42%)	<0.14
46–75	6308 (56.08%)	6,172 (97.8%)	136 (2.16%)	
76–105	3180 (28.27%)	3,119 (98.1%)	61 (1.91%)	
Race/ethnicity				
White, non-Hispanic	7,890 (70.14%)	7,798 (98.8%)	92 (1.2%)	<0.0001
Black, non-Hispanic	2,220 (19.56%)	2,176 (98.0%)	24 (1.08%)	
Hispanic	765 (6.80%)	689 (90.0%)	76 (10.0%)	
Asian/Other[a]	394 (3.50%)	364 (92.4%)	30 (7.6%)	
Heart Rate[b], mean (SD)	87.82 (21.9)	87.76 (4.23)	88.27 (20.50)	
Normal	8,245 (73.3%)	8,093 (98.1%)	152 (1.8%)	0.10
Abnormal	3,000 (26.7%)	2,930 (97.6%)	70 (2.3%)	
On-scene-time (OST) (minutes) mean (SD)	9.769 (4.22)	9.78 (4.23)	8.93 (3.4)	<0.0001

[a] Asian/Other: Asian and Asian/Pacific Islander comprises the majority; the category includes American Indian, Alaskan Native, Native American, N/A, Multiracial, Other.
[b] Normal heart rate: 60–100 beats per minute (bpm), abnormal heart rate: <60 or >100 bpm.
[c] *p*-Values are from chi-square statistic for dichotomous variables and the Student's *t*-test.

4 Results

The characteristics of the 11,249 study population are reported in Table 1. Our study population was comprised of an equal number of men and women (49% and 51%, respectively), the majority of patients were between 46 and 75 years old, and 73% of the study population had normal heart rates. White, non-Hispanics comprised the majority (70%) of the study population, and 20% were non-Hispanic Black, 7% Hispanic, and 3.5% Asian/Other. Language incongruences were present in 222 of paramedic–patient interactions (1.97%). By race/ethnicity, paramedics perceived language barriers to be present among 1.18% of White, non-Hispanics patients; 11.03% of Hispanics, 1.10% of Black, non-Hispanics; and 8.2% of Asian/Other. The average on-scene time was 9.76 minutes (SD 4.22) with a median of 9.00 minutes (Table 1). The presence of a language incongruence was associated with different total OST compared to when no language incongruence was present ($p < 0.0001$). When a language incongruence was present, the total mean OST was lower (8.93 minutes, SD 3.4) than the total mean OST when no language incongruence was present (9.78 minutes, SD 4.23). The percentage of patients with abnormal heart rates was slightly higher among those with language incongruences $p < 0.0001$ (Table 1).

Table 2. Linear Regression Models of the Mean Difference in Total On-Scene Time (OST) By Language Congruency

	Model 1		**Model 2**		**Model 3**		**Model 4**	
	β	**95% CI**	**β**	**95% CI**	**β**	**95% CI**	**β**	**95% CI**
Language incongruence								
Yes	−0.854	(−1.4, −0.29)	−0.86	(−1.42, −0.30)	−0.693	(−1.26, −0.123)	−0.72	(−1.29, −0.14)
No	Ref.	—						
Age			0.003	(−0.001,0.00821)	.0029	(−0.002, 0.007)	0.001 (0.5713)	(−0.004, 0.006)
Gender								
Male			Ref.	—	Ref.	—	Ref.	—
Female			0.120 (0.13)	(−0.28, −0.037)	−0.1207	(−0.28, 0.01)	−0.109 (0.1761)	(−0.267, 0.049)
Race/ethnicity								
White					Ref.	—	Ref.	
Black					0.0381	(−0.17, 0.24)	0.035 (0.736)	(−0.169, 0.239)
Hispanic					−0.035	(−0.67, −0.03)	−0.353	(−0.67, −0.03)
Asian/other					−0.58	(−1.00, −0.15)	−0.576	(−1.00, −0.15)
Heart rate								
Normal							Ref.	Ref.
Abnormal							−0.007	(−0.012, −0.003)

Table 3. Linear Regression Models of the Mean Difference in OST by Language Congruency and Racial/Ethnic Groups[a]

Language incongruence	**White**		**Black**		**Hispanic**		**Asian/Other**	
	β	**95% CI**	**β**	**95% CI**	**β**	**95% CI**	**β**	**95% CI**
Yes	0.104	(−0.77, 0.98)	−0.543	(−2.25, 1.16)	−1.27	(−2.23, −0.306)	−1.94	(−3.36, −0.525)
No	Ref.		Ref.		Ref.		Ref.	

[a] Adjusted for age, gender, race/ethnicity and heart rate. Overall, *p*-value for interaction is <0.05.

The crude relationship between the presence of language incongruence and the total OST can be seen in Model 1 of Table 2. In this model, the presence of a language incongruence was associated with less total OST ($\beta = -0.854$, CI: −1.415, −0.29311, $p < 0.0028$). This suggests that paramedics spent on average 52 seconds less with chest pain patients in which they had language incongruences than they did with chest pain patients in which they did not. After adjusting for age and gender (Model 2), the association remained significant ($\beta = -0.859$, CI: −1.42, −0.298, $p < 0.0027$). Model 3 adjusts for race/ethnicity, which we found to be an independent predictor of OST. Compared to white, non-Hispanics, paramedics spent less total OST with Hispanics ($\beta = -0.3717$, CI: −0.692, −0.051, $p < 0.0228$) and with Asian/Other race/ethnicity members ($\beta = -0.5647$, CI: −0.9947, −0.1347, $p < 0.0101$). The fully adjusted model includes heart rate (Model 4). The effect of language incongruences on the time spent on scene persisted after adjustment for this clinical variable and other demographic measures.

Using the adjusted model, we found that the association between language incongruence and OST varied among racial/ethnic groups (Table 3). Although the *p*-value for the interaction between language incongruence and race/ethnicity was not statistically significant, there appeared to be important differences across racial/ethnic groups. For Hispanic patients in whom a paramedic noted language incongruence, less OST (β = −1.27, CI: −2.227, −0.3058, $p < 0.0098$) was spent compared to when no language incongruence was perceived and among Hispanics. For Asian/Other, on average less OST was spent during language incongruent interactions (β = −1.94, CI: −3.36, −0.525, $p < 0.0073$). In absolute terms, paramedics spent 55 seconds less with Asian/Others when they experienced language incongruences compared to Asian/Others in which language congruency existed (Table 3). Statistically significant differences were not seen among White and Blacks (Table 3). Interaction terms, however, were not significant when included in the fully adjusted model.

5 Discussion

Our findings suggest that language congruency between patient and provider affects the total on-scene time. More specifically, our study suggests that among NJ 911 calls for chest pain, the lack of language congruency between patient and paramedics is associated with less total on-scene time spent by paramedics of EMS units. In the fully adjusted model, the presence of language incongruence predicts significantly less time spent at the scene, independent of the patient's age, gender, race/ethnicity, and heart rate. In addition, each of the covariates examined were significantly associated with time spent on the scene in fully adjusted models. We also found that the association between language incongruence and total OST varied by race/ethnicity, such that the amount of time paramedics spent with patients of Asian origin was the lowest of all groups, followed by Hispanics and Blacks and increased time spent with Whites.

Our study is the first to examine the effect of language congruency on the out-of-hospital management of chest pain. Previous studies have shown that language barriers among patients with chest pain and suspected angina lead to prolonged 911 calls and the receipt of lesser quality care in the ED and hospital (Burt, McGaig, & Valverde, 2006; DuBard, Garrett, & Gizlice, 2006). Contrary to the delays in care that LEP persons and those of disadvantaged racial/ethnic groups experience in the formal medical setting, we found that in the prehospital setting, less time is actually spent with these patient groups when they call 911 for chest pain. To date, only one study has shown EMS runs complicated by language barriers to be of shorter duration than those complicated by other factors such as weather and traffic delays (Timmins, 2002). While we cannot draw definitive conclusions from our findings, we speculate that language incongruences offer less opportunity for conversation at the scene. Perhaps when less able to communicate, paramedics diagnose, treat, and transport the patient with less questioning and explanation. Without linguistic obstacles, paramedics likely receive a fuller description of symptoms and the events that precipitated the 911 calls from the patient or accompanying family members.

Although it is unclear whether the overall clinical outcome of the patients in our study were affected by total OST, we speculate that since cardiovascular care is time-sensitive, arrival at the hospital with minimal delays in the field is advantageous for both the patient and paramedic. Some might argue that less communicative ability could lead to fewer diagnostic and therapeutic interventions in the field. We do not refute that language incongruences may lead to both faster transit times and fewer diagnostic procedures; however, our data did not capture this. Further research is needed to determine if chest pain patients with language incongruences received less interventions than those without language incongruences of similar on-scene times. We do assert that since chest pain care in the field is protocol driven such that when suspected, similar objective steps are performed regardless of ability to fully communicate. Furthermore, patients who arrive at the hospital faster are more likely to receive time-sensitive treatment such as reperfusion therapy and percutaneous intervention (PCI).

Previous studies have shown that language barriers affect the care received by Chinese, Japanese, and Korean speakers in the emergency department and during 911 telecommunications (Ong et al., 2012). Our study population did not have enough Asian patients to power a separate subanalysis for this group only. Given that Asian-language speakers are one of the fastest-growing populations in the United States, it would be important for future studies to examine if Asian ethnicity predicts less on-scene time care (U.S. Census Bureau, 2010).

5.1 Limitations

Our study has several limitations. The lack of language congruency between patients and paramedics represents a small (1.97%) percentage of the study population and is likely due to the select population being examined (i.e., patients calling 911 with chest pain complications). Given the rise of immigrant populations over the last few decades in the state, language incongruences are likely much larger in other medical exchanges such as emergency rooms, medi-clinics, or community centers (Lee et al., 2008). Future studies would benefit from increasing the study period of analysis and/or sample size. A related issue is that we likely did not detect statistically significant differences across race/ethnicity because of sample size limitations. Language congruency, although accepted as a measure of ease in which language and conversation is carried on between individuals, is not as widely used in the literature as language barrier or communication barrier. We acknowledge that there may be misclassification bias with respect to language congruency as the main independent variable. First, it fails to capture the patient's perceptions of the health-care interaction since the paramedic is the one to rate congruency. Second, although more than one paramedic is at the scene it is unclear if the paramedic with the majority of clinical responsibilities is the one who entered data regarding language into the EMR. As with any observational study, causality cannot be attributed despite statistical analyses that showed significant associations. We included four confounders in the final models, but these may be insufficient to tease out additional confounding that may exist by socioeconomic status or the presence of a family member/bystander at the scene who may have assisted with communication. Moreover we failed to control for individuals who may have called 911 before; persons with familiarity of the ALS process may have an easier time with communication. While we selected heart rate as a clinical variable, other more sensitive measures may have strengthened our analysis, such as the number of interventions performed or the use of additional clinical variables. Patients with severe chest pain may be too physiologically sick to communicate and thus language congruency would be a moot point. Paramedics were trained to leave language congruence blank in situations like these (stroke, hearing loss, pain and confusion/obtunded). However, this may not have occurred in all occasions since language incongruence was noted among non-Hispanic Whites and Blacks, who typically are English speaking. This, along with the number of paramedic–patient interactions excluded due to a missing entry for language congruency, may have biased our observed association. Additionally, we did not have data on whether professional telephone interpreters were accessed by paramedics, and how cases were classified in the EMR system (Meischke et al., 2010). However, if these cases were classified as “yes” to language incongruence, then we would have underestimated the observed effect, lending further support to our overall results.

5.2 Strengths

Despite these limitations, our study has several strengths. Our study population is large and includes the largest racial/ethnic groups in New Jersey. The EMS system and its catchment area are diverse in geographic region and serve both PCI and non-PCI hospitals. Unlike other retrospective analyses, our study contains minimal recall bias since all data were entered immediately at the scene of care and stored in an electronic database. Data is standardized and objective since much of it was entered via electronically prompted drop-down menus. This is one of the first studies to quantitatively isolate the prehospital time interval for chest pain management. Previous studies have used interventions and medications (numbers, doses) given at the scene to proxy for quality of care. In the present study, we use cumulative OST since it includes all health-care interactions and best captures our main independent variable, communication, which pervades all interactions and is most relevant to those interested in improving health-care disparities. Further, our regression models adjusted for several confounders, and were able to stratify across key racial and ethnic groups of the state (and nation) to determine if associations differed by race/ethnicity.

6 Conclusion

The findings from this study have both academic and practical applications. Our study sought to elucidate the effect of language congruency between patients and paramedics on the out-of-hospital management of chest pain. We found that in the prehospital setting, language incongruences are associated with less time on the scene independent of the patients' age, gender, race/ethnicity, and heart rate. Our study suggests that paramedics spend less on-scene time with patients who lack language congruency with them, and likely transport them more quickly to the emergency room. Thus, despite being transported to the hospital faster, other research has shown that once in the ED and hospital patients with perceived language barriers as well as those of certain racial/ethnic groups experience delays in care and receive less quality care in the hospital (Mensah, Mokdad, Ford, Greenlund, & Croft, 2005). Although we did not parse out the amount of interventions performed en route to the hospital, it is clear that our study shows significant differences in time at the scene by language congruency. Further research is necessary to elucidate the association between OST and clinical outcome post-ED or hospital discharge. If management of chest pain is optimally handled in the prehospital setting for disadvantaged populations such as those with limited English proficiency, than research and policy efforts should be devoted to decreasing disparities in care in ED and hospital.

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